INFORMATION HANDOUT

For Contract No. 01-378144
At 01-Men-128-Var

Identified by
Project ID 0100000134

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WATER QUALITY

California Regional Water Quality Control Board

AGREEMENTS

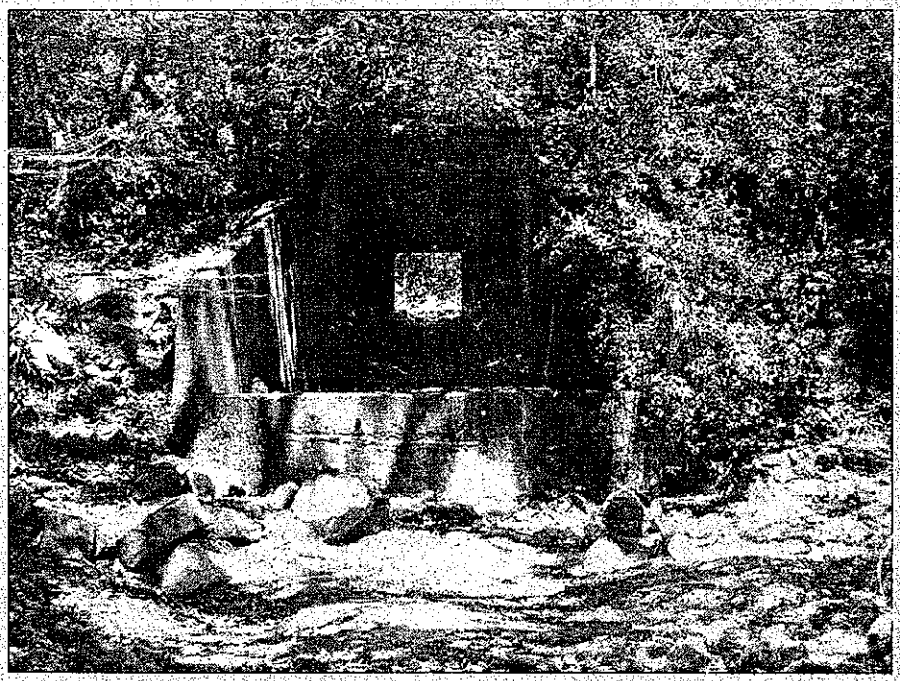
California Department of Fish and Wildlife

Notification No. 1600-2015-0030R1

National Marine Fisheries Services

U.S. Fish and Wildlife Service

Men 128/253 Culvert Rehabilitation Project



Biological Assessment for
National Marine Fisheries Service Consultation

Men 128/253 Culvert Rehabilitation Project
Mendocino County, California
01-Men-128- KP 0.29 to 81.41 (PM 0.18 to 50.59) and
01-Men-253-KP 1.59 to 27.6 (PM 0.99 to 17.15)
EA Number 378100

January 2004

DEPARTMENT OF TRANSPORTATION
UNITED STATES OF AMERICA

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U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration, and
STATE OF CALIFORNIA
Department of Transportation

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1.0 SUMMARY OF FINDINGS, CONCLUSIONS AND DETERMINATIONS

The California Department of Transportation, in conjunction with the Federal Highway Administration, proposes to rehabilitate or replace deteriorated culverts and appurtenant structures at 274 locations on Routes 128 and 253 in Mendocino County. This Biological Assessment has been prepared to address potential effects to federally listed and proposed species under jurisdiction of the National Atmospheric and Oceanic Administration, National Marine Fisheries Service that may occur as a result of this project.

The BA includes an evaluation of all federally listed and proposed anadromous salmonid species known from the region that could occur in the project vicinity and be affected by the project. Based on this evaluation, it was determined that four federally listed species may be affected by the proposed project: California coastal chinook salmon, central California coast coho salmon, central California coast steelhead and northern California steelhead. The BA provides a detailed accounting of the potential project effects on these species and proposed *Avoidance and Minimization Measures*. These measures primarily address work windows, protection of adjacent habitat, and minimizing water quality effects.

The BA concludes that the project *is Not Likely To Adversely Affect* these listed species during repair or replacement of 43 culverts that do not convey streams supporting or potentially supporting one or more of the listed species, and 1 culvert (PM 20.15) that does convey a stream supporting or potentially supporting one or more of the listed species. In addition, the BA concludes that repair, replacement or retrofitting of 5 culverts (PM's 21.8, 27.54, 36.63, 39.88, and 49.66) that convey streams supporting or potentially supporting one or more of the listed species is *Likely To Adversely Affect* one or more of these species. The BA also concludes that the project *is Not Likely To Adversely Modify* designated Critical Habitat and will result in *Minimal Adverse Effects* to Essential Fish Habitat.

2.0 INTRODUCTION

The California Department of Transportation (Caltrans), in conjunction with the Federal Highway Administration, proposes to rehabilitate or replace deteriorated culverts and install standard drainage inlet and outlet structures at 274 locations on Routes 128 and 253 in Mendocino County. Work on these culverts is needed because the 30 to 45-year old pipes are deteriorating (rusty, perforated, bent, separated at the joints, etc.) and have reached the end of their maximum useful life. If the culverts are not replaced, further deterioration will take place under the roadway. The deterioration will eventually lead to the pipes collapsing under the weight of the roadway and the roadway itself will begin to deteriorate, possibly resulting in unsafe conditions and increasing the costs of repair. Substantial environmental damage could also result if the roadway fill and/or road surface materials erode into a stream.

This Biological Assessment (BA) has been prepared to evaluate potential impacts to federally listed anadromous fish species that may be affected by the proposed activity. The BA will be used to facilitate consultation with the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) pursuant to Section 7 of the federal Endangered Species Act (FESA).

2.1 PROJECT OVERVIEW

The proposed work on Route 128 is located between Post Miles 0.18 to 50.59 and involves rehabilitation or replacement at 216 locations. The proposed work on Route 253 includes 58 locations between Post Miles 0.99 and 17.15. Figures 1 and 2 (map pocket) provide location and vicinity maps of the proposed project.

Because the culverts convey water beneath the existing highways, most of the required work will occur close to the roadways and within Caltrans right-of-way. Work may extend away from the road and outside of right-of-way where deemed necessary (depending upon final design determinations). Some drainage work will be done at inlets and outlets, and minor vegetation removal may be performed to improve water flow. Minor grading may also be performed at various locations when deemed necessary to prevent water buildup at inlets and/or outlets.

In order to evaluate baseline resources and potential impacts to those resources, Caltrans established approximate limits of work at each culvert location based on the type of rehabilitation/replacement proposed and general site characteristics. At most sites, work will be confined to an area within 15 meters (50 feet) of either side of the road, and within 15 meters on either side of the culvert, for a maximum total impact area (excluding the road surface) of under 0.08 ha (0.2 acre). At many sites, the impact area will be substantially less than this; however, at some sites, the work area will be larger due to access requirements or other physical constraints.

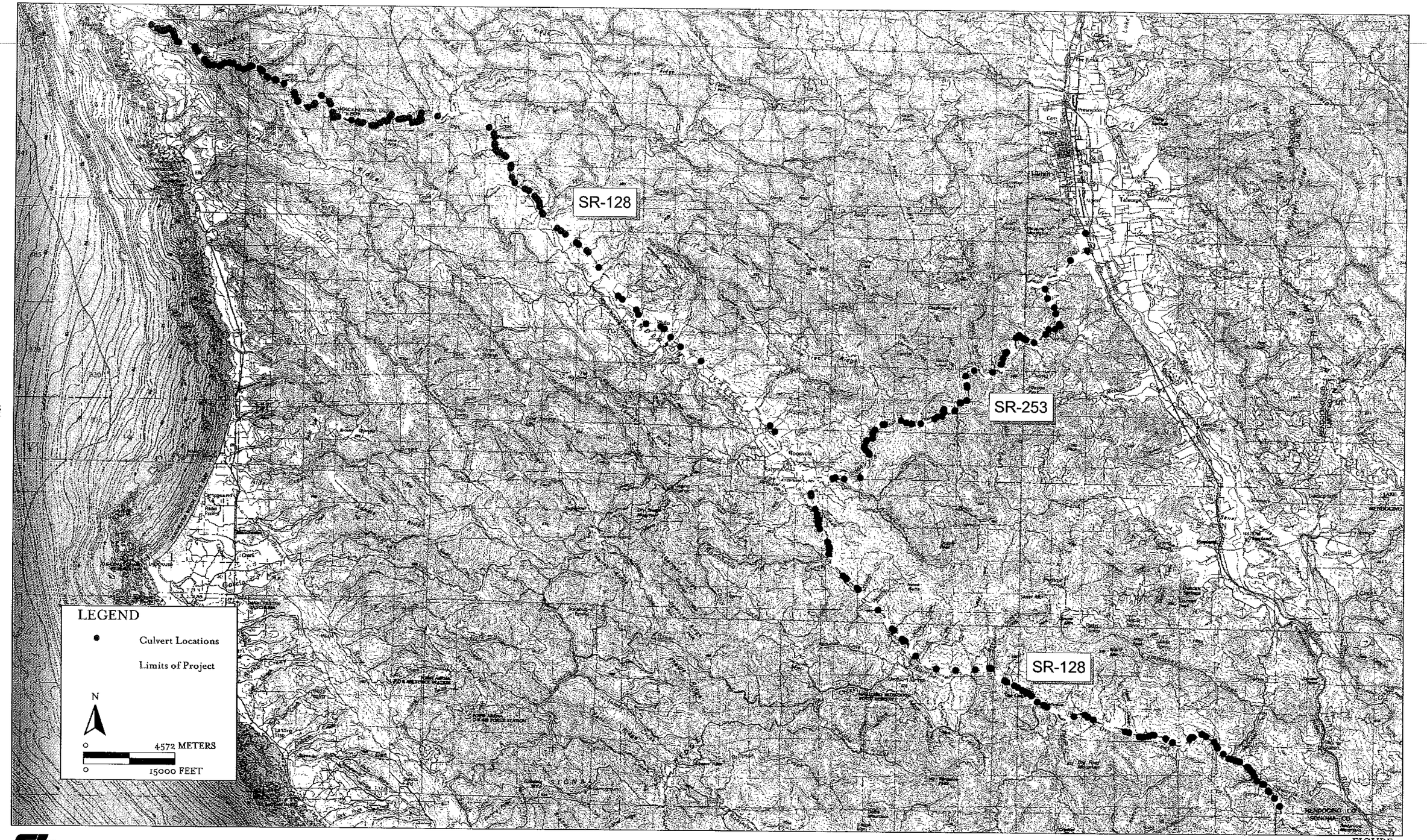

FIGURE 1

Men 128/253 Culvert Rehabilitation Project
01-MEN-128-KP 0.29-81.41 (PM 0.18-50.59)
01-MEN-253-KP 1.59-27.60 (PM 0.99-17.15)
EA 378100
Project Vicinity

SOURCE: BASEMAP - USGS 30X60' SERIES QUADS - UKIAH & POINT ARENA; MAPPING/GIS - LSA ASSOCIATES, INC.

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2.2 DETAILED DESCRIPTION OF PROPOSED WORK

For purposes of evaluating project effects to listed anadromous salmonids, the 274 repair sites were separated into those sites that could potentially affect listed salmonids and those that would not. It was determined that repairs at 49 of the 274 sites could affect listed salmonids. These 49 sites were further separated into those sites that conveyed streams that support or potentially support anadromous salmonids (i.e., a fish passage site), and those that do not (i.e., non-fish passage site). It was determined that only 6 of the 49 sites, all of which occur along SR 128, were fish passage sites.

2.2.1 Non-Fish Passage Sites

To minimize erosion and associated water quality impacts, culvert rehabilitation/replacement will be conducted outside of the rainy season, which generally extends from October through April. If water is present at any of the culvert locations, the contractor will dewater the work area. Although contractors will have discretion in the specific method to be employed (subject to Caltrans approval), dewatering is commonly done by capturing the flow upstream of the culvert and pumping the water into a roadside ditch where it can flow to an adjacent culvert. Other options that may be employed include utilizing an existing, to-be-abandoned culvert, or installing a small diameter pipe in a shallow trench across the roadway. Regardless of the method, any dewatering will be performed in compliance with Caltrans Best Management Practices.

Rubber tire backhoes are the most common equipment employed for this type of work, and movement of the equipment off the shoulder should only be required for deep installations. Rubber tire equipment is preferred in order to avoid unnecessary damage to pavement and the added cost of moving equipment between culvert locations. Crawler mounted excavators may also be used when the depth or reach of excavation is greater than 4.5 m (15 ft).

Standard construction techniques will be employed to rehabilitate the culverts. The most commonly employed technique will be to completely replace the culvert and associated structural elements (headwall and/or endwall). Traffic will be routed to one lane to provide a safe work area on a paved surface. One-half of the culvert will be replaced at a time. The asphalt-concrete road surface will be sawcut, followed by excavation of backfill and removal of the existing culvert. The new culvert segment will be placed at the planned grade and backfilled with native soils or concrete slurry; when slurry backfill is used, earth plugs will be used to contain the slurry within the trench. Traffic will then be switched to the opposite lane and the remaining segment completed. The excavation will normally be paved after the new culvert is in place to allow the restoration of two-way traffic, but multiple replacements may be completed and paved all at once to improve paving efficiency. In this case, protection of the backfill is typically accomplished by placing steel plates over the area until the paving occurs.

Based on typical traffic conditions in the project area, local contractors should be able to install both halves of a 600 mm (2-ft)-diameter culvert, including backfill, in a single, one-day shift. In order to avoid delivery of partial truckloads of AC paving material, contractors will typically pave once per week, usually covering three complete crossings. Depending on the situation, inlet or outlet work may be performed with a different crew at a later date.

At some sites, a new drainage inlet (metal or concrete) will be installed. Inlets will be set into place and either backfilled or grouted after connection with inlet and outlet pipes is complete. Rock slope

protection (RSP) will be necessary at some culvert outlets to stabilize the outlet area and minimize erosion; RSP is currently proposed at about 50 of the 274 locations.

When the depth of the culvert below the road surface is too great for excavation, or the work would result in unacceptable traffic delays, jacking techniques will be utilized. This technique is currently being considered at 4 of the 274 sites. For smaller culverts, a micro-bore is used that has a small cutting head, 600-1,200 mm (2-4 ft) in diameter. The material cut by the micro-bore is typically removed by an auger attached to the cutting head or by a conveyor belt in the new culvert. For larger jobs (greater than 1.8 m/6 ft diameter) low profile tractors are driven into the "tunnel" and the material is "mucked" out. High pressure jacking of the new reinforced concrete culvert pipe is used to keep the end of the new culvert close to the point of excavation. Jacking operations will require a larger work area for access and staging (up to 1,880 sq. meters, about 0.5 acre), and the period of construction may extend over several days.

At some locations, it may be possible to install a new liner within an existing culvert rather than remove the culvert. This approach is typically limited to small diameter pipe (usually 600-900 mm/2 to 3 ft diameter). To accomplish the installation, a high-density plastic or metal liner is pushed into the existing pipe using a jack or hydraulic equipment. The liner is fabricated with holes to allow pumping of grout into the space between the liner and original pipe. Liners are currently proposed at nine locations.

Paving of the invert is proposed at approximately ten locations. Paving prolongs the life of culverts that may be failing on the bottom but are otherwise in good condition. Grout is pumped from a transit mix truck via hose to pave the bottom of culvert. The grout is quick drying and isolated from any streamflow.

At some locations, it may be more efficient, or less impacting, to abandon the existing culvert and install a new culvert at a different location. Large culverts (over 600 mm/2 ft) that are abandoned will be filled with sand and/or grout and plugged. Smaller culverts will be plugged with grout at the inlet only.

In steep terrain, outlet pipes often extend down slopes. Suspension systems are generally used to support the segment of pipe installed on the exposed slope. Due to "reach" constraints (4.5 to 6 m/15 to 20 ft for typical backhoes), a temporary work pad may need to be constructed part way down the slope at some sites to allow equipment to reach the outlet of the culvert. RSP may be required at these locations to minimize erosion.

A disposal agreement is usually prepared when any excess material is generated on a project. Through this agreement, the contractor assumes ownership of and responsibility for disposal of the excess material, with the requirement that Caltrans approve the disposal method and site. It is expected that this material will be hauled to aggregate pits, but occasionally private parties obtain the needed grading permits to allow disposal on private property.

Over the years, erosion gullies have formed at the outlets of many of the culverts. As part of the culvert rehabilitation/replacement project, outlet areas will be stabilized as necessary to minimize future erosion; and erosion gullies will be repaired and/or filled, as necessary.

2.2.2 Fish Passage Sites

The following are general measures that will apply to the 6 fish passage sites along SR 128. The individual descriptions of the work proposed at the fish passage sites follow below. Preliminary design plans and hydraulic calculations for the fish passage sites are contained in Appendix A.

- Instream work and work on the banks of perennial anadromous fish-bearing streams will be conducted between June 15 and October 15.

- Riparian areas outside the designated work areas will be designated as Environmentally Sensitive Areas (ESA's) and clearly indicated as such on project construction plans. Project specifications will include a requirement that ESA's are clearly delineated with brightly colored fencing, rope or equivalent prior to beginning construction.

- Dewatering, if necessary, will consist of using sandbags or equivalent method to construct a temporary cofferdam upstream of the work area at the inlet, and downstream of the work area at the outlet. Following construction of the cofferdams, a gravity siphon hose system will be installed to transport upstream flows through the work area to the channel downstream of the work area. If necessary, a pump will be used to convey flows through the hose.

- Water for dust abatement (if necessary) will be acquired from an off-site source. No drafting will be permitted.

- Measures consistent with the current Caltrans' Construction Site Best Management Practices (BMPs) Manual (including the Storm Water Pollution Prevention Plan [SWPPP] and Water Pollution Control Program [WPCP] Manuals (http://www.dot.ca.gov/hq/construc/Construction_Site_BMPs.pdf]) will be implemented to minimize effects to anadromous fish habitat (e.g., siltation, etc.) during construction.

- Graded or otherwise bare areas resulting from construction activities will be revegetated using native species. At least six months prior to the start of project construction, Caltrans will prepare detailed construction drawings and specifications for implementation of the revegetation effort. The guidelines in Appendix B have been prepared to outline the revegetation strategy to be implemented by Caltrans for temporary impacts to riparian vegetation during construction.

Description of Fish Passage Sites

MEN 128 - PM 20.15 Unnamed Creek. Proposed work at this site is limited to invert paving and minor improvements to the existing concrete apron at the outlet to prevent further erosion of the adjacent banks and channel. A temporary access road will not be necessary.

MEN 128 - PM 21.80 Clow Creek. Proposed work at this site consists of replacing the existing 1.5 m (5 ft) diameter corrugated steel pipe (CSP) with 3.0 m (10 ft) diameter welded steel pipe (WSP). The new pipe will be jacked under SR 128 from the outlet side. The existing culvert will be removed once the new culvert is installed. Three inch minus cobble will be imported to place in the culvert bottom. A 20 m (65 ft) square area will be required to stage equipment in the outlet channel, and a temporary access road will be constructed down the road embankment west of the existing culvert.

MEN 128 - PM 27.54 Graveyard Creek. Proposed work at this site consists of retrofitting the existing 2.1 m (6.5 ft) diameter CSP. Retrofits will consist of removal of 9.5 m (31.1 ft) of the culvert at the inlet and construction of a new concrete headwall. The section of the channel where the culvert is removed will be regraded to natural contours. Two concrete fish weirs will be constructed in the outlet channel and a new concrete headwall will be constructed. In addition, a roughened channel bottom will be installed in the existing CSP. Temporary access roads will be required at both the inlet and outlet. At the inlet, an access road will be constructed down the road embankment east of the existing culvert. At the outlet, an access road will be constructed down the road embankment west of the existing culvert.

MEN 128 - PM 36.63 Lost Creek. Proposed work at this site consists of retrofitting the existing 2.4 m (7.9 ft) square reinforced concrete box (RCB). Retrofits will include invert paving and installation of five concrete weirs on the bottom of the RCB. In addition, a concrete fishway consisting of six weirs will be constructed in the outlet channel starting at the edge of the existing concrete apron. A temporary access road will be required at the outlet to construct the fishway. The access road will be constructed on the west side of the channel from an existing gravel road that connects to SR 128.

MEN 128 - PM 39.88 John Hiatt Creek. Proposed work at this site consists of retrofitting the existing 2.1 m (6.5 ft) diameter CSP. Retrofits will include installation of a roughened channel bottom in the existing CSP and construction of three concrete weirs in the outlet channel. Approximately 32 m^2 (345 ft^2) of quarter ton RSP and light RSP will be placed on the banks at the outlet. A temporary access road will be required at the outlet to construct the weirs. The access road will be constructed on the SR 128 embankment west of the existing culvert.

MEN 128 - PM 49.66 Edwards Creek. Proposed work at this site consists of replacing the existing 1.2 m (4 ft) and 1.5 m (5 ft) diameter CSP's with a 4.3 m (14 ft) by 2 m (6.5 ft) double RCB. Three inch minus cobble will be imported to place in the culvert bottom. New concrete headwall and endwalls will be constructed and approximately 24 m^2 (260 ft^2) of light RSP will be placed on the banks at the inlet. A temporary access road is will not be required as the site is accessible from the highway.

3.0 ENVIRONMENTAL SETTING

This section provides an overview of the physical and biological setting of the project and serves as a baseline for determining potential sensitive species occurrence in the project area.

3.1 GEOGRAPHIC AREA

The project area is located in southwestern Mendocino County. SR 128 begins at SR 1, at the mouth of the Navarro River south of Albion. The highway extends in a southeasterly direction, paralleling the Navarro River and North Fork Navarro River for the first 13 km (8 miles). At the community of Navarro (KP 23.16/PM 14.39), the highway turns toward the south and follows a south-southeasterly route through the Anderson Valley and the towns of Philo and Boonville. Past Boonville (approx. KP 47/ PM 29), the highway climbs out of the Anderson Valley, passes through the community of Yorkville, and crosses the Sonoma County line just north of Cloverdale. The total length of SR 128 within Mendocino County is 81.4 km (50.9 miles).

SR 253 begins at SR 128 in the Anderson Valley, just south of Boonville. The highway extends in a northeasterly direction, climbing over Pine Ridge, which separates the Anderson and Russian River Valleys, and terminates at US 101 on the south end of Ukiah. The total length of SR 253 is about 28 km (17.5 miles).

3.2 TOPOGRAPHY

The general topography in the project vicinity is characterized by steep and very steep northwest-trending ridges dissected by perennial streams and rivers. The topography within the project limits, along SR 128 and SR 253, is characterized by gently sloping, low elevation river valleys with moderately steep intervening ridges. Elevations range from less than 15 m (50 feet) MSL at the west end of SR 128 to over 600 m (1,980 feet) MSL where SR 253 crosses Pine Ridge between the Anderson and Russian River Valleys. The majority of the project area is below 150 M (500 feet) in elevation.

3.3 SOILS

Numerous soil types are represented along the 109 km (67 mi) of the project. The predominant soil types mapped by the Soil Conservation Service (USDA, Soil Conservation Service, 1991; 2003 http://www.ca.nrcs.usda.gov/mlra02/wmendo.html) are described in Table A below, where they are generally presented in order of geographic distribution from west to east (coastal to interior).

Table A: Predominant Soil Types in the Project Area

Map Unit	Texture	Soil Depth	Drainage Class/ Permeability	Dominant Vegetation	Location in Project Area
Dystrocepts	Loam	Shallow to moderately deep	Well drained/ Extremely variable	Brush and grass, Douglas fir, redwood	Along SR 128 from western end of the project area east to about PM 2
Bigriver loamy sand	Loamy sand	Very deep	Well drained/ Moderately rapid	Redwood forest	Along SR 128 and the Navarro River to about PM 13, west of Navarro
Ornbaun-Zeni Complex	Loam and gravelly loam	Moderately deep to deep	Well drained/ Moderate	Mixed broadleaf / coniferous forest including redwood, Douglas fir, tanoak, and madrone	Steeply sloping area along SR 128 to about PM 17
Bearwallow-Wolfey Complex	Loam and sandy loam	Shallow to moderately deep	Well drained/ Moderate to moderately slow	Primarily annual grasses and forbs	Along SR 128 from around PM 17 to PM 18.5; scattered locations along west end of SR 253
Pinole- Boontling	Loam	Very deep	Somewhat poorly to well drained/ Moderately slow	Mostly in grape and orchard production	Along SR 128 through Anderson Valley, from about PM 18.5 to PM 30
Hopland, Hopland-Squawrock, Hopland-Witherell-Squawrock, Hopland-Wohly	Loam, gravelly loam	Shallow to moderately deep	Well drained to excessively drained/ Moderately slow to moderate	Mixed broadleaf including black oak, madrone, live oak, with some Douglas fir, and annual grassland	Along most of western end SR 253 in short segments from about PM 2 to PM 8.5
Yorktree-Hopland-Woodlin	Loam to gravelly, sandy loam	Moderately deep to deep	Well drained/ Moderate to slow	Oaks and grassland	Eastern portion of SR 253 from about PM 11 to PM 14
Yorkeville-Squawrock-Witherell	Loam , clay loam, gravelly loam	Shallow to very deep	Moderately well to somewhat excessive drained/ very slow to moderate	Primarily annual grasses and forbs	Along SR 128 south of Anderson Valley to about PM 39; along west end of SR 253 to about PM 2 and other short segments
Feliz Loam-Feliz Clay Loam	Loam and clay loam	Very deep	Well drained/ Moderate	Grasses with scattered oaks and cottonwoods	Along SR 128 in Dry Creek area, east of Yorkville to about PM 46; along east end of 253 from about PM 15 to PM 17
Yorkville-Yorktree-Squawrock	Loam and cobbly loam	Moderately deep to very deep	Well drained and moderately drained	Oaks and grassland	Southern end of SR 128, southeast of Yorkville to about PM 48 and small portions of SR 253
Bearwallow-Hellman-Witherell	Loam to sandy loam	Shallow to very deep	Well to somewhat excessively drained/ moderate to slow	Grassland with scattered oaks	Along southernmost end of SR 128 to about PM 51

3.4 CLIMATE AND HYDROLOGY

Climate in the project area is mild with cool rainy winters and warm dry summers. Inland areas are significantly warmer during summer than coastal areas. Average annual minimum and maximum temperatures in Pt. Arena on the coast range from 44.9 to 61.8 F, while average annual minimum and maximum temperatures in Ukiah range from 43.6 to 73.9 F. The average annual July maximum temperatures for these same locations are 65.5 F and 93.1 F, respectively. Average annual precipitation ranges from 37.09 inches at Ukiah to 40.88 inches at Pt. Arena. Although the "rainy season" is generally October through May, most of the rainfall occurs between the beginning of November and end of March.

The majority of the project area falls within the Navarro River watershed. The watershed begins southwest of the community of Yorkville, at the southern end of Mendocino County, and generally follows SR 128 northwest through Anderson Valley. Rancheria Creek is the primary tributary in the southern portion of the watershed. Rancheria Creek meanders toward the north, joining with Anderson Creek near Philo to form the Navarro River. The main stem of the Navarro River continues northward, joining the North Fork Navarro River about nine river miles inland from the coast. The North Fork Navarro River, which is divided into north and south branches, drains the area to the east of the community of Navarro. Other main tributaries in the watershed include Mill Creek and Indian Creek. The Navarro River continues northward, emptying into the Pacific Ocean just south of the community of Albion.

A sand sill forms at the mouth of the Navarro River during mid summer (August) in most years, diminishing tidal exchange until the mouth closes off completely, typically in September (Steve Cannata, CDFG, pers. comm.) This results in the formation of a brackish lagoon that extends upstream for several miles. The breaching of the lagoon mouth occurs after the first or second significant rainfall, usually in November (Steve Cannata, CDFG, pers. comm).

The southernmost and easternmost portions of the project area fall within the Russian River watershed. Robinson Creek, which is crossed by SR 253 just southwest of Ukiah, Dry Creek, which parallels SR 128 south of Yorkville, and Edwards Creek, which flows under SR 128 just north of Cloverdale, are the primary Russian River tributaries within the project area. The Russian River flows south past Healdsburg, then turns west, and empties into the ocean at Jenner.

3.5 BASIC PLANT COMMUNITIES

A number of plant communities characterize the project area. The primary community types are described below and are generally presented in order of geographic distribution from west to east (coastal to interior). Community descriptions are generally according to Holland (1986).

Because the project area includes road shoulders and other disturbed area along highways, much of the understory is dominated by nonnative (primarily), ruderal species. The composition of this weedy understory is generally consistent throughout the project area, regardless of the overstory community type. These ruderal species are often the dominant plants in the vicinity of culvert inlets and outlets. Common elements of this weedy understory include, horsetail (*Equisetum* sp.), rattlesnake grass (*Briza* sp.), velvet grass (*Holcus lanatus*), wild oat (*Avena* sp.), brome grasses (*Bromus* sp.), annual fescue (*Vulpia myuros*), star thistle (*Centaurea solstitialis*), hedgehog dogtail (*Cynosaurus echinatus*), bur chervil (*Anthriscus caucalis*), plantain (*Plantago* sp.), sweet pea (*Lathrus latifolius*), clover (*Trifolium* spp.), vetch (*Vicia* sp.), Queen Anne's lace (*Daucus carota*), and others.

In wetter areas, Himalaya blackberry (*Rubus discolor*), reed canary grass (*Phalaris arundinaceae*), annual rabbitsfoot grass (*Polypogon monspeliensis*), nutsedge (*Cyperus* sp.), pennyroyal (*Mentha pulegium*), birdsfoot trefoil (*Lotus coriniculatus*), dallis grass (*Paspalum dilatatum*), sweetclover (*Melilotus* sp.), and bull thistle (*Cirsium vulgare*, dock (*Rumex* sp.) are common.

3.5.1 Northern Coastal Scrub

This low, shrubby community occurs on windy, exposed sites with shallow soils in the westernmost portion of the project area. Coyote brush (*Baccharis pilularis*) is the dominant species. Other common species found in this community type include California blackberry (*Rubus ursinus*), poison oak (*Toxicodendron diversiloba*), wild cucumber (*Marah macrocarpus*), California figwort (*Scrophularia californica*), honeysuckle (*Lonicera* sp.), and horsetail.

3.5.2 California Bay Forest

California bay forest occurs near the coast on exposed slopes and is dominated by shrubby, wind-pruned California bay (*Umbellularia californica*). In the project area, this community occurs along SR 128, interspersed with bluff scrub, inland to about PM 2. Other species include red elderberry (*Sambucus racemosa*), red alder (*Alnus rubra*), Douglas fir (*Pseudotsuga menziesii*), willow (*Salix* spp.), coyote brush, poison oak, and various species of *Rubus*.

3.5.3 Alluvial Redwood Forest/Upland Redwood Forest

These redwood-dominated forest types occur on deep, well drained soils of canyon bottoms and on shallower soils of steep slopes. In the project area, alluvial redwood forest occurs along SR 128 and the Navarro River, with upland redwood forest on the adjacent slopes. Both forest types are interspersed with mixed evergreen forest. The redwood-dominated forests occur from about PM 2 inland to about PM 13, near the community of Navarro. Common species in addition to coast redwood (*Sequoia sempervirens*) include Douglas fir and California bay, with occasional Sitka spruce (*Picea sitchensis*), tanoak (*Lithocarpus densiflorus*), red alder California huckleberry (*Vaccinium ovatum*), California nutmeg (*Torreya californica*), salal (*Gaultheria shallon*), various *Rubus* species, redwood sorrel (*Oxalis oregana*), sedges (*Carex* spp.), and western sword fern (*Polystichum munitum*).

3.5.4 Mixed Evergreen Forest

Mixed evergreen forest occurs on moist, well-drained soils, typically on slopes. In the project area, mixed evergreen forest is interspersed with redwood forest along the Navarro River, becoming more predominant at the inland limit of the forest, and extending throughout the project area on more mesic sites. In the western end of the Anderson Valley, this community type is interspersed with vineyards. Dominant species in the project area include California bay, big-leaf maple (*Acer macrophyllum*), madrone (*Arbutus menziesii*), tanoak, elderberry, chinquapin (*Chrysolepis* spp.), Douglas fir, redwood, Oregon oak (*Quercus garryana*), canyon live oak (*Q. chrysolepis*), and black oak (*Q. kelloggii*).

3.5.5 Mixed North Slope Cismontane Woodland

This broadleaf-dominated woodland, which occurs on somewhat drier, inland sites than mixed evergreen forest, is the most abundant plant community in the project area. Mixed woodland ranges from dense woodland to open savanna, with an understory primarily consisting of nonnative grassland. Common species include interior live oak, Oregon oak, valley oak (*Quercus lobata*), black oak, California bay, buckeye, toyon (*Heteromeles arbutifolia*), scotch broom (*Cytisus scoparius*), coyote brush, and poison oak.

3.5.6 Upland Douglas Fir Forest

This coniferous forest is strongly dominated by Douglas fir. Distribution in the project area is limited to the eastern portion of the SR 128 corridor, primarily on north-facing slopes above Rancheria Creek.

3.5.7 Red Alder Riparian Forest

Red alder riparian forest occurs along streams and at seeps on hillsides near the coast. The dominant species is red alder, generally mixed with willow, and with an understory including various *Rubus* species, elk clover (*Aralia californica*), stinging nettle (*Urtica dioica*), and others.

3.5.8 North Coast Riparian Scrub

This riparian community occurs along perennial and intermittent streams. Willow species typically dominate with red alder, big-leaf maple, California bay, Oregon ash (*Fraxinus latifolia*), and other trees, and with an understory typically including Himalaya blackberry and other nonnative species, as described above.

3.5.9 Vernal Marsh

Permanent freshwater marsh is uncommon in the project area, but seasonal marsh does occur along some streams, roadside ditches and at seeps. Common species include rushes (*Juncus* spp.) monkey flower (*Mimulus guttatus*), and many of the nonnative mesic species described above.

3.5.10 Pasture/Nonnative Grassland

This herbaceous community is common and widespread in the project area, especially in Anderson Valley and along SR 253, and is commonly interspersed with mixed woodland. Dominant species include wild oats, brome grasses, fescue, storksbill (*Erodium* spp.), ryegrass (*Lolium multiflorum*), California poppy (*Eschscholzia californica*), goldfields (*Lasthenia* spp.), lupine (*Lupinus* spp.), tarweed (*Hemizonia* spp.), and others.

3.5.11 Vineyard/Orchard

Natural communities have been converted to vineyards and orchards within Anderson valley and other portions of the project area. These areas are generally interspersed with mixed woodland and nonnative grassland. Except for weedy species, vineyards and orchards generally lack any native vegetation.

4.0 SPECIES CONSIDERED IN THIS DOCUMENT

The species addressed in this BA are limited to those federally listed fish or wildlife species under the jurisdiction of NMFS pursuant to their authority under FESA of 1973, as amended. Federally listed fish or wildlife species under the jurisdiction of the U.S. Fish and Wildlife Service are addressed in a separate document. The majority of taxa under NMFS's jurisdiction consist of marine and pelagic fish and wildlife species such as tuna, sea turtles, marine mammals, etc., but NMFS also has jurisdiction over anadromous salmonid species. This document also addresses potential effects to Critical Habitat as designated pursuant to Section 4 of the FESA, and Essential Fish Habitat (EFH), as defined under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA).

The proposed project is located completely within the inland area of Mendocino County (i.e., will not affect coastal waters). Consequently, the species considered in this BA include only anadromous salmonids (i.e., salmon and steelhead); federally listed marine and pelagic species potentially occurring in the coastal waters are not addressed. NMFS identifies Pacific anadromous salmonids as separate populations, or Evolutionarily Significant Units (ESU), of the species as a whole. In order to be considered an ESU, a population (or group of populations) must be substantially reproductively isolated from other populations, and contribute substantially to the ecological or genetic diversity of the species (Myers, et al, 1998).

Based on review of pertinent literature, coordination with NMFS and California Department of Fish and Game (CDFG) personnel, and past experience in the region, it has been determined that one ESU of chinook salmon, one ESU of coho salmon, and two ESU's of steelhead could potentially occur in the project area. Table B, below, lists these four ESU's, the general boundaries of each ESU, and the listing status for each ESU under the FESA.

In addition, a population of coho salmon designated by CDFG as a Candidate Recover Species also occurs in the project area. This population, termed northern California coho salmon, includes the northern portion of the Central California coast coho salmon ESU (from San Francisco Bay to Punta Gorda), and the southern (California) portion of the southern Oregon/northern California ESU (Punta Gorda, California to Cape Blaco, OR). Northern California coho salmon have been proposed for *Endangered* status in the southern portion of their range (where they overlap with the Central California coast ESU), and proposed for *Threatened* status in the northern portion (where they overlap with the southern Oregon/northern California ESU). Official listing pursuant to the California Endangered Species Act is currently deferred.

Since this BA is a federal document and northern California coho salmon have no federal status, they are not included in Table B. However, due to the overlapping ranges between northern California coho salmon and the central California coast ESU, project effects to these populations will be identical. Therefore, for the purpose of this document, the evaluation of project effects to northern California coho salmon will be covered under the evaluation of project effects to the central California coast coho salmon ESU, and it is hereby noted that these effects are assumed to be

identical. This approach is appropriate due to the overlap in range of these two populations and the location of the project in the overlapping area.

Table B: Salmon and Steelhead ESU's Occurring in the Project Area

Common Name ***Latin Name***	**ESU Boundaries**	**Listing Status**
California coastal chinook salmon *Oncorhynchus tshawytscha*	Redwood Ck., Humboldt Co. to Russion R., Sonoma Co.	*Threatened*
Central California coast coho salmon *Oncorhynchus kisutch*	Punta Gorda, Humboldt Co. to San Lorenzo R., Santa Cruz Co.	*Threatened*
Central California Coast steelhead *Oncorhynchus mykiss*	Russian R., Sonoma Co. to Soquel Ck., Santa Cruz Co. (ex. San Francisco and San Pablo Bays)	*Threatened*
Northern California steelhead *Oncorhynchus mykiss*	Redwood Ck., Humboldt Co. to Gualala R., Mendocino Co.	*Threatened*

5.0 STUDY METHODS

Due to the large number of sites included in the proposed project, a two-step approach was used to evaluate impacts of the proposed project to listed salmonids.

The initial step in the process was to conduct a cursory field investigation of the entire project area, during which each site was briefly evaluated for presence of suitable habitat and potential effects to salmonids. The goal of the first visit was to identify all sites where the proposed work could potentially affect listed salmonids or their habitat; it was also determined if a given culvert conveyed a fish-bearing stream and if the proposed work at the culvert could potentially affect fish passage. During this initial field work, very little was known about the actual work required for each site, and only minimal background review of the potential species affected was conducted prior to this first visit. As a result, during this first pass, a very liberal approach was taken in determining whether listed salmonids could be affected by the proposed work for a given site (i.e., a site was included if there was any chance at all that the proposed work could effect salmonids or their habitat). Initial site investigations resulted in a list of 87 sites that included work that could potentially affect listed salmonids or their habitat. Of those 87 sites, 29 were identified as having potential fish passage issues.

The second step of the process included focussed literature review and agency coordination, including early coordination and field meetings with CDFG and NMFS (see Table C for a summary of meetings). The preliminary list of potential "fish passage" sites was also forwarded to local CDFG fisheries biologist Scott Harris for review and comment. Mr. Harris conducted a preliminary inspection at each site and provided comment on whether a given stream was fish-bearing. Mr. Harris determined that of the 29 sites in the preliminary list, 16 conveyed fish-bearing streams and one site required a survey to determine its fish bearing status.

Table C: Summary of Agency Coordination Meetings

Meeting Date	Attendees	Purpose
December 12, 2002	Peter Lewendal, Caltrans Jeff Bray, LSA Fred Botti, CDFG	Early Coordination
January 7, 2003	Peter Lewendal, Caltrans Jeff Bray, LSA Jeff Jahn, NMFS Jon Mann, NMFS Dick Butler, NMFS	Early Coordination
April 15, 2003	Peter Lewendal, Caltrans Jeff Bray, LSA Jeff Jahn, NMFS Jon Mann, NMFS Dick Butler, NMFS Fred Botti, CDFG	Progress, Early Coordination

May 12, 2003	Peter Lewendal, Caltrans Sebastian Cohen, Caltrans Jeff Jahn, NMFS Jon Mann, NMFS Fred Botti, CDFG Doug Albin, CDFG	Field Visit Review to Fish Passage Sites

Literature review focussed on determining which, if any, species occurred in a given waterbody that could be affected by the work proposed at one or more sites. Because of the linear nature of the project, it was important to locate any migration barriers and/or determine the upstream extent of anadromy for a given waterbody in order to determine whether listed salmonids even occurred at a given site.

Following agency coordination and literature review, follow-up field investigations were conducted to 1) make an accurate assessment of the potential effects to listed salmonids/habitat from the proposed work at each site, 2) assess potential effects to listed salmonids/habitat on a site-by-site basis, and 3) field-check locations of migration barriers and/or other features documented in the literature that could affect the analysis. The follow-up investigation resulted in the list of "fish sites" being reduced to 49, and the "fish passage" sites being reduced to 6. Table D provides a complete list of the sites, including the postmile and kilometer post, existing conditions, and proposed repair. As shown in the Table D, all 6 fish passage sites are located on SR 128.

Habitat evaluation for the fish passage sites was completed by conducting field surveys within the stream corridors to the limit of legal access (91.5 m/300 ft). Additionally, reaches of the stream beyond the legal access limit were reviewed using black and white digital orthorectified aerial photographs and USGS 7.5' topographic quadrangles, at scales of 1:12,000 and 1:24,000 respectively.

The potential for effects to Critical Habitat for central California coast (CCC) coho salmon and EFH for both CCC coho salmon and California coastal (CC) chinook was also evaluated during the follow-up investigations. Potential effects to Critical Habitat and EFH were evaluated at all sites within current ESU boundaries, regardless if the subject species was known to occur at a given site. For example, sites within the ESU boundaries for CCC coho salmon, but above the current range for this species, were evaluated for potential effects to Critical Habitat. The exception was those sites along waterways above impassable migration barriers (e.g., Warm Springs Dam) which, by definition, represent the upstream extent of Critical Habitat. In addition, although Critical Habitat has been vacated for both steelhead ESU's and CC chinook, an evaluation of Critical Habitat for these ESU's was made in anticipation of future reinstatement of Critical Habitat.

The proposed work at a given site was determined to potentially affect Critical Habitat and/or EFH if it 1) will result in direct effects to the live stream or banks, 2) will result in removal of riparian vegetation and/or removal of non-riparian shade habitat, or 3) will result in direct effects to the active floodplain or remove associated riparian vegetation.

Prior to these investigations, Caltrans engineering and environmental staff generated typical repair concepts and established work limits for each site, taking into consideration existing resources, staging areas, etc. These limits of work were used to determine the effects for each site.

Table D: Summary of Fish Sites

Location							
Route	PM	KP	Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Fish Passage Site
128	0.18	0.29	600	600	CMP	Replace culvert and install H W	
128	0.40	0.64	300	600	CMP	Replace culvert and install H W	
128	0.43	0.69	300	600	CMP	Replace culvert and install H W	
128	0.50	0.80	300	600	CMP	Replace culvert and install H W	
128	0.59	0.95	300	600	CMP	Replace culvert and install H W	
128	0.66	1.06	600	600	CMP	Replace culvert and install H W, w / RSP	
128	0.71	1.14	300	600	CMP	Replace culvert and install DI and protection wall	
128	0.73	1.17	300	600	CMP	Replace culvert and install DI and protection wall	
128	0.79	1.27	300	600	CMP	Replace culvert and install OMP DI with two windows	
128	0.82	1.32	300	600	CMP	Replace culvert and install HW	
128	0.96	1.54	300	600	CMP	Replace culvert and install HW	
128	1.02	1.64	300	600	CMP	Replace culvert and install HW	
128	1.10	1.77	450	600	CMP	Replace culvert and install HW	
128	1.15	1.85	750	600	CMP	Replace culvert and install HW	
128	1.29	2.08	300	750	ACP	Replace culvert and install HW	
128	1.34	2.16	300	750	CMP	Replace culvert and install HW	
128	1.38	2.22	300	750	CMP	Replace culvert and install HW	
128	3.08	4.96	300	750	CMP	Replace culvert and install OMP DI Short the Outlet 2 m w/RSP	
128	3.20	5.15	300	750	CMP	Replace culvert and install HW	
128	3.46	5.57	600	900	CMP	Replace culvert and install HW, move HW 1.5 m closer to the road & 50 m^3	
128	4.02	6.47	450	600	CMP	Replace culvert and install HW & EW	
128	4.05	6.52	300	600	CMP	Replace culvert and install OMP DI , extend pipe at Outlet 1.5 m	

Location							
Route	PM	KP	Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Fish Passage Site
128	4.08	6.57	300	600	CMP	Replace culvert and install HW & EW	
128	4.17	6.71	300	600	CMP	Replacement with a 600mm high density polyethylene (HDPE) plastic pipe. The HDPE should be smooth interior wall type. The Outlet should have Rock Energy Dissipater (RED). A new modified Inlet that duplicates the bank stabilization effects of the existing DI should be placed.	
128	4.83	7.77	300	600	CMP	Replace culvert and install DI & EW, extend pipe at outlet 2 m	
128	5.36	8.63	450	1000	CMP	Replace culvert and install DI	
128	6.08	9.78	300	750	CMP	Replace culvert and install DI, extend pipe1.0 m Inlet& 1.5 m outlet.	
128	6.11	9.83	300	600	CMP	Replace culvert and install DI & EW, extend pipe at outlet 1 m	
128	7.40	11.9	300	600	CMP	Replace culvert and install OMP DI	
128	7.51	12.09	600	750	CMP	Replace culvert and install HW & EW, extend pipe at outlet 2 m	
128	9.99	16.08	450	600	CMP	Replace culvert and install HW & EW, extend pipe 1 m at inlet & 2 m at outlet	
128	10.08	16.22	600	600	CMP	Replace culvert and install HW	
128	10.43	16.79	300	600	CMP	Replace culvert and install HW, extend pipe 1 m at inlet	
128	10.47	16.85	300	600	CMP	Replace culvert and install HW & EW	
128	10.73	17.27	450	600	CMP	Replace culvert and install HW & EW, extend pipe 1 m at inlet	
128	11.33	18.23		600		Replace culvert and install HW, raise culvert w / DD	
128	11.40	18.34	450	600	CMP	Replace culvert and install DI & EW	
128	11.54	18.57	450	1100	CMP	Replace culvert and install HW	
128	20.15	32.43	1.2 x 1.5	2130	RCB	Pave invert and repair concrete apron.	X
128	21.80	35.08	900	3000	WSP	Jack new oversized culvert in same location as existing. New culvert will be embedded 40 to 50 percent of diameter.	X
128	27.54	44.32	1800	1800	WSP	Remove 9.5 m of culvert at the inlet side and replace headwall. Construct roughened channel within culvert with embedded rock. Construct new headwall at outlet and concrete fish weir in outlet channel.	X

Location							
Route	PM	KP	Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Fish Passage Site
128	27.78	44.71	1800	1800	CMP	Place a new headwall and pave invert.	
128	36.63	58.95	2600 x 2500	2600x 2500	RCB	Install concrete weirs within the existing culvert and construct concrete fishway at outlet.	X
128	39.88	64.18	2250	2250	CMP	Install concrete weirs within the existing culvert and construct concrete wier at outlet. Install RSP bank protection at outlet.	X
128	49.66	79.92	2x 1200	4300x 2000	RCB	Install new 4.3 m by 2 m double box culvert, embedded approx. 50 percent. Construct new headwalls at inlet and outlet. RSP at outlet.	X
128	49.72	80.01	300	1000	CMP	Replace culvert and install HW	
123	13.73	22.10	450	750	CMP	Replace culvert and install OMP DI with one side window and DD 20-25 m w / 200 m3 RSP	
253	13.96	22.47	450	600	CMP	Replace culvert and install DI, w / DD and RSP	
253	14.31	23.03	600	750	CMP	Replace culvert extend pipe 3 m, w / RSP	
Count		49					6

6.0 SPECIES ACCOUNTS

6.1 CALIFORNIA COASTAL CHINOOK SALMON

The CC chinook salmon was listed as a federally *Threatened* species by NMFS on September 16, 1999. The CC chinook ESU includes all naturally spawned populations from rivers and streams south of the Klamath River to the Russian River.

CC chinook salmon generally spend two to four years in saltwater before returning to spawn (Myers et al, 1998). This ESU consists of both fall-run and spring-run salmon; little data is available on run timing. Chinook salmon, and salmonids in general, require clean, cold, well-oxygenated streams for spawning. Spawning streams must have a substrate of gravel or small cobble to provide safe incubation sites for the eggs.

6.1.1 Critical Habitat/EFH

Critical Habitat for this ESU was initially designated in February 2000 (Federal Register 2000), but was subsequently vacated pursuant to a April 30, 2002, court order by the U.S. District Court for the District of Columbia. A revised Critical Habitat designation is currently under development.

EFH includes waters (e.g., wetlands, estuarine, and riverine habitats) and substrate (including associated biological communities) necessary to fish for spawning, breeding, feeding, or growth to maturity.

6.2 CENTRAL CALIFORNIA COAST COHO SALMON

The CCC coho salmon was listed as a federally *Threatened* species by NMFS on October 31, 1996. The CCC coho ESU includes all naturally spawned populations from Punta Gorda in northern California to the San Lorenzo River in central California, including tributaries to San Francisco Bay (excluding the Sacramento-San Joaquin River Basin).

CCC coho salmon generally spend approximately 18 months in freshwater and 18 months in saltwater before returning to spawn (Meyers et al 1998). Migration generally occurs in December and January, with spawning beginning soon after migration. Coho salmon, and salmonids in general, require clean, cold, well-oxygenated streams for spawning. Spawning streams must have a substrate of gravel or small cobble to provide safe incubation sites for the eggs.

6.2.1 Critical Habitat/EFH

Critical Habitat for this ESU, as designated by NMFS on May 5, 1999, (Federal Register 1999), includes all reaches and estuarine areas accessible to steelhead within the range of the ESU (as described above). Also included in Critical Habitat are adjacent riparian zones. Generally, existing dams or longstanding natural migration barriers (e.g., impassable waterfalls) define the upstream limit of Critical Habitat.

EFH includes waters (e.g., wetlands, estuarine and riverine habitats) and substrate (including associated biological communities) necessary to fish for spawning, breeding, feeding, or growth to maturity.

6.3 CENTRAL CALIFORNIA COAST STEELHEAD

The Central California Coast (CCC) steelhead was listed as a federally *Threatened* species by NMFS on August 18, 1997. The CCC steelhead ESU includes all naturally spawned populations from the Russian River to Aptos Creek, including drainages of the San Francisco and San Pablo Bays eastward to the Napa River (excluding the Sacramento-San Joaquin River Basin).

CCC steelhead generally spend two years in freshwater and one to two years in saltwater before returning to spawn (Busby et al 1996). Migration generally occurs from July through May, with peaks in September and February. Spawning begins in late December and can extend into April. Steelhead, and salmonids in general, require clean, cold, well-oxygenated streams for spawning. Spawning streams must have a substrate of gravel or small cobble to provide safe incubation sites for the eggs.

6.3.1 Critical Habitat

Critical Habitat for this ESU was initially designated in February 2000 (Federal Register 2000), but was subsequently vacated pursuant to a April 30, 2002, court order by the U.S. District Court for the District of Columbia. A revised Critical Habitat designation is currently under development

6.4 NORTHERN CALIFORNIA STEELHEAD

Northern California (NC) steelhead was listed as a federally *Threatened* species by NMFS on June 7, 2000. The NC steelhead ESU includes all naturally spawned populations from Redwood Creek south to the Gualala River, inclusive.

NC steelhead generally spend two years in freshwater and one to two years in saltwater before returning to spawn (Busby et al 1996). Migration generally occurs from July through May, with peaks in September and February. Spawning begins in late December and can extend into April. Steelhead, and salmonids in general, require clean, cold, well-oxygenated streams for spawning. Spawning streams must have a substrate of gravel or small cobble to provide safe incubation sites for the eggs.

6.4.1 Critical Habitat

Critical Habitat for this ESU is currently under development.

7.0 RESULTS: IMPACTS AND AVOIDANCE AND MIINIMIZATION MEASURES

7.1 OCCURRENCE IN THE PROJECT AREA

In general, SR 128 and SR 253 parallel several streams within the project area. For SR 128 (west to east), these include the Navarro River, North Fork Navarro River, Anderson Creek, Rancheria Creek, Beebe Creek, John Hiatt Creek, Dry Creek, and Edwards Creek. For SR 253 (east to west), these include Soda Creek, an unnamed tributary to Robinson Creek, and Robinson Creek. Potential effects from the project are generally limited to these adjacent streams and the anadromous fish species present. Therefore, the primary focus of this section is identifying which species occur in the subject streams and evaluating potential project effects to these species.

7.1.1 California Coastal Chinook Salmon

Russian River Watershed. CC chinook salmon occur in the Russian River upstream of Ukiah and, consequently, could potentially occur in the eastern portion of the project area. Per e-mail correspondence with Mr. Scott Harris, CDFG fisheries biologist, CC chinook are not expected to occur in the (upstream) section of Edwards Creek that flows through the project area along SR 128, at approximately PM 50.0 (Harris, CDFG pers. comm.). However, CC chinook could occur in Robinson Creek along SR 253, and potentially in an unnamed tributary to Robinson Creek along SR 253 near approximately PM 14.0.

Warm Springs Dam, located south of the project area, represents the upstream limit of anadromy on Dry Creek, a tributary to the Russian River (CDFG 2002). As a result, CC chinook are assumed absent from the reach of Dry Creek within the project area along SR 128 from approximately PM 40.0 to 47.0, as it is upstream of the dam.

Navarro River Watershed. This ESU is not known from the Navarro River and is assumed absent from this watershed.

7.1.2 Central California Coast Coho Salmon

Russian River Watershed. CCC coho salmon are known from the lower Russian River, generally below the Dry Creek confluence (Harris, CDFG pers. comm.). Brown and Moyle (1991) surveyed historical CCC coho tributaries in the upper Russian River watershed (near Ukiah) in 2001 with negative results. The main stem Russian River and its tributaries were not included in this survey; the subject reach is not considered CCC coho juvenile rearing habitat due to low flow and high temperatures (Harris, CDFG pers. comm.). Consequently, considering the migration barrier represented by Warm Springs Dam, CCC coho are considered absent from the portions of the Russian River watershed in the project area.

Navarro River Watershed. CCC coho are known throughout the Navarro River watershed. Within the project area, CCC coho occur in the main stem Navarro River up to the confluence with Anderson Creek, based on 2001 surveys by Brown and Moyle (1991). These same surveys assumed CCC coho presence in the North Fork Navarro River. Surveys were negative for CCC coho in Rancheria Creek and Indian Creek, and Anderson Creek was not surveyed. Per e-mail correspondence with Mr. Scott Harris, CDFG fisheries biologist, CCC coho have not been observed in Anderson Creek in many years (Harris, pers. comm.). In addition, as documented by Jones (2001), surveys of Con Creek and Soda Creek (tributaries to Anderson Creek) in 1994 reported only steelhead present. Based on this data, it is assumed that within the project area CCC coho are present in the main stem Navarro River up to the confluence with Anderson Creek, and absent from Rancheria Creek and Anderson Creek, and their tributaries.

7.1.3 Central California Coast Steelhead

Russian River Watershed. CCC steelhead have been observed in Edwards Creek (Dept. of Transportation 2001) within the project area along SR 128 at PM 49.66, and in Robinson Creek (LSA Associates, Inc. 2000) at the Robinson Creek Road crossing. An unnamed, perennial tributary to Robinson Creek that flows along SR 253 within the project area confluences approximately one mile downstream of Robinson Creek Road; CCC steelhead are assumed present in this tributary.

Due to the migration barrier represented by Warm Springs Dam, CCC steelhead are assumed absent from the reach of Dry Creek within the project area along SR 128 from approximately PM 40.0 to 47.0 as it is upstream of the dam.

Navarro River Watershed. The Navarro River is not within the range of the CCC steelhead ESU.

7.1.4 Northern California Steelhead

Russian River Watershed. The Russian River is not within the range of the NC steelhead ESU.

Navarro River Watershed. NC steelhead are known throughout the Navarro River watershed within the project area. Jones (2001) reports NC steelhead in the main stem Navarro River, North Fork Navarro River, Indian Creek, Rancheria Creek, Anderson Creek and Soda Creek during 1994 surveys. Jones also noted a 20-foot high falls on Soda Creek at approximately PM 3.0, which presented a migration barrier and the upstream limit of anadromy for NC steelhead. This falls was field-checked during the follow-up field investigations for this project and its presence confirmed. Jones (2001) also reports NC steelhead in two tributaries to Rancheria Creek, Beasely Creek in 1994 (approximately PM 34.0), and Yale Creek in 1962 (approximately PM 38.0). Although the 1962 report for Yale Creek is old and no records were located for NC steelhead above Yale Creek, field investigations did not reveal migrations barriers or unsuitable conditions that would otherwise prevent NC steelhead from migrating to Yale Creek. The only barrier identified was a culvert crossing on John Hiatt Creek (tributary to Rancheria Creek via Beebe Creek) at PM 39.37 (Harris, CDFG pers. comm.). Consequently, it is assumed that NC steelhead occur in the main stem Navarro River, North Fork Navarro River, Anderson Creek, Soda Creek up to the falls at approximately PM 3.0, and Rancheria Creek (to at least the confluence with Yale Creek at approximately PM 38.0), Beebe Creek and John Hiatt Creek to PM 39.37.

This section evaluates the potential effects of culvert replacement at the 49 non-fish passage sites to CC chinook, CCC coho, CCC steelhead, and NC steelhead, and Critical Habitat/EFH, based on the distribution information presented in Section 7.1 and in Table E.

7.2.1 Avoidance and Minimization Measures

1) No work will be conducted in the live channel of perennial anadromous fish-bearing streams (e.g., the Navarro River).
2) Work in non-fish bearing streams (i.e., intermittent or ephemeral streams) will be conducted when the channel is dry. In the event of sudden thunderstorms or other unusual rain event, temporary dewatering (using sandbags or bladders) may be used to avoid siltation of the channel.
3) Work on the bank of fish-bearing streams (e.g., the Navarro River) will be conducted between June 15 and October 15.
4) Riparian areas outside the designated work areas will be designated as ESA's and clearly indicated as such on project construction plans. Project specifications will include a requirement that ESA's are clearly delineated with brightly colored fencing, rope or equivalent prior to beginning construction.
5) Measures consistent with the current Caltrans' Construction Site BMPs Manual (including the SWPPP and WPCP Manuals [http://www.dot.ca.gov/hq/construc/Construction_Site_BMPs.pdf]) will be implemented to minimize effects to anadromous fish habitat (e.g., siltation, etc.) during construction.
6) For those sites located in the redwood forest (i.e., along the Navarro River and North Fork Navarro River), impacts are primarily limited to minor grading of mostly unvegetated understory areas that are covered by a thick layer of duff. At these sites, the duff within the proposed work area will be collected and stockpiled prior to the start of work, and then re-spread on the graded/bare areas following construction. Provided sufficient duff is available to cover all graded/bare areas, no compensatory measures is proposed at these sites.
7) With the exception of item 6 above, graded or otherwise bare areas resulting from construction activities will be revegetated using native species. At least six months prior to the start of project construction, Caltrans will prepare detailed construction drawings and specifications for implementation of the revegetation effort. The guidelines in Appendix B have been prepared to outline the revegetation strategy to be implemented by Caltrans for temporary impacts to riparian vegetation during construction.

7.2.2 Project Impacts

Culvert replacement at the 49 non-fish passage sites in the project will result in direct permanent effects to CC chinook, CCC coho, CCC steelhead, and NC steelhead through loss of Critical Habitat/EFH[1] for CC chinook, CCC coho, CCC steelhead, and NC steelhead, totalling 0.004 ha (0.01 ac) as shown in Table D. Permanent habitat loss will occur during placement of RSP, totalling 0.002 ha (0.005 ac) for CCC coho, and NC steelhead and totalling 0.002 ha (0.005 ac) for CC chinook and CCC steelhead. With implementation of the measures in Section 7.2.1, culvert replacement at these sites will not result in indirect effects to CC chinook, CCC coho, CCC steelhead, or NC steelhead.

[1] "Critical Habitat" refers to "habitat" in general, with the understanding that "Critical Habitat" is officially only designated for CCC coho, but will likely be reinstated at some time in the future for CC chinook, CCC steelhead, and NC steelhead; it is also noted that EFH refers only CC chinook and CCC coho.

Direct temporary effects to these species from culvert replacement at the 49 non-fish passage sites will occur through temporary removal of Critical Habitat/EFH. As shown in Table E, the 49 non-fish passage sites will remove approximately 0.13 ha (0.31 ac) of Critical Habitat/EFH. Habitat impacts will occur during removal of the existing culverts and installation of the new culverts, grading for temporary access, and minor grading to facilitate drainage.

The majority of temporary effects (0.1 ha/0.24 ac) will occur to riparian habitat along the Navarro River and North Fork Navarro River near the west end of SR 128. Work at these sites will affect Critical Habitat/EFH for CCC coho and NC steelhead. However, many sites at the west end of the project occur in upland redwood forest (near the banks of the rivers), and the proposed work at these sits will not affect riparian vegetation. These sites are in close proximity to the Navarro River or North Fork Navarro River and require minor grading of existing, upland ditches that outlet onto the banks. Although the work at these sites will result in removal of understory redwood vegetation totalling approximately 0.02 ha (0.06 ac), the actual impacts to the banks of these rivers are too small to calculate. However, the effects could not be discounted as the Navarro River and North Fork Navarro River rivers are identified as Critical Habitat/EFH.

The remaining non-fish passage sites are along SR 253, and occur in north slope cismontane woodland. Culvert replacement at these sites will affect Critical Habitat/EFH for CC chinook and CCC steelhead. NC steelhead will not be affected as the sites along SR 253 that may affect Soda Creek are located upstream of the falls at approximately PM 3.0. The work at these sites will affect only upland vegetation totalling 0.03 ha (0.07 ac); however, due to their location upslope (i.e., on extremely steep slopes) from anadromous fish bearing streams, and the increased potential for siltation, or where the existing culvert conveys an ephemeral tributary and outlets in close proximity to a fish bearing stream, they were included as potential effects to Critical Habitat/EFH.

Since no work will be conducted within or over the live channel of any fish bearing streams and no pile driving will occur, temporary noise impacts to listed salmonids are not expected.

7.2.3 Compensatory Measures

Due to the minimal amount of permanent habitat loss at the non-fish passage sites due placement of RSP, approximately 0.004 ha (0.01 ac), and with implementation of the *Avoidance and Minimization Measures* in Section 7.2.1, no compensatory measures are proposed.

7.2.4 Cumulative Effects

Non-federal activities in the region that affect anadromous fish include local agency (e.g., Mendocino County) road projects, timber harvesting, and vineyard development and operation. These activities affect fish either directly (e.g., stream encroachment during construction) or indirectly (e.g., habitat removal and degradation, increased siltation and urban runoff, etc.). Culvert replacement at the 49 non-fish passage sites will result in minimal direct permanent and temporary effects through removal of Critical Habitat/EFH. All Critical Habitat/EFH temporarily removed during construction will be revegetated using native species. Consequently, the culvert replacement at the 49 non-fish passage sites in the project will not result in substantial cumulative effects to CC chinook, CCC coho, CCC steelhead, or NC steelhead.

7.2.5 Conclusions and Determinations

Culvert replacement at the 49 non-fish passage sites will result in permanent direct effects to CC chinook, CCC coho, CCC steelhead, and/or NC steelhead through permanent loss of Critical Habitat totalling 0.004 ha (0.01 ac). Culvert replacement at these sites will also result in direct temporary effects to these species through temporary loss of Critical Habitat totalling 0.13 ha (0.31 ac). With implementation of the *Avoidance and Minimization Measures* described Section 7.2.1, the minimal permanent and temporary loss of habitat is *Not Likely To Adversely Affect* CC chinook, CCC coho, CCC steelhead, or NC steelhead. In addition, the minimal permanent and temporary loss of habitat is *Not Likely To Adversely Modify* Critical Habitat for CCC coho[2], and will result in only *a Minimal Adverse Affect* to EFH for CC chinook and CCC coho. Informal consultation with NMFS is required under Section 7 of the ESA. Consultation with NMFS is also required pursuant to the MSFCMA.

[2] In the event Critical Habitat is designated for CC chinook, CCC steelhead or NC steelhead in the future, this *not likely to adversely modify* finding would also apply to the Critical Habitat for these species.

Table E: Summary of Impacts to Fish Sites (Note: Fish Passage Sites are Shaded)

Location											
Route	PM	KP	Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Temporary Effects	Permanent Effects	Species Affected	Critical Habitat/EFH	Take
128	0.18	0.29	600	600	CMP	Replace culvert and install H W	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.40	0.64	300	600	CMP	Replace culvert and install H W	19 m^2/250 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.43	0.69	300	600	CMP	Replace culvert and install H W	23 m^2/250 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.50	0.80	300	600	CMP	Replace culvert and install H W	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.59	0.95	300	600	CMP	Replace culvert and install H W	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.66	1.06	600	600	CMP	Replace culvert and install H W, w / RSP	9 m^2/200 ft^2 Riparian	5 m^2/50 ft^2 Riparian	CCC coho/ NC steelhead	CCC coho	N
128	0.71	1.14	300	600	CMP	Replace culvert and install DI and protection wall	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.73	1.17	300	600	CMP	Replace culvert and install DI and protection wall	9 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.79	1.27	300	600	CMP	Replace culvert and install OMP DI with two windows	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.82	1.32	300	600	CMP	Replace culvert and install HW	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.96	1.54	300	600	CMP	Replace culvert and install HW	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N

Location											
Route	PM	KP	Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Temporary Effects	Permanent Effects	Species Affected	Critical Habitat/EFH	Take
128	1.02	1.64	300	600	CMP	Replace culvert and install HW	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	1.10	1.77	450	600	CMP	Replace culvert and install HW	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	1.15	1.85	750	600	CMP	Replace culvert and install HW	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	1.29	2.08	300	750	ACP	Replace culvert and install HW	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	1.34	2.16	300	750	CMP	Replace culvert and install HW	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	1.38	2.22	300	750	CMP	Replace culvert and install HW	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	3.08	4.96	300	750	CMP	Replace culvert and install OMP DI Short the Outlet 2 m w/RSP	37 m^2/400 ft^2 Riparian	5 m^2/50 ft^2 Riparian	CCC coho/ NC steelhead	CCC coho	N
128	3.20	5.15	300	750	CMP	Replace culvert and install HW	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	3.46	5.57	600	900	CMP	Replace culvert and install HW, move HW 1.5 m closer to the road & 50 m3	37 m^2/400 ft^2 Riparian	5 m^2/50 ft^2 Riparian	CCC coho/ NC steelhead	CCC coho	N
128	4.02	6.47	450	600	CMP	Replace culvert and install HW & EW	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	4.05	6.52	300	600	CMP	Replace culvert and install OMP DI , extend pipe at Outlet 1.5 m	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	4.08	6.57	300	600	CMP	Replace culvert and install HW & EW	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N

Location			Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Temporary Effects	Permanent Effects	Species Affected	Critical Habitat/EFH	Take
Route	PM	KP									
128	4.17	6.71	300	600	CMP	Replacement with a 600mm high density polyethylene (HDPE) plastic pipe. The HDPE should be smooth interior wall type. The Outlet should have Rock Energy Dissipater (RED). A new modified Inlet that duplicates the bank stabilization effects of the existing DI should be placed. Recommended by Sebastian	37 m^2/400 ft^2 Riparian	5 m^2/50 ft^2 Riparian	CCC coho/ NC steelhead	CCC coho	N
128	4.83	7.77	300	600	CMP	Replace culvert and install DI & EW, extend pipe at outlet 2 m	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	5.36	8.63	450	1000	CMP	Replace culvert and install DI	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	6.08	9.78	300	750	CMP	Replace culvert and install DI, extend pipe1.0 m Inlet& 1.5 m outlet.	37 m^2/400 ft^2 redwood understory		CCC coho/ NC steelhead	CCC coho	N
128	6.11	9.83	300	600	CMP	Replace culvert and install DI & EW, extend pipe at outlet 1 m	37 m^2/400 ft^2 redwood understory		CCC coho/ NC steelhead	CCC coho	N
128	7.40	11.9	300	600	CMP	Replace culvert and install OMP DI	56 m^2/600 ft^2 redwood understory		CCC coho/ NC steelhead	CCC coho	N
128	7.51	12.09	600	750	CMP	Replace culvert and install HW & EW, extend pipe at outlet 2 m	37 m^2/400 ft^2 redwood understory		CCC coho/ NC steelhead	CCC coho	N
128	9.99	16.08	450	600	CMP	Replace culvert and install HW & EW, extend pipe 1 m at inlet & 2 m at outlet	9 m^2/100 ft^2 redwood understory		CCC coho/ NC steelhead	CCC coho	N

Location			Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Temporary Effects	Permanent Effects	Species Affected	Critical Habitat/EFH	Take
Route	PM	KP									
128	10.08	16.22	600	600	CMP	Replace culvert and install HW	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	10.43	16.79	300	600	CMP	Replace culvert and install HW, extend pipe 1 m at inlet	37 m^2/400 ft^2 redwood understory		CCC coho/ NC steelhead	CCC coho	N
128	10.47	16.85	300	600	CMP	Replace culvert and install HW & EW	28 m^2/300 ft^2 redwood understory		CCC coho/ NC steelhead	CCC coho	N
128	10.73	17.27	450	600	CMP	Replace culvert and install HW & EW, extend pipe 1 m at inlet	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	11.33	18.23		600		Replace culvert and install HW, raise culvert w / DD	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	11.40	18.34	450	600	CMP	Replace culvert and install DI & EW	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	11.54	18.57	450	1100	CMP	Replace culvert and install HW	56 m^2/600 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	20.15	32.43	1200x1 1500	1200x 1500	RCB	Pave invert and repair concrete apron at outlet.	6 m/20 ft Dewatering (within culvert/apron)		CCC coho/ NC steelhead	CCC coho	N
128	21.80	35.08	900	1830	WSP	Jack new oversized culvert in same location as existing. New culvert will be embedded 40 to 50 percent of diameter.	520 m^2/5600 ft^2 Riparian 18 m/60 ft Dewatering		CCC coho/ NC steelhead	CCC coho	Y

Location											
Route	PM	KP	Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Temporary Effects	Permanent Effects	Species Affected	Critical Habitat/EFH	Take
128	27.54	44.32	1800	600	WSP	Remove 9.5 m of culvert at the inlet side and replace headwall. Construct roughened channel within culvert with embedded rock. Construct new headwall at outlet and concrete fish weir in outlet channel.	170 m^2/1850 ft^2 Riparian 30 m/100 ft Dewatering	40 m^2/430 ft^2 Channel (for weir)	CCC coho/ NC steelhead	CCC coho	N
128	27.78	44.71	1800	1475	CMP	Place a new headwall and pave invert.	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	36.63	58.95	2600 x 2500	750	RCB	Install concrete weirs within the existing culvert and construct concrete fishway at outlet.	40 m^2/40 ft^2 Channel 30 m/100 ft Dewatering	90 m^2/970 ft^2 Channel (for fishway)	CCC coho/ NC steelhead	No	Y
128	39.88	64.18	2250	1270	CMP	Install concrete weirs within the existing culvert and construct concrete weir at outlet. Install RSP bank protection at outlet.	20 m/65 ft Dewatering	32 m^2/350 ft^2 Riparian 24 m^2/260 ft^2 Channel (for weir)	CCC coho/ NC steelhead	No	Y
128	49.66	79.92	2 x 1200	1400	CMP	Install new 4.3 m by 2 m double box culvert, embedded approx. 50 percent. Construct new headwalls at inlet and outlet. RSP at outlet.	110 m^2/1190 ft^2 Riparian 20 m/65 ft Dewatering	24 m^2/260 ft^2 Riparian	CCC steelhead	No	Y
128	49.72	80.01	300	1000	CMP	Replace culvert and install HW	19 m^2/200 ft^2 Riparian		CCC steelhead	No	Y
253	13.73	22.10	450	750	CMP	Replace culvert and install OMP DI with one side window and DD 20-25 m w / 200 m3 RSP	186 m^2/2000 ft^2 Cismontane woodland	9 m^2/100 ft^2 Cismontane woodland	CCC steelhead/ CC chinook	No	N

Location			Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Temporary Effects	Permanent Effects	Species Affected	Critical Habitat/EFH	Take
Route	PM	KP									
253	13.96	22.47	450	600	CMP	Replace culvert and install DI, w / DD and RSP	56 m^2/600 ft^2 Cismontane woodland	9 m^2/100 ft^2 Cismontane woodland	CCC steelhead/ CC chinook	No	N
253	14.31	23.03	600	750	CMP	Replace culvert extend pipe 3 m, w / RSP	37 m^2/400 ft^2 Cismontane woodland	9 m^2/100 ft^2 Cismontane woodland	CCC steelhead/ CC chinook	No	N

7.3 FISH PASSAGE SITES

This section evaluates the potential effects of culvert replacement or retrofitting, or other repairs, at the 6 fish passage sites to CCC coho, CCC steelhead, and NC steelhead, and Critical Habitat/EFH, based on the distribution information presented in Section 7.1 and in Table E. CC chinook does not occur in the vicinity of any of the 6 fish passage sites and, as a result, is not included in the evaluation.

7.3.1 Evaluation of Upstream and Downstream Habitat

With the exception of PM 49.66 where CCC steelhead have been observed, listed salmonids have not been observed at any of the fish passage sites; existing or future presence is assumed based on connectivity (irrespective of known migration barriers) to streams known to support listed salmonids. Therefore, replacement or retrofitting of the four culverts to improve fish passage is being undertaken with the assumption that listed salmonids will be able to access the subject reaches in the future, either through removal of known migration barriers (e.g., Graveyard Creek at Anderson Valley Way), other habitat improvements, etc.

In general, anadromous fish habitat in the vicinity of the six fish passage sites is mediocre. Various conditions exist that have resulted in degradation of the stream habitat in the vicinity of each site. The following is an analysis of the habitat at each site. Due to limitations during site surveys (i.e., access limited to 91.5 m / 300 ft from the highway), evaluation of instream habitat is generally limited to the reaches of each drainage immediately adjacent to the inlet and outlet. Additional evaluation of habitat conditions (e.g., canopy cover, adjacent land uses, etc.) are included for reaches of each drainage to the extent necessary to adequately evaluate the habitat. The additional evaluation was performed by reviewing black and white digital orthorectified aerial photographs and USGS 7.5' topographic quadrangles, at scales of 1:12,000 and 1:24,000 respectively.

MEN 128 - PM 20.15 Unnamed Creek. This creek is a perennial tributary to the Navarro River that dries to very low flows during the late summer and fall. The site is located at the lower end of the drainage, approximately 0.8 km (0.5 mi) upstream of the confluence with the Navarro River. Upstream of SR 128, the creek has been channelized for approximately 0.16 km (0.1 mi); this reach and the entire section of the creek through the valley floor supports a narrow riparian corridor. Downstream of SR 128 to the confluence, the creek generally supports a moderately well developed riparian corridor. The creek is bordered by extensive orchards and vineyards both upstream and downstream of 128, land uses which contribute to erosion, chemical toxicity, and atypical hydrology to the creek. In addition, development occurs along the lower reaches of the creek and several road crossings are present which may present migration barriers. Once beyond the valley floor, the upstream reaches of the creek appear to support more extensive riparian corridors and potential spawning habitat, until the gradient becomes too steep (i.e., a sustained 8 percent grade).

MEN 128 - PM 21.80 Clow Creek. Clow Creek is a perennial tributary to the Navarro River that dries to very low flows during the late summer and fall. The site is located at the lower end of the Clow Creek watershed, approximately 0.16 km (0.1 mi) upstream of the confluence with the Navarro River. Clow Creek generally supports a well developed riparian corridor from the confluence to the upper reaches until the gradient becomes too steep. The upper reaches may provide suitable spawning habitat. Some development occurs near the creek but it is limited to the vicinity of SR 128.

Agricultural land uses also occur near the lower section of the creek and several road crossings are present upstream of SR 128.

MEN 128 - PM 27.54 Graveyard Creek. Graveyard Creek is a perennial tributary to the Navarro River that dries to very low flows during the late summer and fall. This site is located at the lower end of the Graveyard Creek watershed, approximately 0.16 km (0.1 mi) upstream of the confluence with the Navarro River. Graveyard creek supports a moderately well developed riparian corridor along the lower reaches, but the corridor becomes sparse in the upper reaches. Still, spawning habitat is potentially present in the upper reaches of the creek below the section where the gradient becomes too steep. The creek is surrounded by substantial development along the lower reach between SR 128 and the confluence with the Navarro River. In addition, the creek crosses beneath Anderson Valley Way just before the confluence; this crossing appears to be a complete barrier to fish passage.

MEN 128 - PM 36.63 Lost Creek. Lost Creek is an intermittent tributary to Rancheria Creek. Lost Creek confluences with Rancheria Creek approximately 61 m (200 ft) downstream of the SR 128 crossing. Only a short section of Lost Creek is accessible to anadromous salmonids before the gradient becomes too steep. Lost Creek supports a sparse riparian corridor in the vicinity of SR 128 but the channel is mostly open in the upstream section to the point where the gradient becomes too steep. With the exception of a driveway along the west bank upstream of SR 128, no development occurs along the lower section of the creek.

MEN 128 - PM 39.88 John Hiatt Creek. John Hiatt Creek is a perennial tributary to Beebe Creek. John Hiatt Creek confluences with Beebe Creek at approximately PM 39.22. The confluence is located below a known (complete) barrier to fish passage at PM 39.37 (Harris, CDFG pers. comm.), where SR 128 crosses John Hiatt Creek. Upstream, a private road at approximately PM 40.02 presents another barrier to fish passage; the private road appears to be only a partial barrier, likely preventing juvenile passage. The site is located in a fairly steep canyon at the upper extent of the watershed. The subject section of channel supports a well developed riparian corridor and is suitable spawning habitat. Land uses adjacent to the creek are primarily rural residential and open space downstream of SR 128, and vineyards upstream (past approximately PM 40.50). SR 128 also runs along the length of the John Hiatt Creek to the confluence with Beebe Creek, and the crossing at PM 39.37 (i.e., downstream of the site) presents a complete migration barrier (Harris, CDFG pers. comm.).

MEN 128 - PM 49.66 Edwards Creek. Edwards Creek is a perennial tributary to the Russian River. The site is located in the upper extent of the watershed, approximately 6 km (3.75 mi) upstream of the confluence with the Russian River. The creek flows alongside SR 128 immediately upstream of the site for approximately 4.8 km (0.3 mi). The upstream section flows through a fairly steep canyon, supports a well developed riparian corridor and is suitable spawning habitat. The downstream section flows through grassland and oak woodland habitats and has a narrow riparian corridor. Land uses in the vicinity are primarily open space and some grazing. Several low water crossings occur upstream of SR 128.

Evaluation Summary

Since all the fish passage sites were fairly similar in terms of habitat value for anadromous salmonids, the cost of retrofitting each culvert for fish passage was evaluated and weighed against the potential benefits of the retrofit. Table F summarizes the cost of retrofitting each culvert for fish passage as well as the cost for repairing the culvert to improve hydraulic efficiency. As shown in Table F, costs for retrofitting the culverts range from $40,000 to $135,000, with PM 39.88 being the least expensive and PM 20.15 being the most expensive, 150 percent more than the next highest (PM 21.80 at $90,000). Due to the substantial difference in cost to retrofit PM 20.15, it was agreed by all parties at the May 12, 2003, meeting that retrofitting PM 20.15 to only improve hydraulic efficiency would be acceptable provided the other five culverts were retrofitted for fish passage.

Table F: Summary of Cost Analysis for Fish Passage Sites

PM	KP	Name	Type of repair	Retrofit cost including fish passage work	Repair cost for hydraulic purposes only
20.15	32.42	Unnamed Creek	None	$135,000	$11,500
21.80	35.08	Clow Creek	Replacement	$90,000	0
27.54	44.31	Graveyard Creek	Retrofit	$80,000	$55,000
36.63	58.94	Lost Creek	Retrofit	$60,000	$15,000
39.88	64.17	Beebe Creek	Retrofit	$40,000	$4,000
49.66	79.92	Edwards Creek	Replacement	$75,000	$67,000
Total				$480,000	$152,500

7.3.2 Avoidance and Minimization Measures

1) In-stream work and work on the banks of perennial anadromous fish-bearing streams will be conducted between June 15 and October 15.
2) Dewatering, if necessary, will consist of using sandbags or equivalent method to construct a temporary cofferdam upstream of the work area at the inlet, and downstream of the work area at the outlet. Following construction of the cofferdams, a gravity siphon hose system will be installed to transport upstream flows through the work area to the channel downstream of the work area. If necessary, a pump will be used to convey flows through the hose.
3) Riparian areas outside the designated work areas will be designated as ESA's and clearly indicated as such on project construction plans. Project specifications will include a requirement that ESA's are clearly delineated with brightly colored fencing, rope or equivalent prior to beginning construction.
4) Water for dust abatement (if necessary) will be acquired from an off-site source. No drafting will be permitted.
5) Measures consistent with the current Caltrans' Construction Site BMPs Manual (including the SWPPP and WPCP Manuals [http://www.dot.ca.gov/hq/construc/Construction_Site_BMPs.pdf]) will be implemented to minimize effects to anadromous fish habitat (e.g., siltation, etc.) during construction.
6) Graded or otherwise bare areas resulting from construction activities will be revegetated using native species. The guidelines in Appendix B have been prepared to outline the revegetation strategy to be implemented by Caltrans for temporary impacts to riparian vegetation during construction.

7.3.3 Project Impacts

Culvert replacement at 5 fish passage sites (PM's 21.8, 27.54, 36.63, 39.88, and 49.66) will result in direct permanent effects to CCC coho, CCC steelhead, and NC steelhead through permanent loss or alteration of Critical Habitat/EFH totalling 0.02 ha (0.05 ac), as shown in Table G. Permanent loss of Critical Habitat/EFH will occur during placement of RSP, totaling (0.004 ha/0.01 ac). Placement of RSP will result in the loss of riparian habitat adjacent to the channel. Direct permanent effects to Critical Habitat/EFH will also occur during construction of fish weirs and fishways, totalling 0.016 ha/0.04 ac. These effects will occur in the channel at the outlets to the several of the culverts (see Table E and Appendix A). Although construction of the fish weirs and fishways will result in permanent effects to Critical Habitat/EFH, these effects are considered beneficial as they will improve the quality of the channel habitat by making the substrate at the outlet more conducive to fish passage. Direct effects to CCC coho, CCC steelhead, and NC steelhead could also occur if these species are present in the construction area when construction begins. Direct effects to CCC coho, CCC steelhead, and NC steelhead, if any, will be limited to harassment if fish are present during site dewatering.

Direct temporary effects at the 5 sites will occur during temporary removal/disturbance of Critical Habitat/EFH as a result of construction activities (e.g., staging areas, access roads, etc.). As shown in Table G, the 5 sites will temporarily remove or disturb approximately 0.08 ha (0.21ac) of Critical Habitat/EFH for CCC coho, CCC steelhead, and NC steelhead. Approximately 0.076 ha (0.18 ac) of riparian habitat and 0.004 ha (0.01 ac) of channel habitat will be temporarily affected. Temporary impacts may also include dewatering the work area in order to complete the work. A maximum of approximately 124 m (410 ft) of stream channel (not including the length of the existing culvert) could be temporarily dewatered during construction.

Repairs at PM 20.15 will be limited to the existing culvert outlet, and will result in direct temporary effects during dewatering a section of the culvert and outlet apron. However, since the outlet is a complete barrier to fish passage during low flow conditions (i.e., during the work window), fish will not be present in the culvert or the outlet apron during the repairs.

With implementation of the measures in Section 7.3.2, culvert replacement, retrofitting, or other proposed repairs at these sites will not result in indirect effects to CCC coho, CCC steelhead, or NC steelhead.

The total impacts from the fish passage sites are summarized in Table G.

Table G: Summary of Fish Passage Site Habitat Impacts

Effects	Riparian	Channel	Total
Direct			
Permanent	56 m^2 / 600 ft^2 (0.004 ha / 0.01 ac)	154 m^2 / 1,660 ft^2 (0.016 ha / 0.04 ac)	**210 m^2 / 2260 ft^2 (0.02 ha / 0.05 ac)**
Temporary	819 m^2 / 8,610 ft^2 (0.076 ha / 0.18 ac)	40 m^2 / 430 ft^2 (0.004 ha / 0.01 ac)	**859 m^2 / 9040 ft^2 (0.08 ha / 0.21 ac)**
Indirect	-----	-----	----
Total	**875 m^2 / 9,210 ft^2 (0.08 ha / 0.21 ac)**	**194 m^2 / 2,090 ft^2 (0.02 ha / 0.05 ac)**	**1,069 m^2 / 11,300 ft^2 (0.10 ha / 0.26 ac)**

Although the proposed work at the 6 fish passage sites will result in permanent and temporary effects to CCC coho, CCC steelhead, and NC steelhead, and Critical Habitat/EFH, overall, the project will result in a net benefit for these species and Critical Habitat/EFH. The net benefit is due to replacement or retrofitting of 5 of the 6 fish passage culverts, which will improve fish passage conditions at these sites. The proposed replacement or retrofit will result in decreased velocity, increased water depth, and increased flow area for all life stages of anadromous potentially occurring at these sites (refer to hydraulic analyses in Appendix A).

7.3.4 Compensatory Measures

The proposed work at the 6 fish passage site will result in a net benefit to CCC coho, CCC steelhead, and NC steelhead as fish passage conditions will be improved at 5 of the 6 sites, as described in Section 7.3.3. In addition, direct effects due to permanent loss of Critical Habitat/EFH from placement of RSP will be minimal (0.004 ha / 0.01 ac), and temporary effects to Critical Habitat/EFH from construction activities will be avoided and/or minimized per the measures in Section 7.3.2. Consequently, no compensatory measures are proposed.

7.3.5 Cumulative Effects

Non-federal activities in the region that affect anadromous fish include local agency (e.g., Mendocino County) road projects, timber harvesting, and orchard and vineyard development and operation. These activities affect fish either directly (e.g., stream encroachment during construction) or indirectly (e.g., habitat removal and degradation, increased siltation and urban runoff, etc.). Although the construction activities at the 6 fish passage sites will result in minimal direct permanent and temporary effects through removal or disturbance of Critical Habitat/EFH, the project will result in net beneficial effects to CCC coho, CCC steelhead, and NC steelhead due to improved fish passage conditions through the culverts (except PM 20.15). Consequently, the proposed work at the 6 fish passage sites will not result in substantial cumulative effects to CCC coho, CCC steelhead, or NC steelhead.

7.3.6 Conclusions and Determinations

Culvert replacement, retrofit, or other repairs at five fish passage sites (PM's 21.8, 27.54, 36.63, 39.88, and 49.66) will result permanent direct effects to CCC coho, CCC steelhead, and NC steelhead through permanent loss of Critical Habitat/EFH totalling 0.016 ha (0.040 ac). The proposed work at these sites will also result in direct temporary effects to these species through temporary loss of Critical Habitat/EFH (0.08 ha / 0.21 ac) and possibly dewatering of 124 m (410 ft) of stream channel. Since work will be required within the stream channel when CCC coho, CCC steelhead, and NC steelhead could potentially be present, the work at the five fish passage sites is *Likely To Adversely Affect* CCC coho, CCC steelhead, or NC steelhead. Work at one fish passage site (PM 20.15) is *Not Likely To Adversely Affect* these listed species. Since the overall project will result in a net benefit as fish passage conditions at five of the six sites will be improved, the minimal permanent and temporary loss of habitat is *Not Likely To Adversely Modify* Critical Habitat for CCC coho[3], and will result in only *a Minimal Adverse Affect* to EFH for CCC coho. Formal consultation with NMFS is

[3] In the event Critical Habitat is designated for CC chinook, CCC steelhead, or NC steelhead in the future, this *not likely to adversely modify* finding would also apply to the Critical Habitat for these species.

8.0 REFERENCES

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APPENDIX A – PRELIMINARY DESIGN PLANS, HYDRAULIC ANALYSES, AND PHOTOS

SR 128 / PM 21.80 Clow Creek

Clow Creek
Men-128-PM 21.80

Existing: 1500 mm (5ft) x 44.3m (145.3 ft) SSPP @ 4.2% slope
Bankfull Width = Appx 8 ft, Active Channel = Appx 5ft
2.7% DS Channel Grade

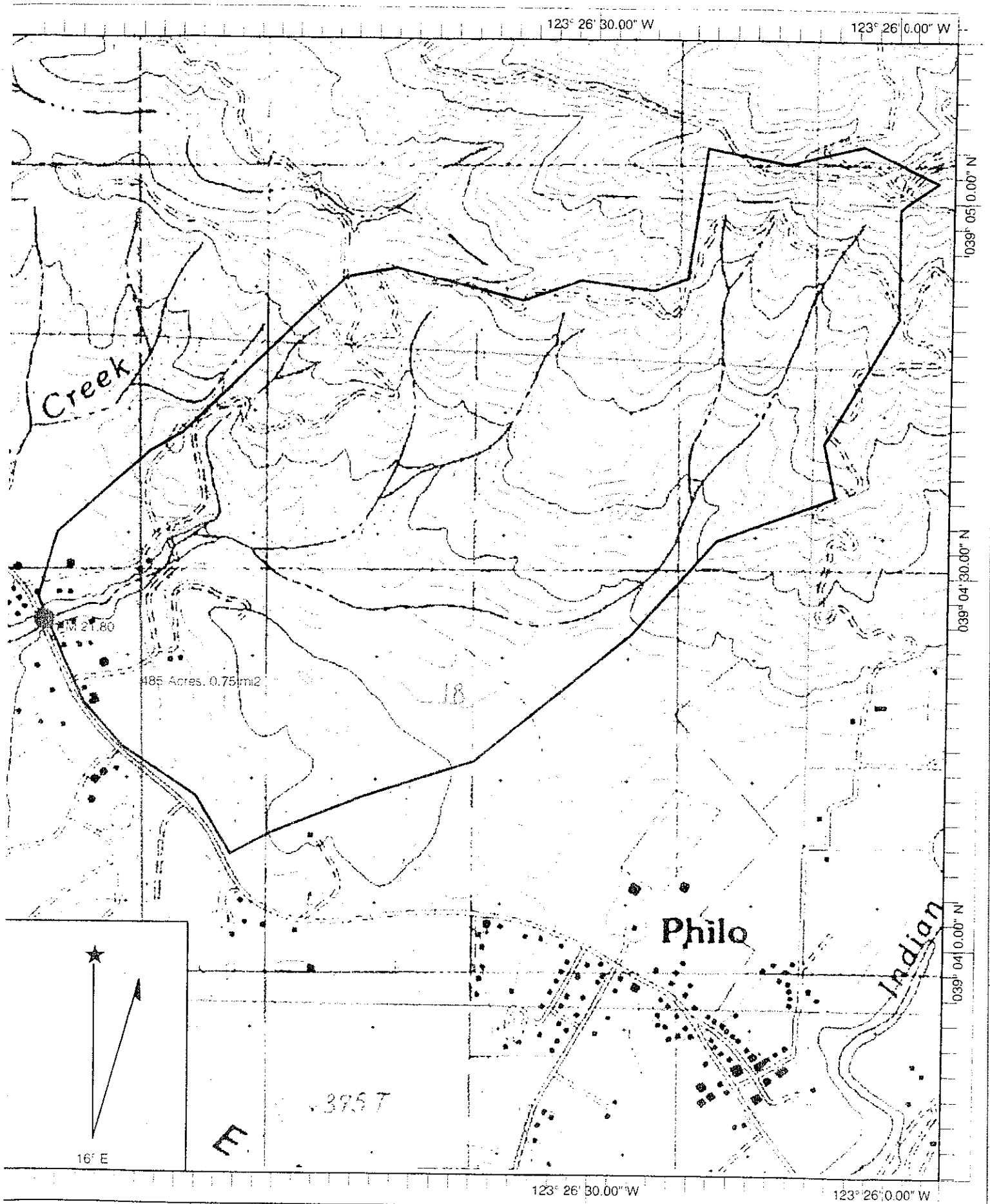
Proposed: 3000mm (10ft) x 44.0m (144.3 ft) Embedded WSP @ 2% Grade (Jack & Bore Method)
Import 3" Minus Cobble, Gradation Commensurate With Upstream and Downstream Stream Gradation

	*Existing Conditions			
Adult Anadromous	**Velocities (fps)**	**Depths (ft)**	**Flow Area (ft^2)**	**EDF**
Lower Q50% (cfs) 3.00	7.41	0.27	0.41	19.18
Upper Q1% (cfs) 16.95	12.18	0.62	1.4	31.73
Resident Trout				
Lower Q90% (cfs) 2.00	6.55	0.22	0.3	17.47
Upper Q5% (cfs) 5.74	9.02	0.36	0.63	23.88
Juvenile Salmonids				
Lower Q95% (cfs) 1.00	5.3	0.16	0.19	13.79
Upper Q10% (cfs) 2.92	7.35	0.26	0.39	19.66

****Proposed Conditions**
Embedded 3.0m (10 ft) Diameter Steel Culvert

			Outlet Vel (fps)	Outlet Depths (ft)	Control Type	HW/D
Q10=	185.0	cfs	15.24	2.97	Inlet	1.53
Q100=	322.4	cfs	16.75	4.74	Inlet	3.5

NOTES:
* Velocities and depths determined using Culvert Master software program (FHWA Equations) (diam=5.0ft, n=0.024)
** Velocities and depths not necessary for Stream Simulation designs
Fish Design Flow Rates determined from Exceedence Flow Curves derived from local gauge stations
Q10 and Q100 flow rates detrmined from Regional Method, based on Q annual of 50 in/yr

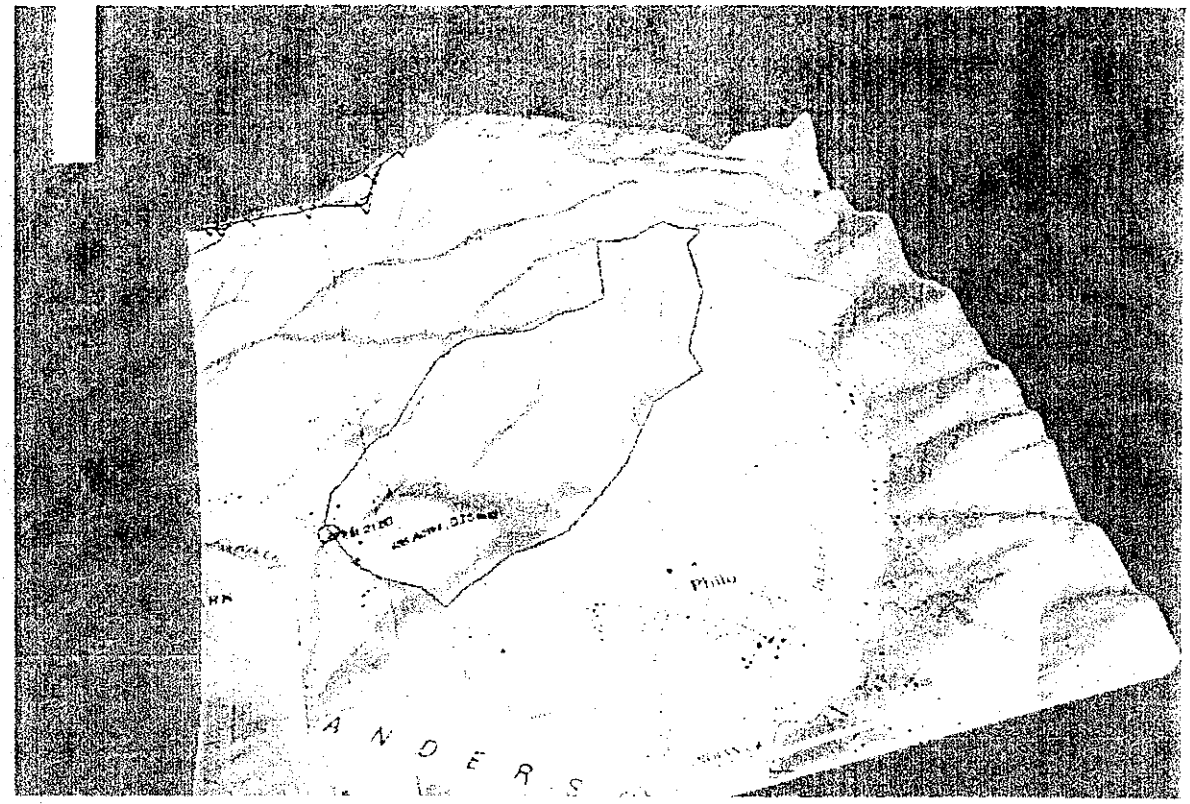


Name: PHILO
Date: 4/8/2003
Scale: 1 inch equals 1000 feet

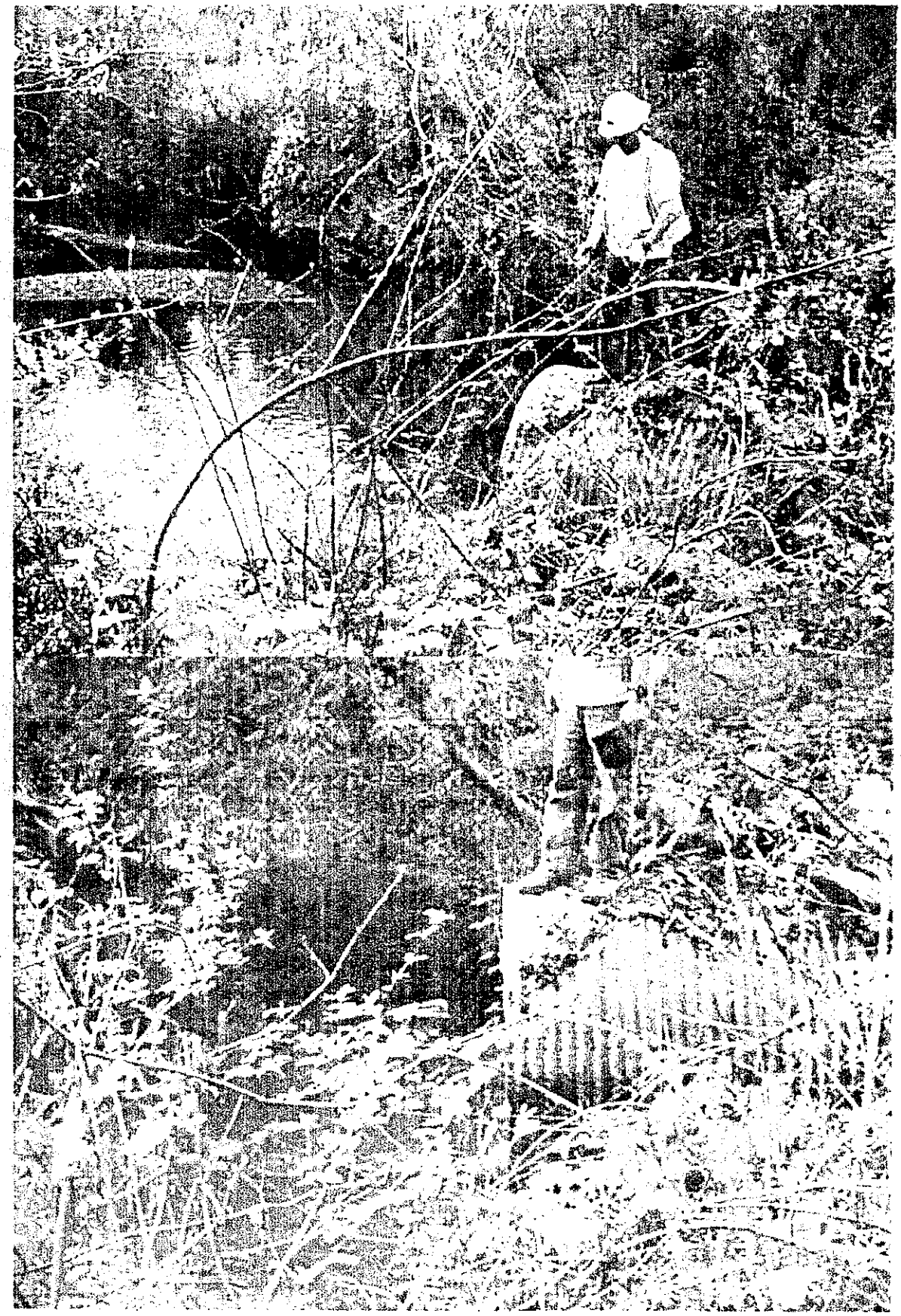
Location: 039° 04' 27.4" N 123° 26' 42.0" W
Caption: small layers, dark

Copyright (C) 1997 Maptech, Inc.

60" SSPP Culvert @ Men-128-PM 21.80
Drainage Area = 485 acres, 0.75 mi2
01-378100



Men-128-PM 21.80, Clow Creek
1500mm CSP
2% Slope
Projecting inlet and outlet



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
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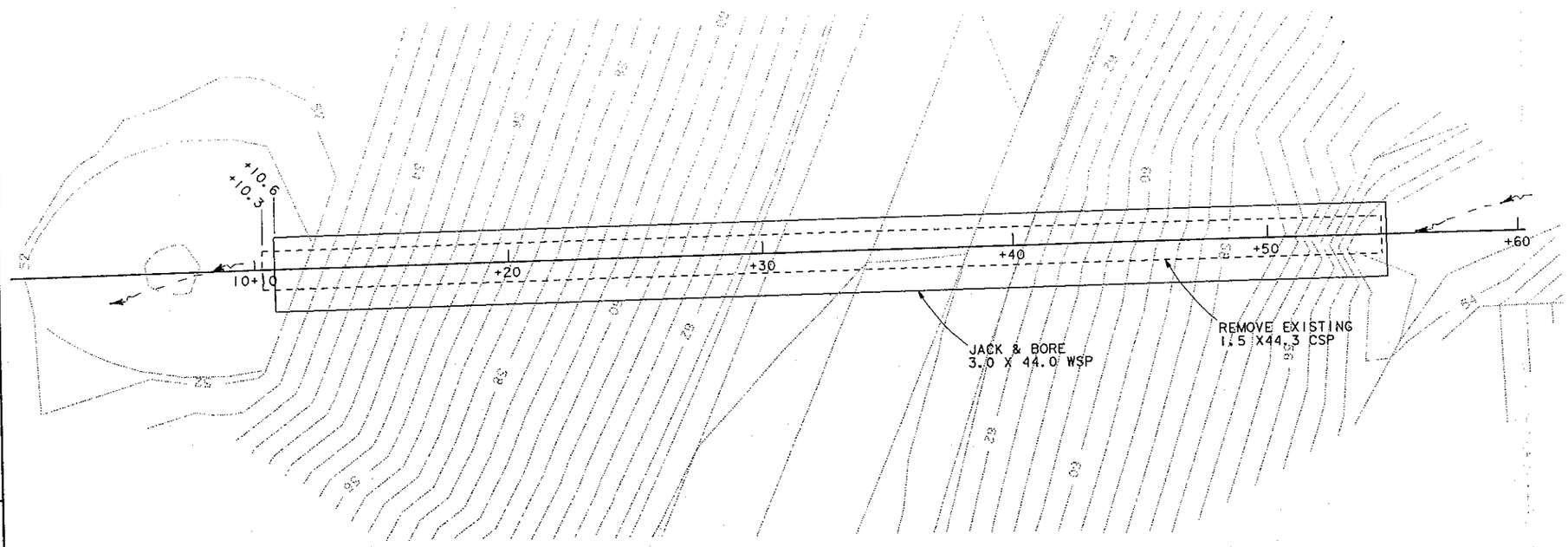
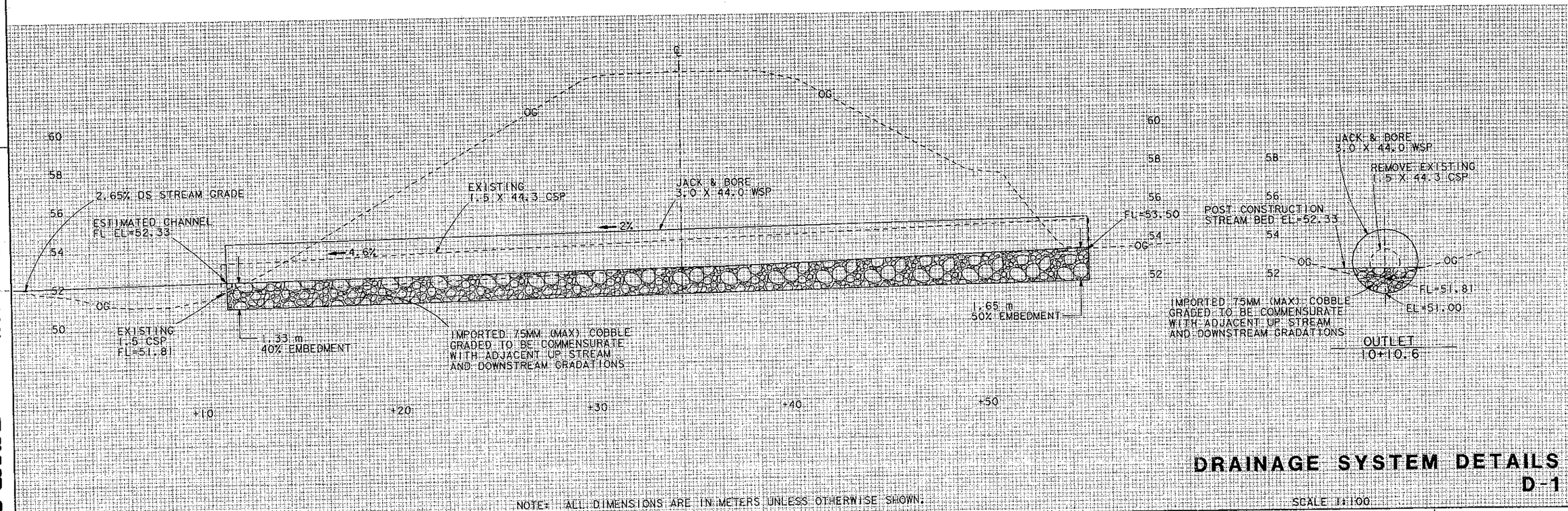
FOR DESIGN STUDY ONLY

Caltrans Metric





DRAINAGE SYSTEM DETAILS
D-1

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

SCALE 1:100

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS

PROJECT ENGINEER: Sebastian Cohen

CALCULATED/DESIGNED BY | CHECKED BY | DATE | REVISED BY | DATE REVISED

DATE PLOTTED => 17-SEP-2003

LAST REVISION 00-00-00

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => tldonh
DGN FILE => 128_2180_001.dgn

CU 03230

EA 378101

SR 128 / PM 27.54 Graveyard Creek

Graveyard Creek

Men-128-PM 27.54

Existing: 2100 mm (7ft) x 72.2m (236.88 ft) SSPP @ 2.8% slope
Active Channel Width=4.3ft
2.1% DS Channel Grade

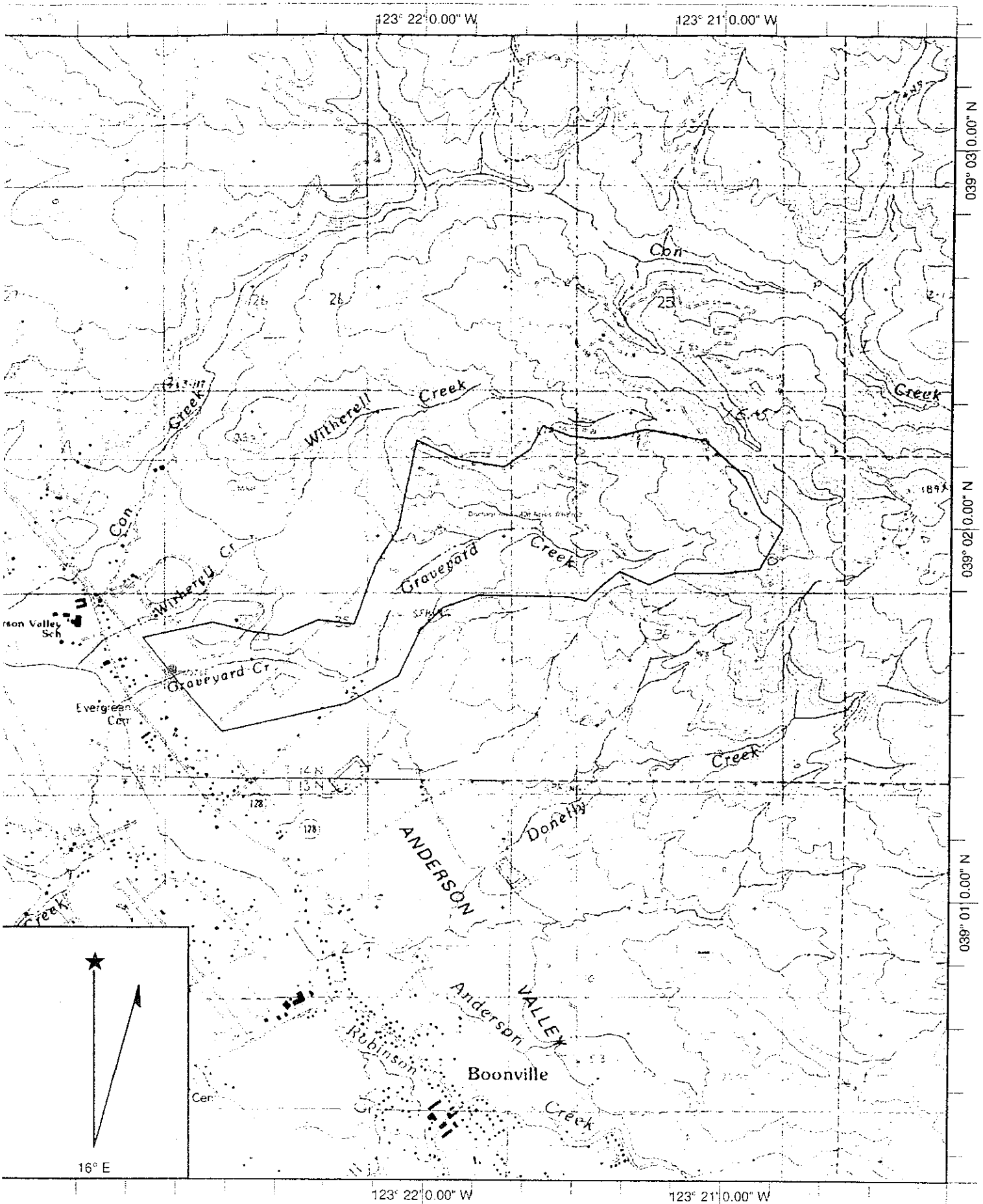
Proposed: Remove 9.6m of SSPP from Inlet, Place Roughened Channel Inside 62.7m of Existing SSPF
Place Headwall & Endwall, Re-Grade Inlet Channel and Re-Vegetate, Place Two Concrete Weirs @ Outlet

	*Existing Conditions				**Proposed Conditions			
Adult Anadromous	**Velocities (fps)**	**Depths (ft)**	**Flow Area (ft^2)**	**EDF**	**Velocities (fps)**	**Depths (ft)**	**Flow Area (ft^2)**	**EDF**
Lower Q50% (cfs) 3.00	3.96	0.36	0.75	6.99	3.06	0.43	0.90	5.82
Upper Q1% (cfs/cfs) 15.31	6.48	0.78	2.35	11.38	4.66	0.98	3.00	8.92
Resident Trout								
Lower Q90% (cfs) 2.00	3.5	0.3	0.57	6.13	3.18	0.47	1.03	3.39
Upper Q5% (cfs) 5.18	4.67	0.47	1.11	8.15	3.52	0.57	1.36	6.65
Juvenile Salmonids								
Lower Q95% (cfs) 1.00	2.83	0.22	0.36	4.85	2.32	0.25	0.40	4.37
Upper Q10% (cfs) 2.64	3.81	0.34	0.69	6.68	2.96	0.40	0.81	5.69

			Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D	Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D
Q10=	169.1	cfs	13.06	2.59	Inlet	0.84	9.2	3.38	Outlet	0.92
Q100=	295.1	cfs	15.12	3.54	Inlet	1.18	11.23	4.52	Outlet	1.70

NOTES:

* Velocities and depths determined using Culvert Master software program (FHWA Equations) (diam=7.0ft, n=0.024)
** Velocities and depths determined using Culvert Master software program (FHWA Equations) (diam=6.0ft, n=0.060)
Fish Design Flow Rates determined from Exceedence flow curves derived from local gauge stations
Q10 and Q100 flow rates detrmined from Regional Method, based on Q annual of 50 in/yr

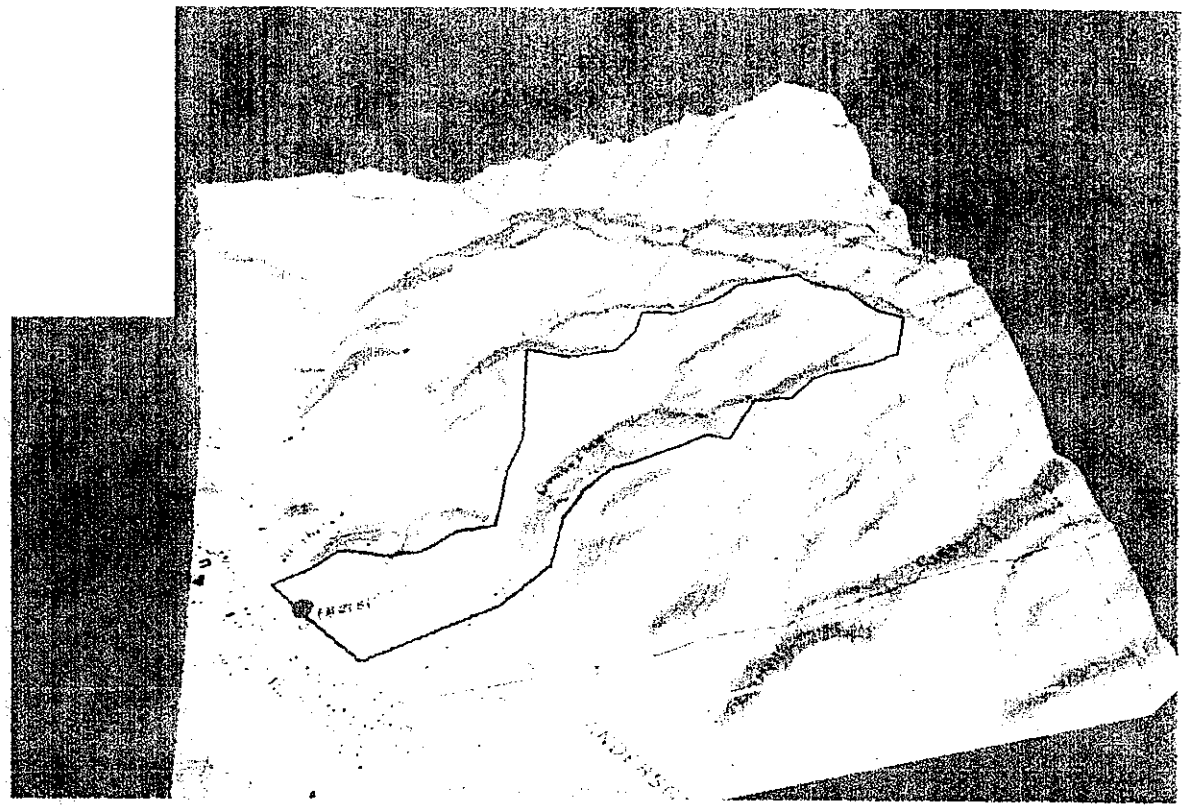


Name: BOONVILLE
Date: 4/8/2003
Scale: 1 inch equals 2000 feet

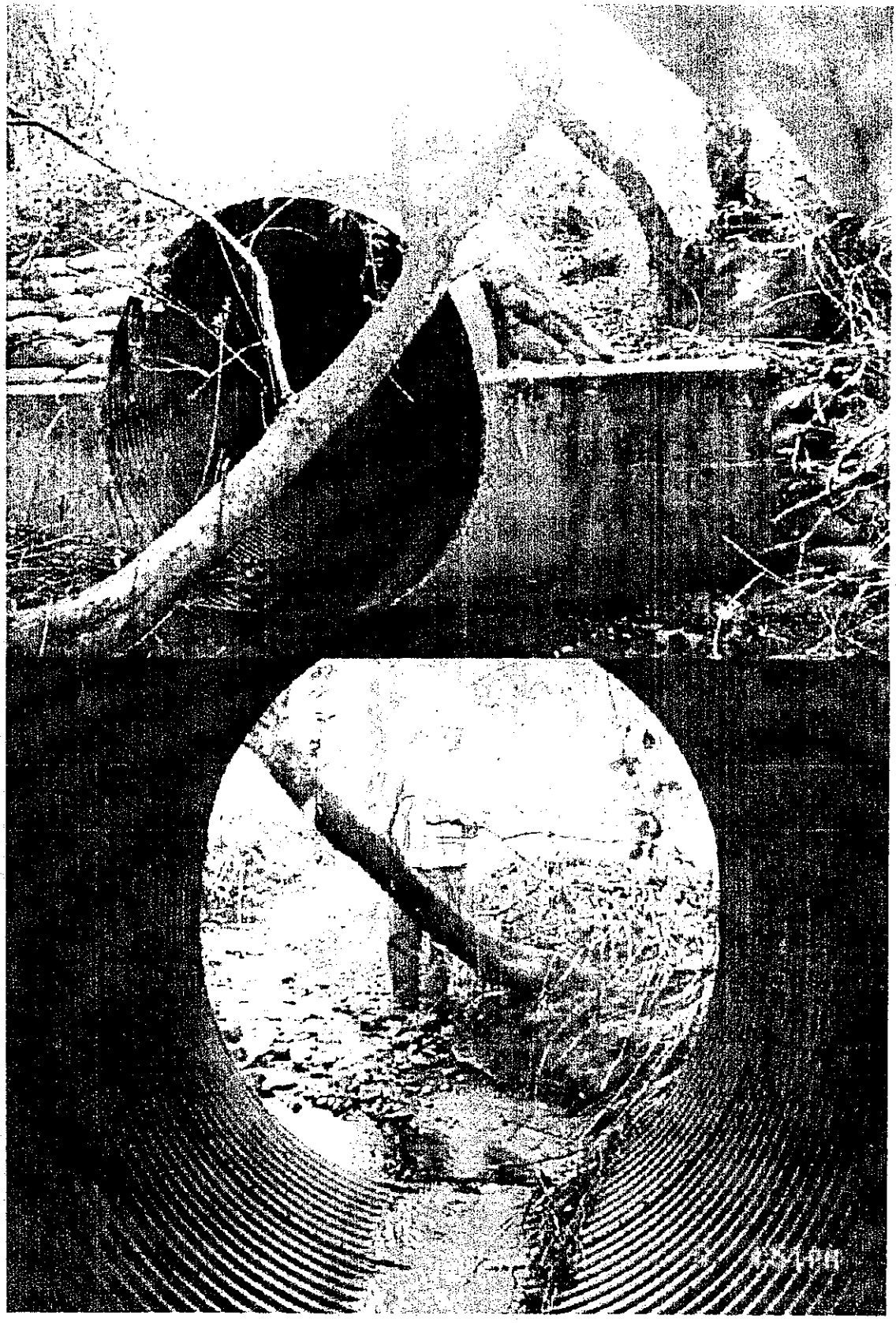
Location: 039° 01' 46.8" N 123° 21' 49.7" W
Caption: Drainage Area = 438 acres. 0.68 mi2

Men-128-PM 27.54

PM 27.54 Graveyard Creek. 2.1m (84") x 71.7m SSPP
Drainage Area = 438 acres, 0.68 mi2
01-378100



Men-128-PM 27.54
72.2m x 2.1m SSPP
2.8% Slope
SFES @ Outlet, Headwall @ Inlet



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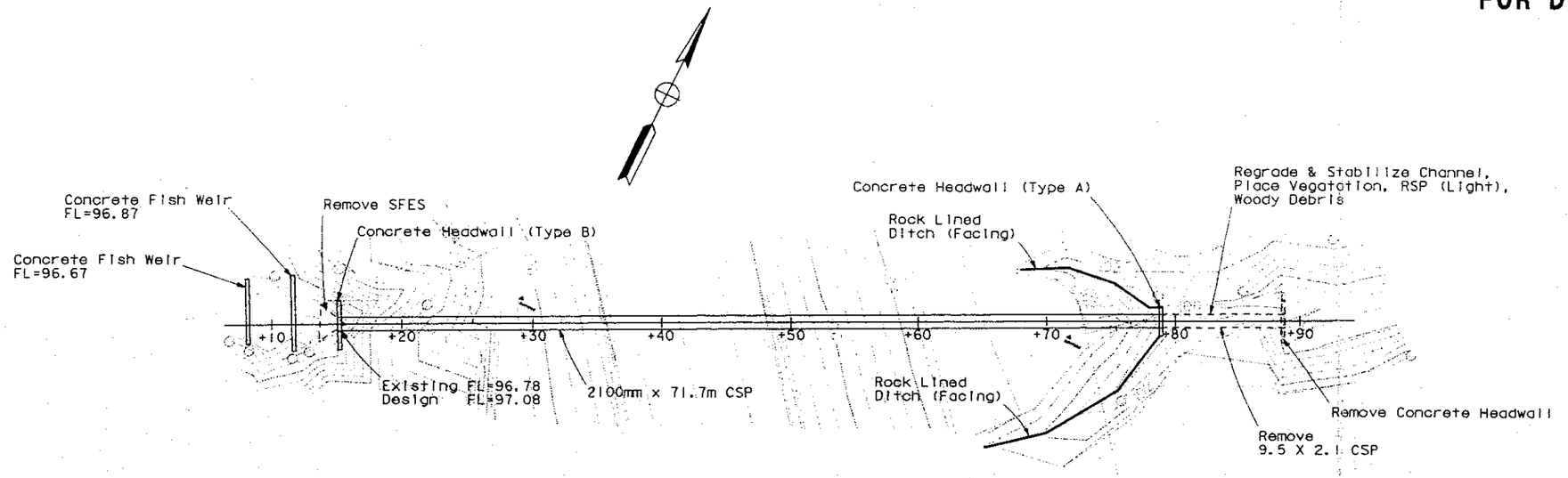
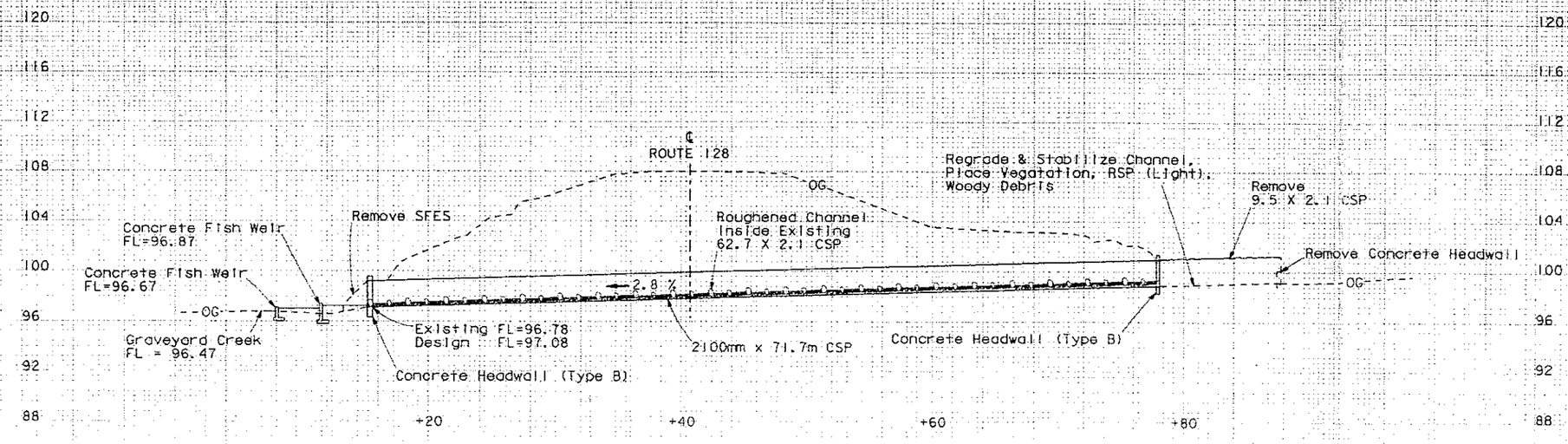
FOR DESIGN STUDY ONLY

Caltrans Metric





NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

DRAINAGE SYSTEM DETAILS

D-1

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CU 03230

EA 378101

DATE PLOTTED => 17-SEP-2003

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HYDRAULICS

PROJECT ENGINEER Sebastian Cohen

CALCULATED/DESIGNED BY

CHECKED BY

DATE

REVISED BY

DATE REVISED

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
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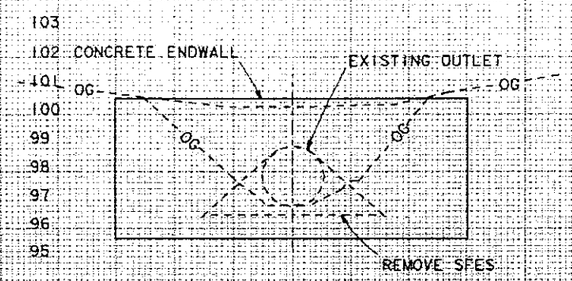
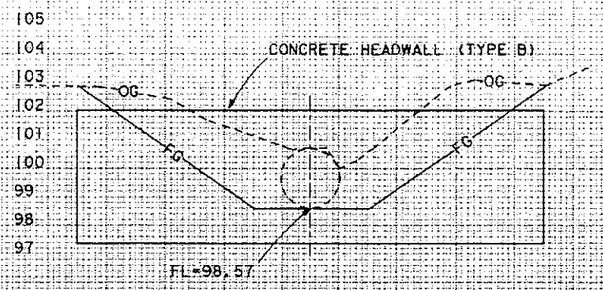
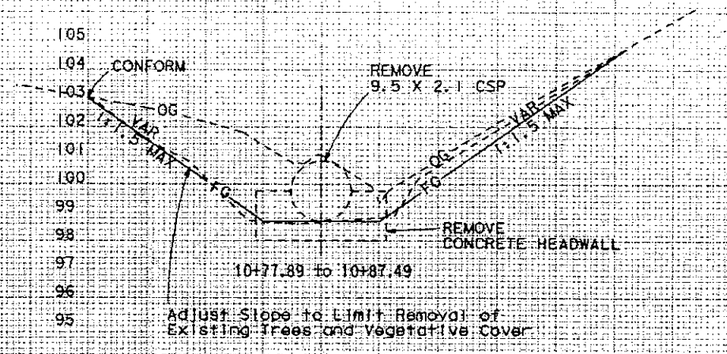
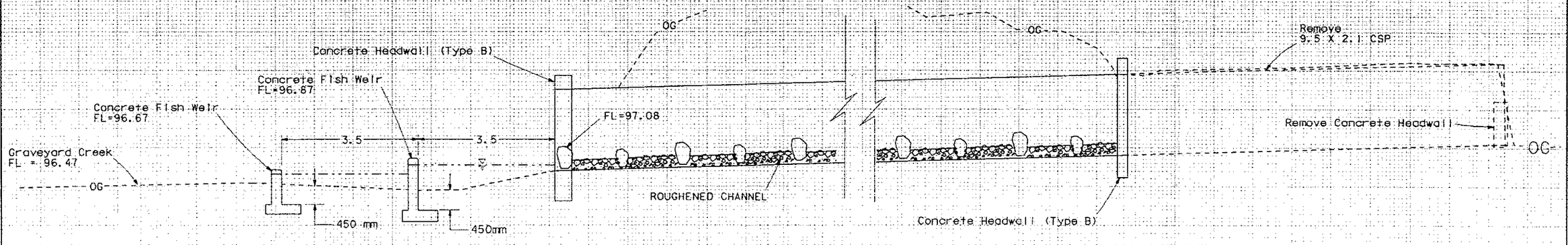
Caltrans Metric









HEADWALL AND CHANNEL DETAILS D-2

NO SCALE

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

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CU 03230 EA 378101

PROJECT ENGINEER Sebastian Cohen

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DATE REVISED | REVISED BY | DATE

LAST REVISION 10-0- DATE PLOTTED = 14-SEP-2001

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
01	Men	128	44.32	3	4

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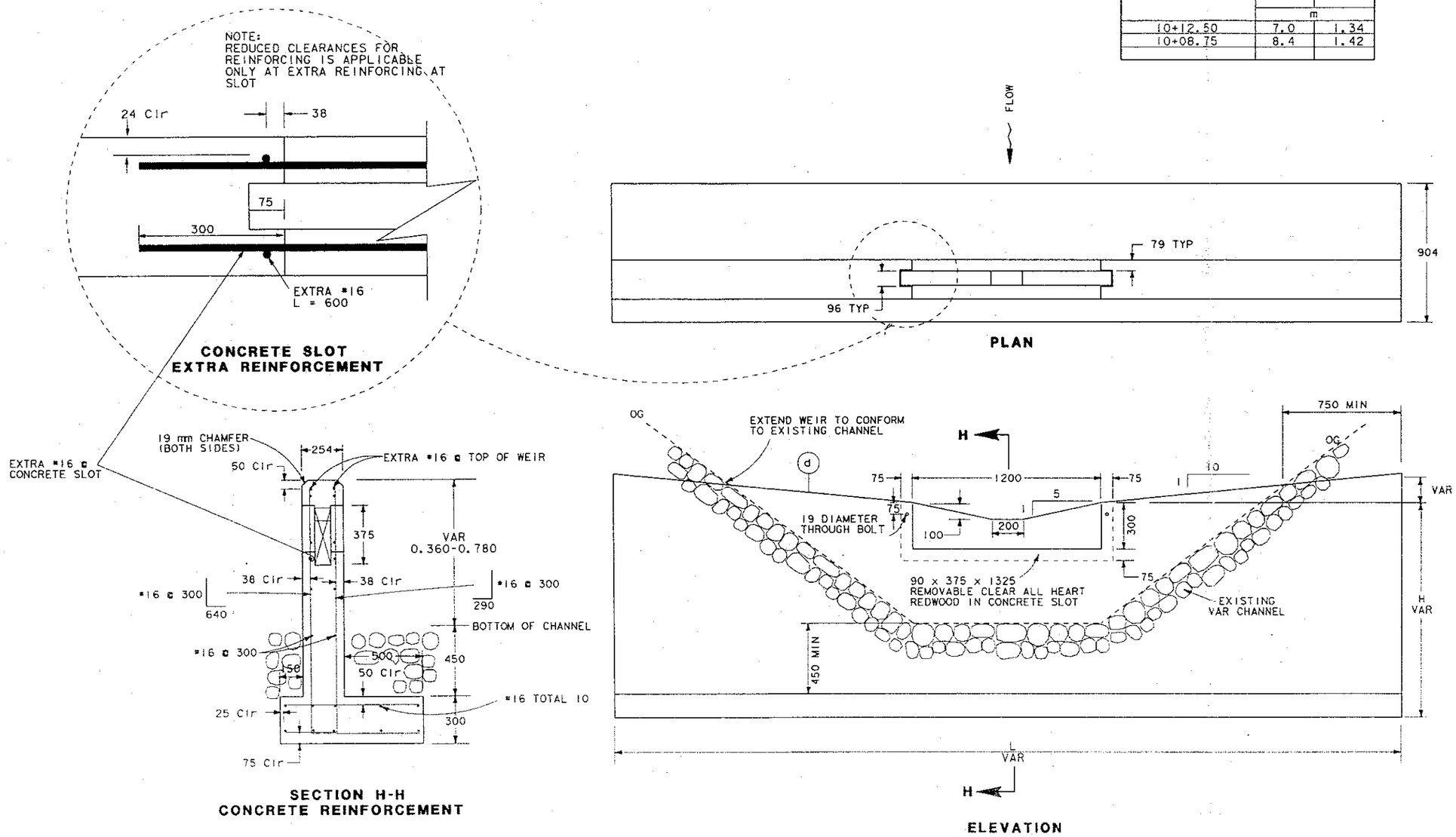
Caltrans Metric

CONCRETE WEIR		
WEIR STATION	H	L
	m	
10+12.50	7.0	1.34
10+08.75	8.4	1.42



NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

FISH WEIR DETAILS
D-3

NO SCALE

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PROJECT ENGINEER: Sebastian Cohen

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CU 03230 | EA 378101

LAST REVISION 00-00-00 | DATE PLOTTED => 17 SEP 2003

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01	Men	128	44.32	4	4

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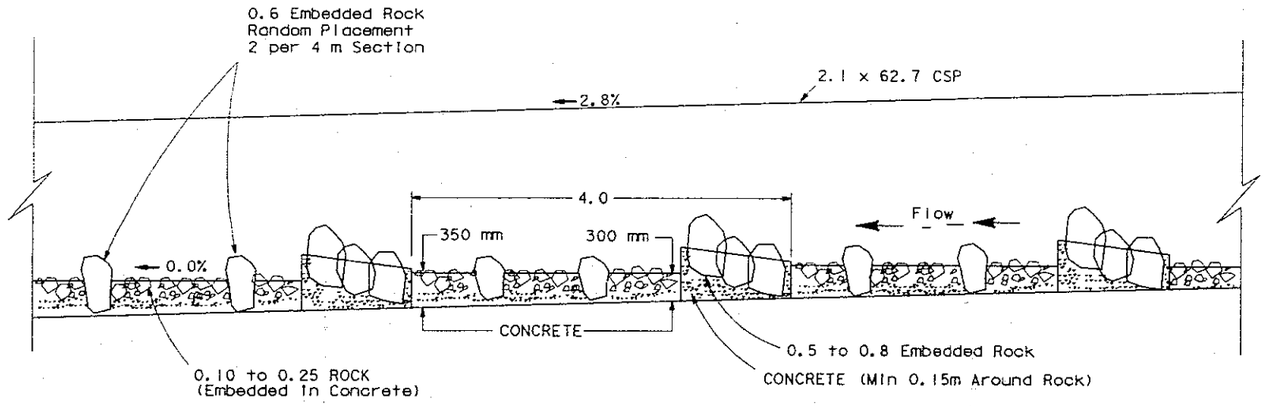
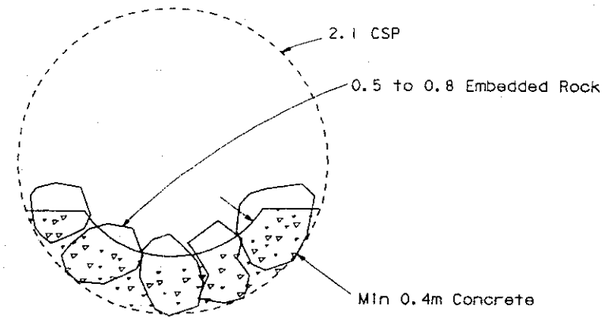
Caltrans Metric





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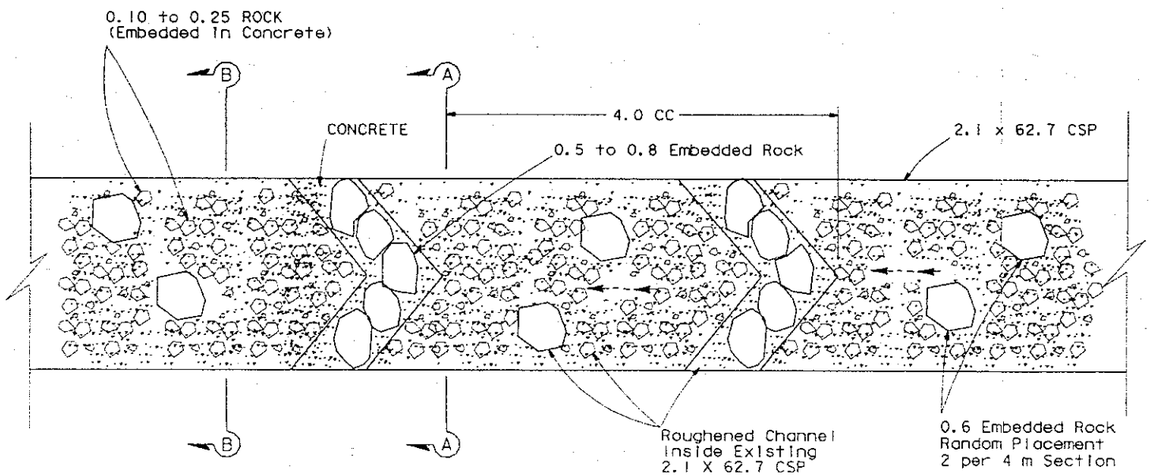

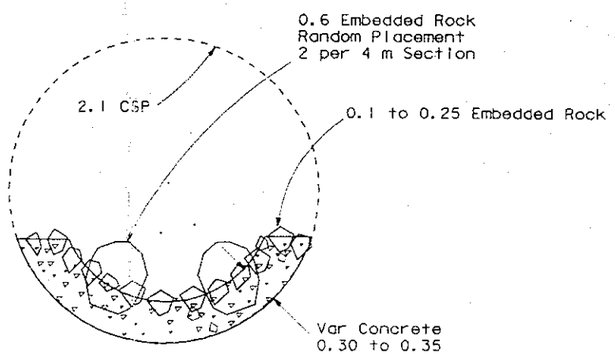

Section B-B

ROUGHENED CHANNEL DETAILS
D-4

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NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

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DGN FILE => 128_44R_004.dgn

CU 03230

EA 378101

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS

PROJECT ENGINEER
Sebastian Cohen

DATE	REVISED BY	DATE REVISED

CALCULATED/DESIGNED BY

CHECKED BY

LAST REVISED 30-0-0 PLOTTED => 30/09/2003 - 2:00 PM

SR 128 / PM 36.63 Lost Creek

Lost Creek

Men-128-PM 36.63

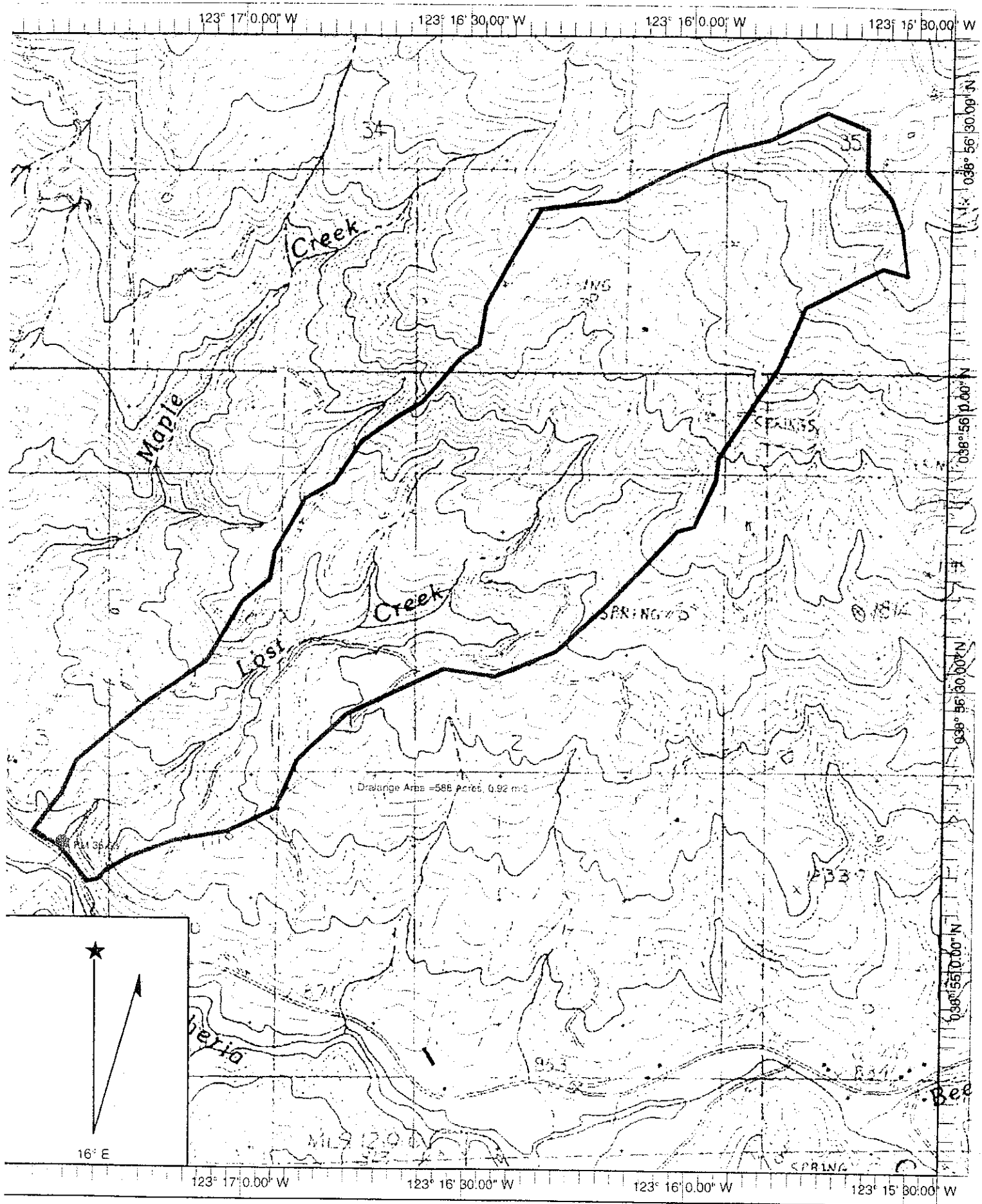
Existing: 2400 mm x 2400mm x 24.6 m (80.65 ft) @ 4.1% slope
Active Channel Width = 12.0ft
4.3% US Channel Grade, 4.0% DS Channel Grade

Proposed: Concrete weirs drill & bonded inside RCB, Pool & Weir style Jump Pools at Outlet

	*Existing Conditions				**Proposed Conditions (in RCB @ weir)					***Proposed Conditions (in Fishway @ Weir)			
Adult Anadromous	Velocities (fps)	Depths (ft)	Flow Area (ft^2)	EDF (culvert)	Velocities (fps)	Depths (ft)	Flow Area (ft^2)	EDF(culvert)	EDF(pool)	Velocities (fps)	Depths (ft)	Flow Area (ft^2)	EDF (pool)
Lower Q50% (cfs) 3.00	4.4	0.09	0.72	10.56	1.61	0.23	1.87	5.85	0.71	1.30	0.15	2.30	0.38
Upper Q1% (cfs/cfs) 20.55	9.32	0.28	2.24	23.24	3.05	0.84	6.73	12.57	4.89	2.48	0.55	8.3	2.6
Resident Trout													
Lower Q90% (cfs) 2.00	3.75	0.07	0.56	9.05	1.40	0.18	1.42	5.20	0.48	1.14	0.12	1.76	0.25
Upper Q5% (cfs) 6.96	6.12	0.14	1.12	15.74	2.13	0.41	3.27	7.49	1.66	1.73	0.27	4.03	0.88
Juvenile Salmonids													
Lower Q95% (cfs) 1.00	2.65	0.04	0.32	7.92	1.11	0.11	0.90	3.90	0.24	0.90	0.07	1.11	0.13
Upper Q10% (cfs) 3.55	4.7	0.09	0.72	12.49	1.70	0.26	3.27	6.15	0.84	1.38	0.17	2.57	0.45

			Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D	Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D
Q10=	193	cfs	17.34	1.39	Inlet	0.17	6.44	3.75	Outlet	0.47
Q100=	381	cfs	19.83	2.4	Inlet	0.3	8.08	5.89	Outlet	0.74

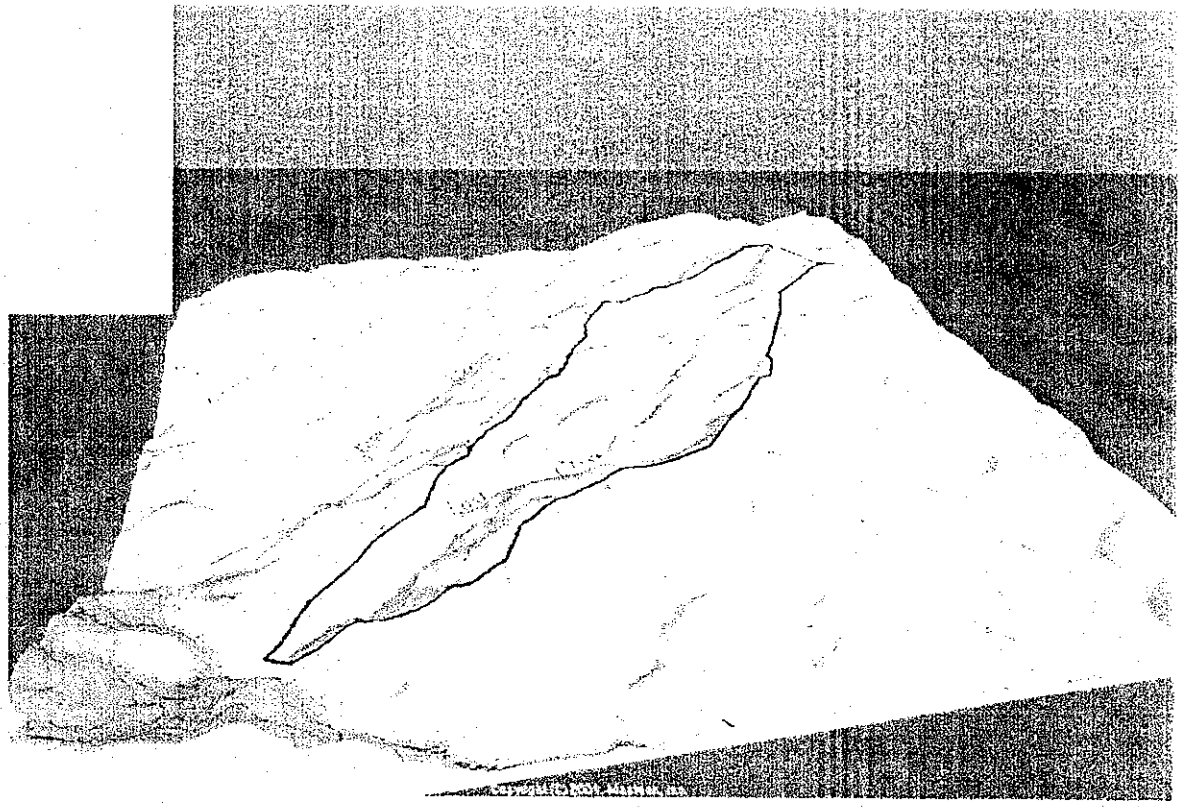
NOTES:
* Velocities and depths determined using Culvert Master software program (FHWA Equations) (diam=8.0ft x 8.0ft RCB, n=0.012)
** Velocities and depths at weir, EDF (pool) assumes pool & wier hydraulics, EDF (culvert) assumes culvert hydraulics (roughened channel)
*** Velocities and depths at wier, assumes pool & weir hydraulics
Fish Design Flow Rates determined from Exceedence Flow Curves derived from local gauge stations
Q10 and Q100 flow rates detrmined from Regional Method, based on Q annual of 50 in/yr



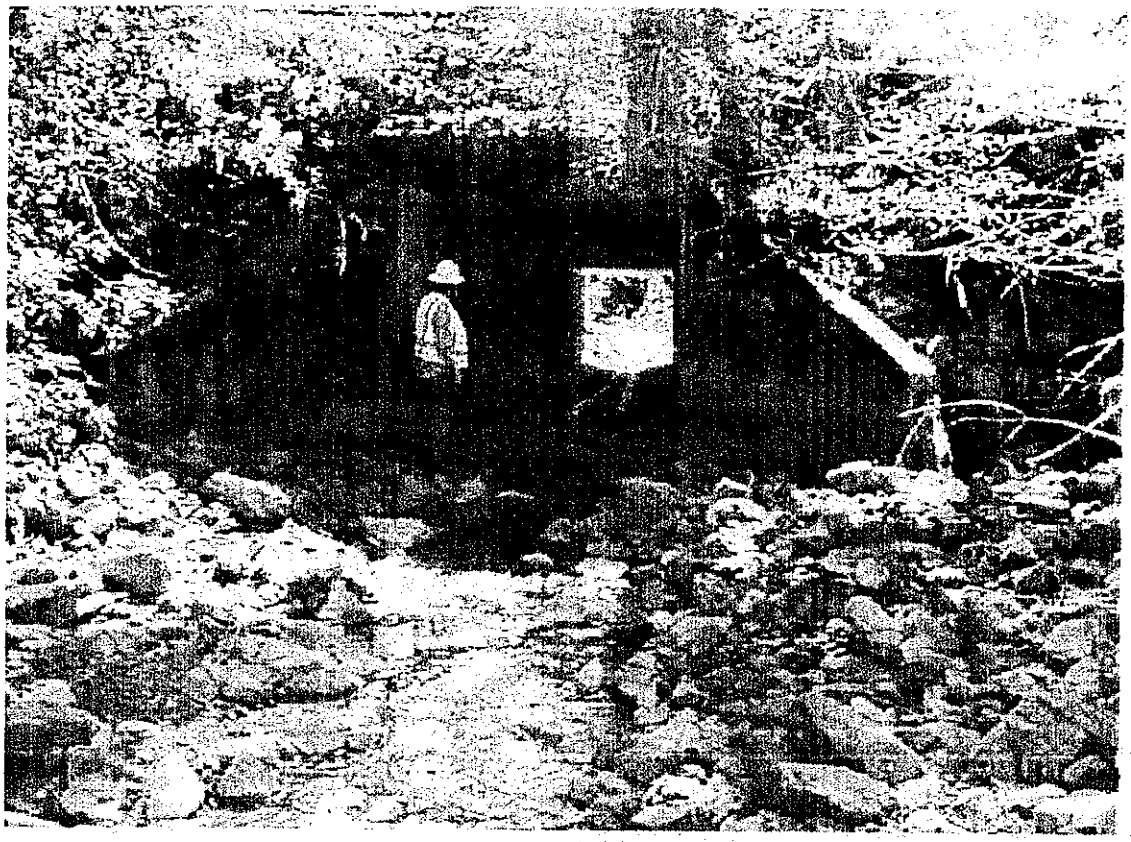
Name: ORNBAUN VALLEY
Date: 4/8/2003
Scale: 1 inch equals 1333 feet

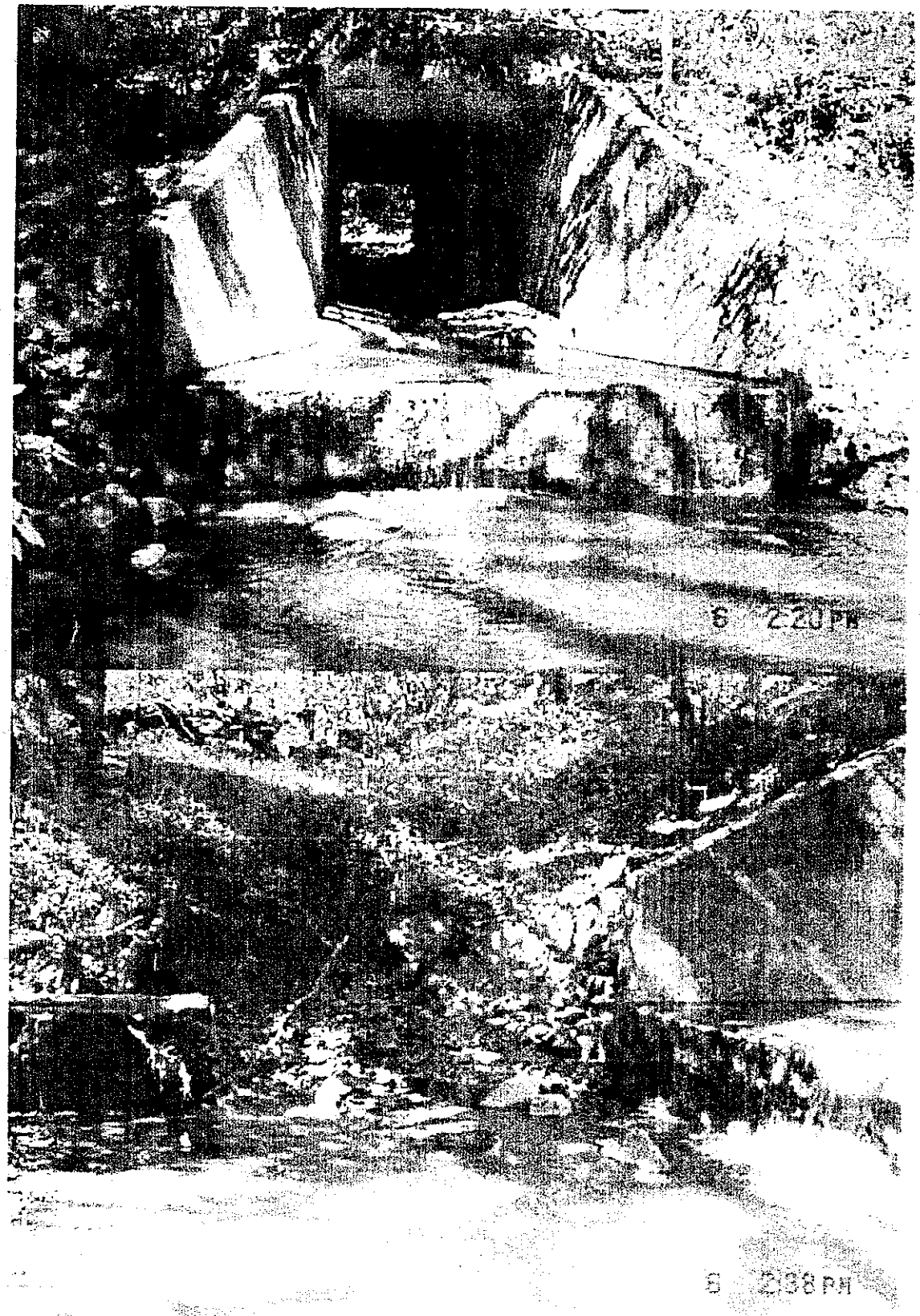
Location: 038° 55' 39.0" N 123° 16' 29.1" W
Caption: Men-128-PM 36.63
Drainage Area 588 Acres. 0.92 mi2
2.4m x 2.4m x 24.6m RCB

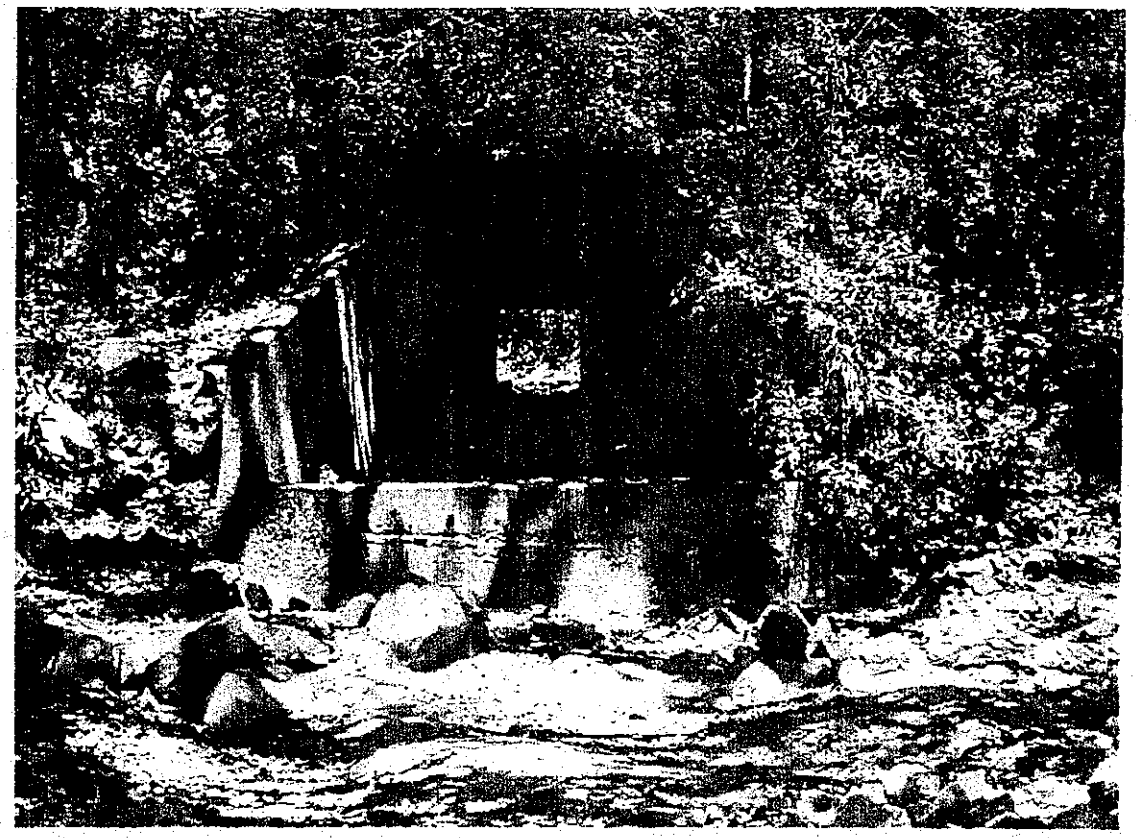
2.4m X 2.4m x 24.6m RCB Culvert @ Men-128-PM 36.63 Lost Creek
Drainage Area = 588 acres. 0.92 mi2
01-378100



Men-128-PM 36.63
24.6m x 2.4m x 2.4m RCB
4.1 % Slope
headwall & wingwalls @ inlet and outlet



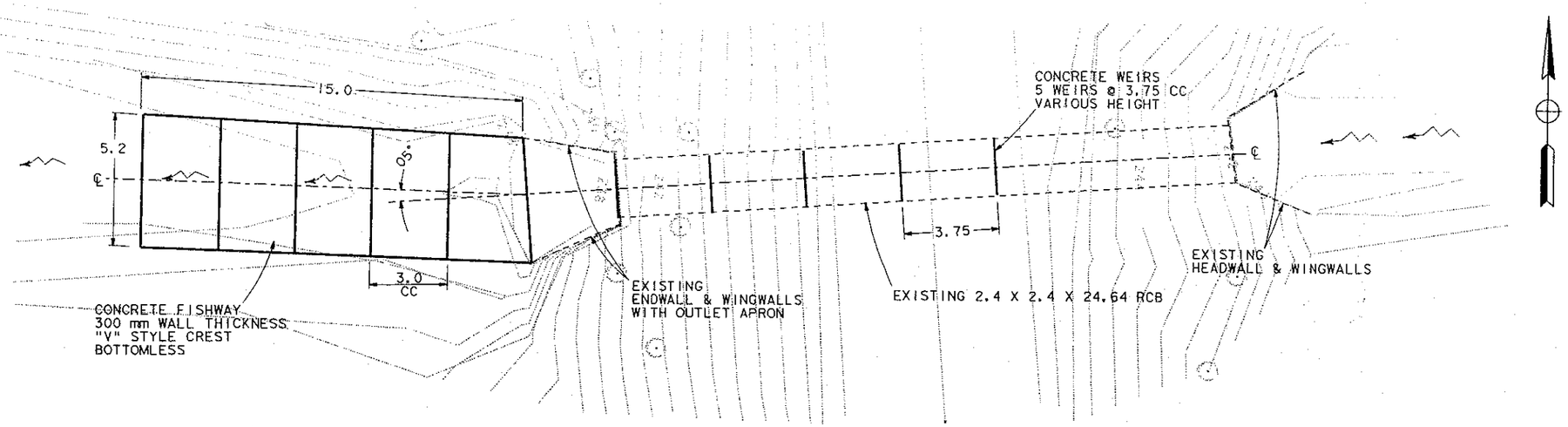

6 2:20PM
6 2:38PM

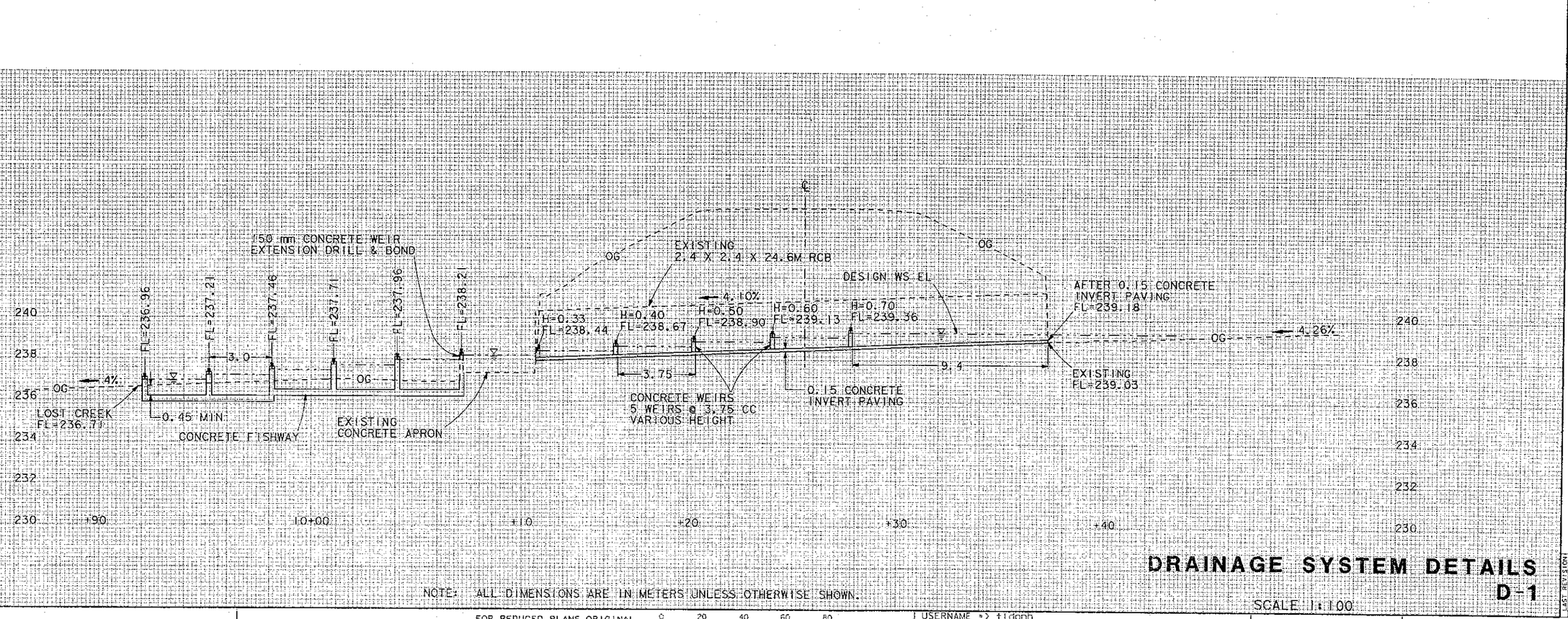


DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Men	128	36.63	1	2

FOR DESIGN STUDY ONLY

Caltrans Metric





DRAINAGE SYSTEM DETAILS D-1

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

SCALE 1:100

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => tidonh
DGN FILE => 128_3663_0001.dgn

CU 03230

EA 378101

LAST REVISION 00-00-00

DATE PLOTTED => 17-SEP-2003

DATE	REVISED BY	DATE REVISED

CALCULATED/DESIGNED BY

CHECKED BY

PROJECT ENGINEER: Sebastian Cohen

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

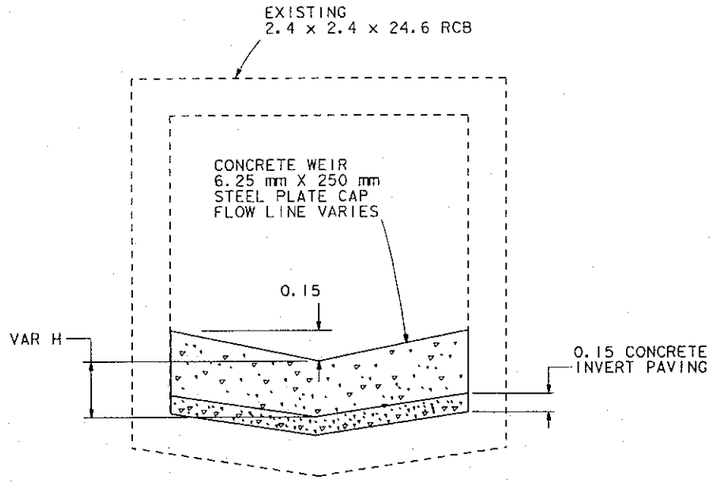
Caltrans

HYDRAULICS

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Men	128	36.63	2	2

FOR DESIGN STUDY ONLY

Caltrans Metric



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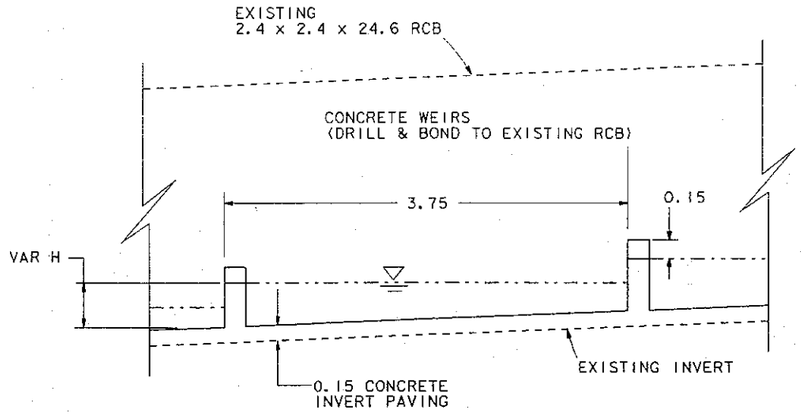
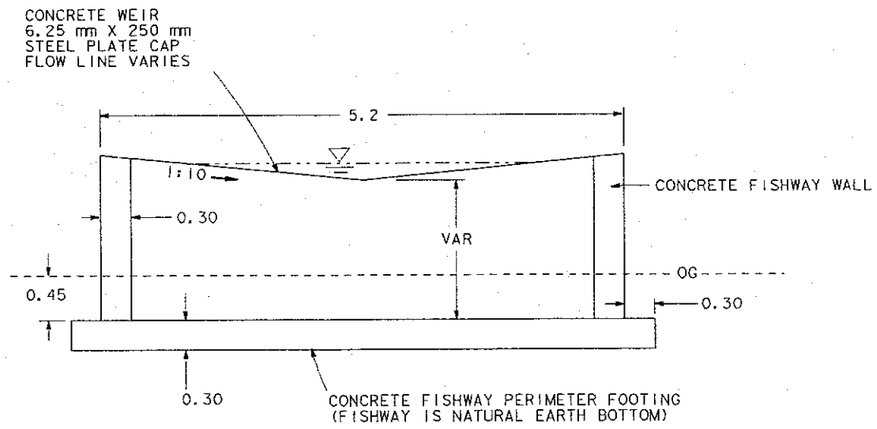
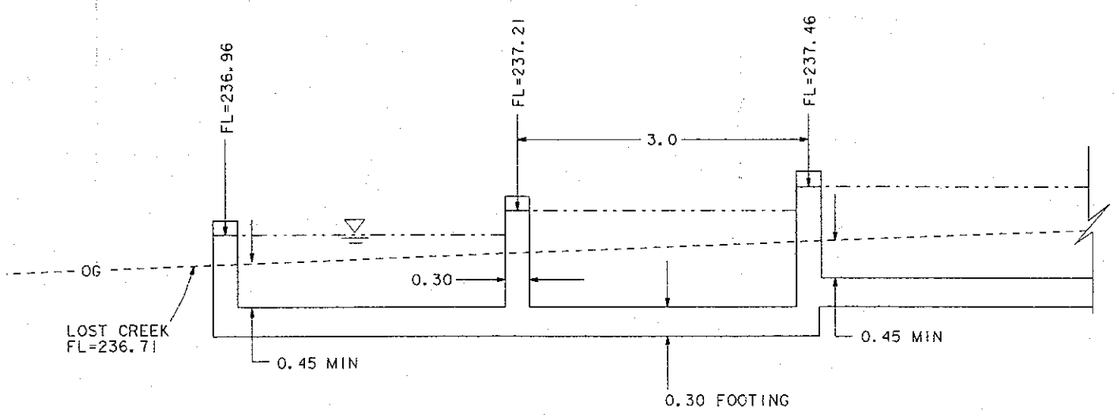


PROFILE

CONCRETE WEIR



TYPICAL



PROFILE

CONCRETE FISHWAY

DRAINAGE SYSTEM DETAILS D-2

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

NO SCALE

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => tidonh
DGN FILE => 128_3663_002.dgn

CU 03230

EA 378101

LAST REVISION 00-0 DATE PLOTTED => 12-FEB-2007

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans HYDRAULICS
PROJECT ENGINEER Sebastian Cohen
CALCULATED/ DESIGNED BY
CHECKED BY
DATE REVISED BY
DATE REVISED

SR 128 / PM 39.88 John Hiatt Creek

Beebee Creek

Men-128-PM 39.88

Existing: 2100 mm (7ft) x 55.5 m (181 ft) SSPP @ 2.69% slope
Active Channel Width = 13.7ft
4.8 % US Channel Grade, 1.2% DS Channel Grade

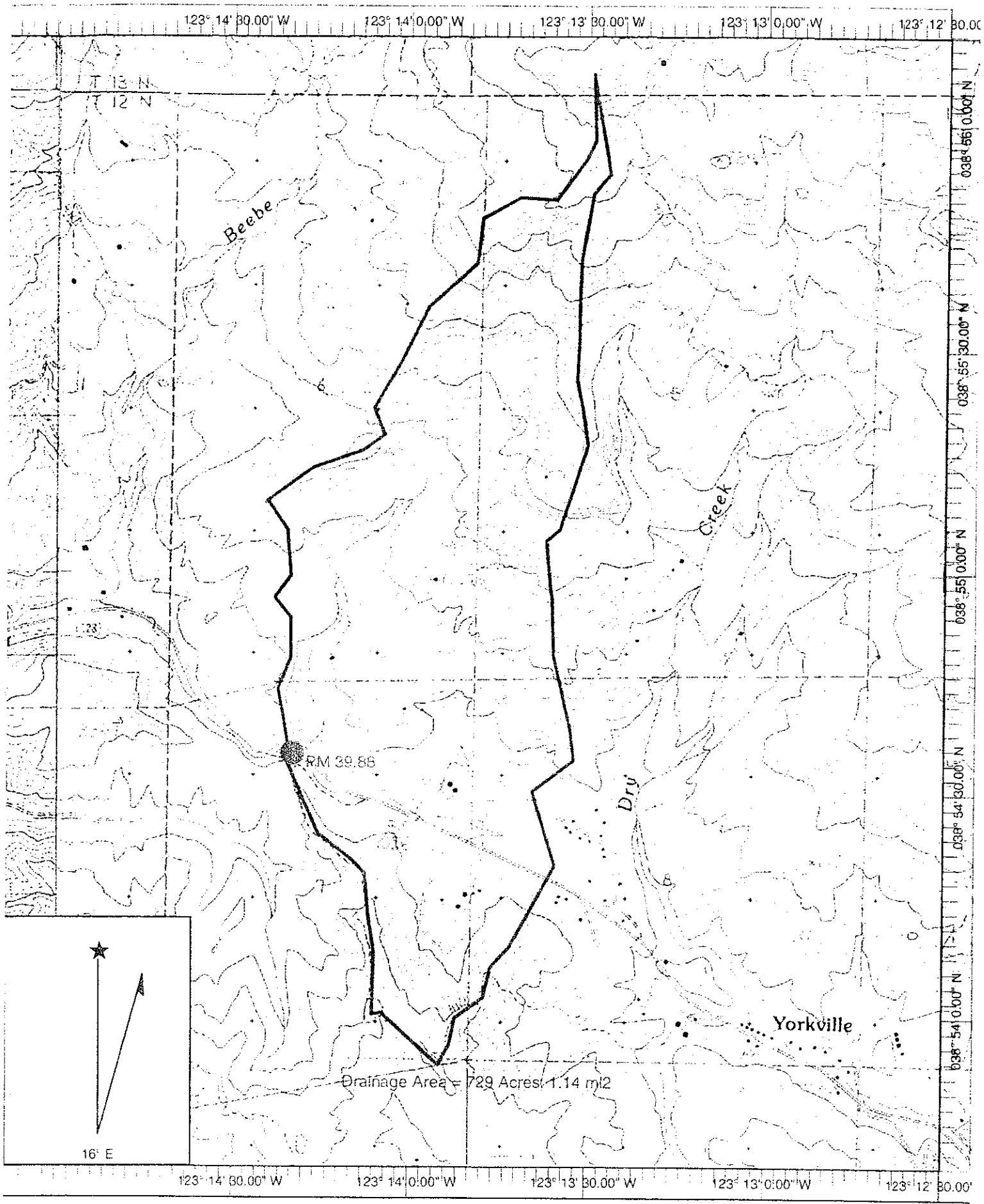
Proposed: Roughened Channel Design, Concrete Weirs and RSP @ Outlet, Bank stabilization RSP on channel bank at outlet.

	*Existing Conditions				**Proposed Conditions			
Adult Anadromous	**Velocities (fps)**	**Depths (ft)**	**Flow Area (ft^2)**	**EDF**	**Velocities (fps)**	**Depths (ft)**	**Flow Area (ft^2)**	**EDF**
Lower Q50% (cfs) 3.00	5.97	0.27	0.49	10.28	3.06	0.43	0.98	5.14
Upper Q1% (cfs/cfs) 25.48	11.44	0.75	2.2	19.44	5.34	1.27	4.76	8.99
Resident Trout								
Lower Q90% (cfs) 2.00	5.28	0.23	0.39	8.61	2.76	0.35	0.72	4.66
Upper Q5% (cfs) 8.63	8.24	0.45	1	14.49	4.01	0.73	2.13	6.80
Juvenile Salmonids								
Lower Q95% (cfs) 1.00	4.27	0.16	0.22	7.63	2.32	0.25	0.44	3.81
Upper Q10% (cfs) 4.40	6.85	0.32	0.63	11.72	3.38	0.52	1.29	5.73

			Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D	Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D
Q10=	225.9	cfs	19.09	2.42	Inlet	0.9	10.48	4.02	Outlet	1.28
Q100=	459.6	cfs	22.07	3.73	Inlet	1.47	15	5.65	Outlet	5.46

NOTES:

* Velocities and depths determined using Culvert Master software program (FHWA Equations) (diam=7.0ft, n=0.024)
** Velocities and depths determined using Culvert Master software program (FHWA Equations) (diam=6.0ft, n=0.060)
Fish Design Flow Rates determined from Exceedence flow curves derived from local gauge stations
Q10 and Q100 flow rates detrmined from Regional Method, based on Q annual of 50 in/yr



Name: YORKVILLE
Date: 4/8/2003
Scale: 1 inch equals 1666 feet

Location: 038° 54' 55.9" N 123° 13' 49.2" W
Caption: Men-128-PM 39.88
2.1m x 55.2m SSPP w/ Invert Paving

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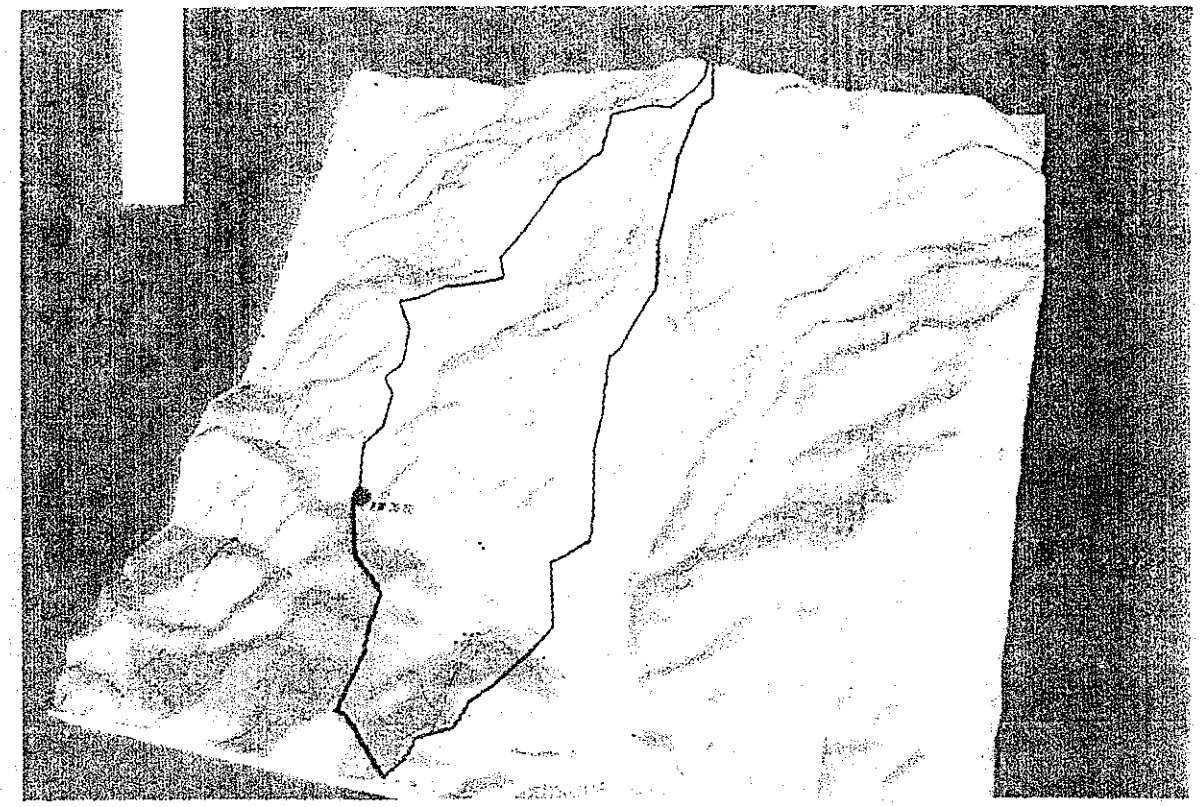
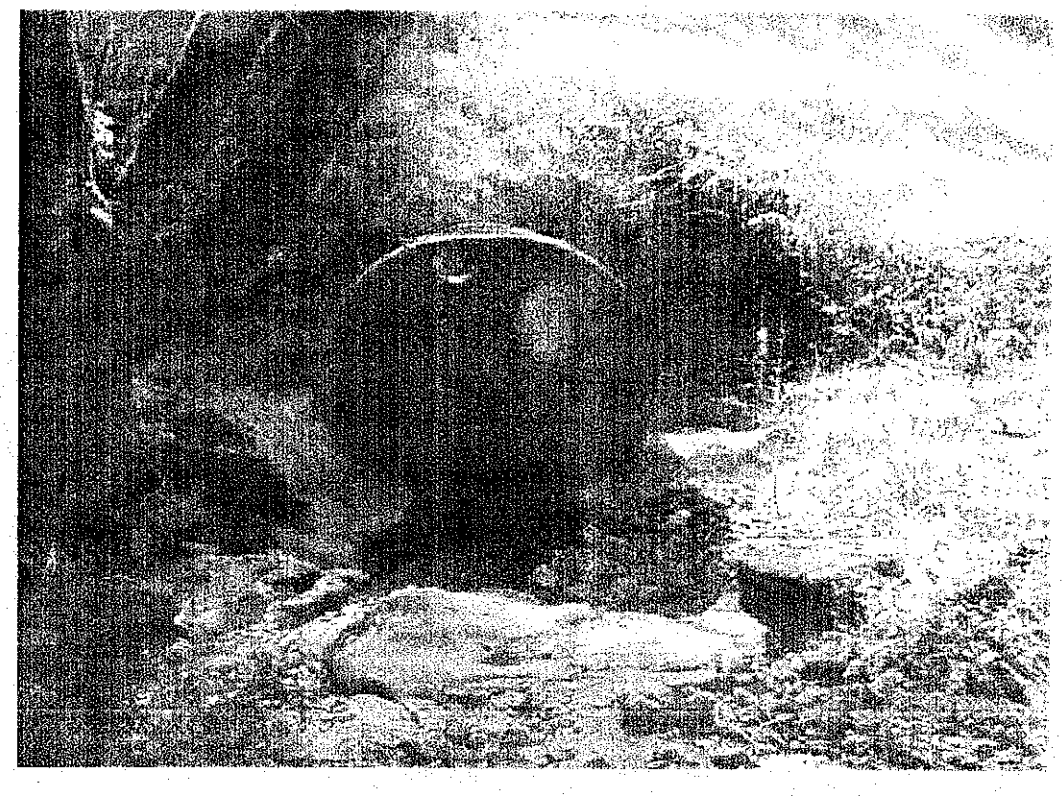
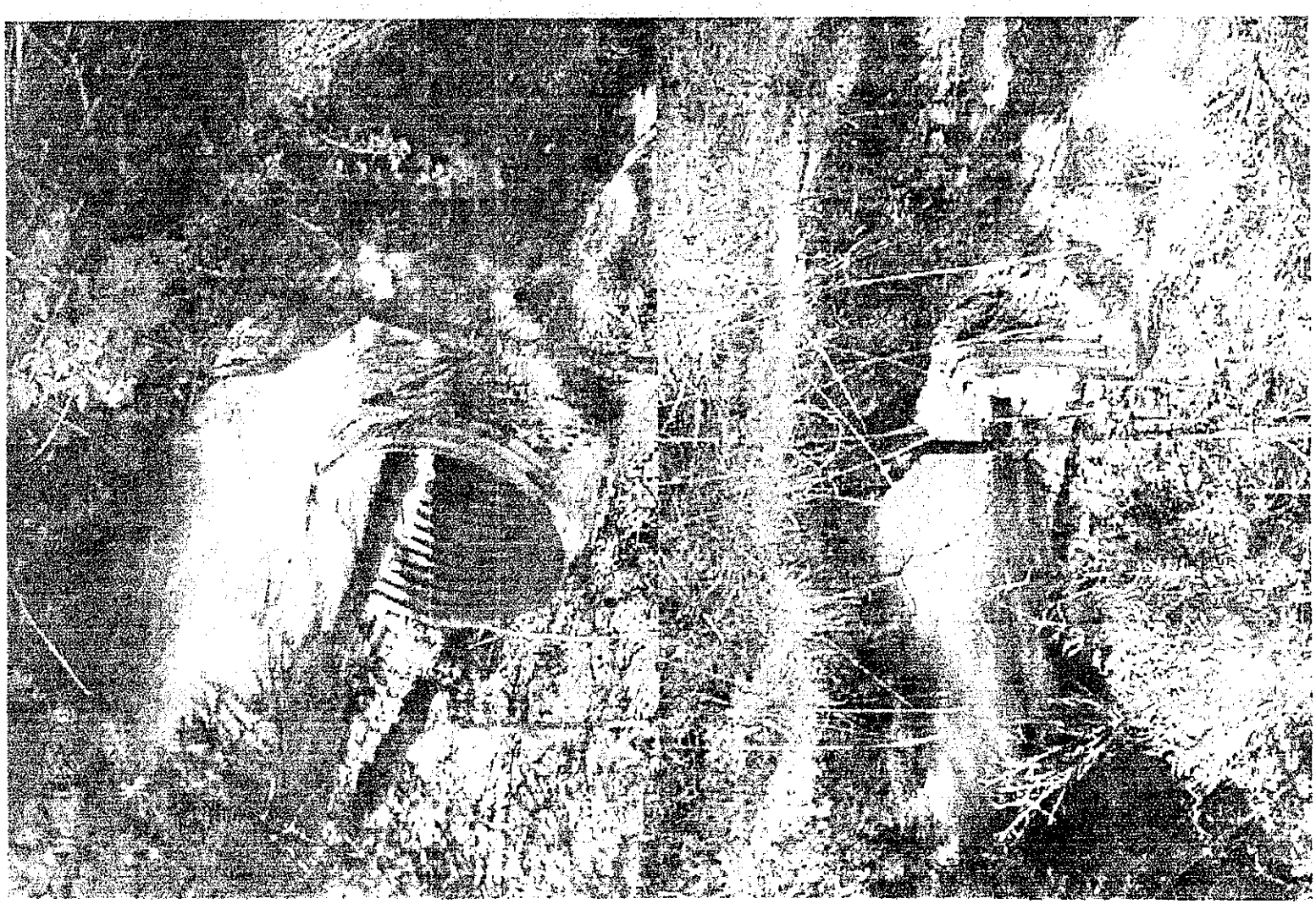
John Hiatt

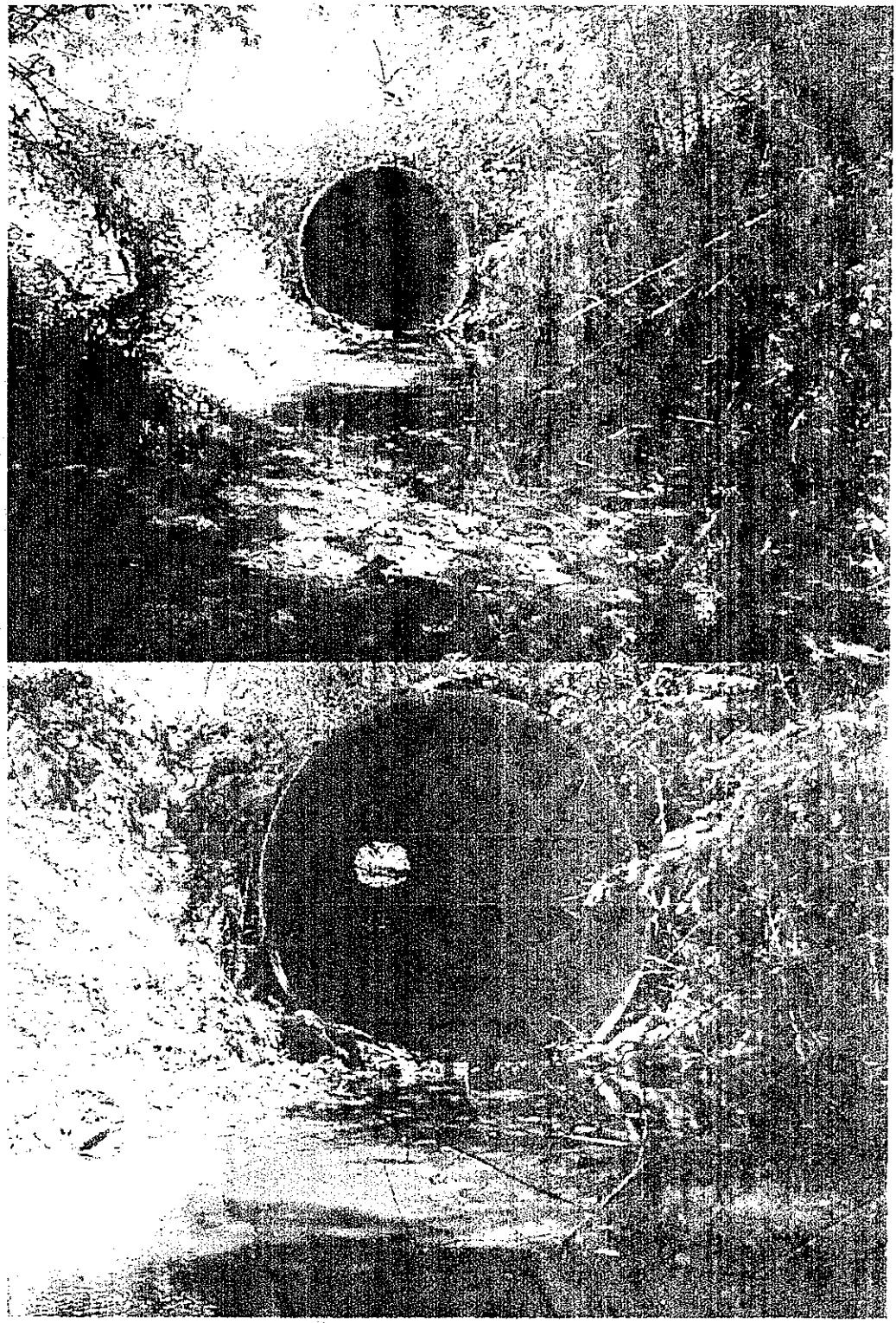
PM 39.88 [redacted] Creek, 2.1m x 55.2m CSP w/ Invert Paving
Drainage Area = 729 Acres, 1.14 mi2
01-378100



Men-128-PM 39.88, John Hiatt Creek
55.2m x 2.1m CSP with concrete invert paving
2.69 % Slope
Projecting inlet and outlet



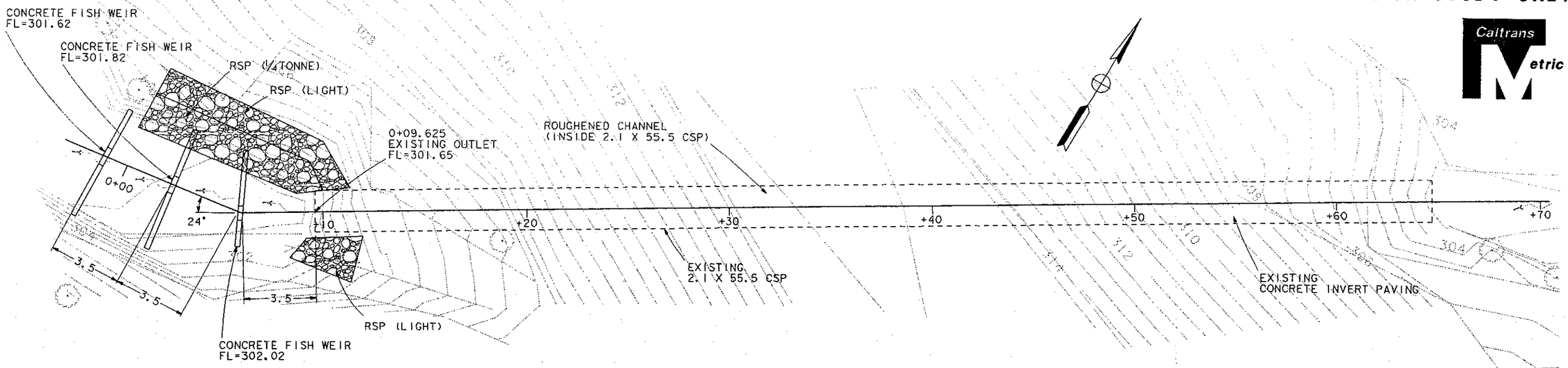


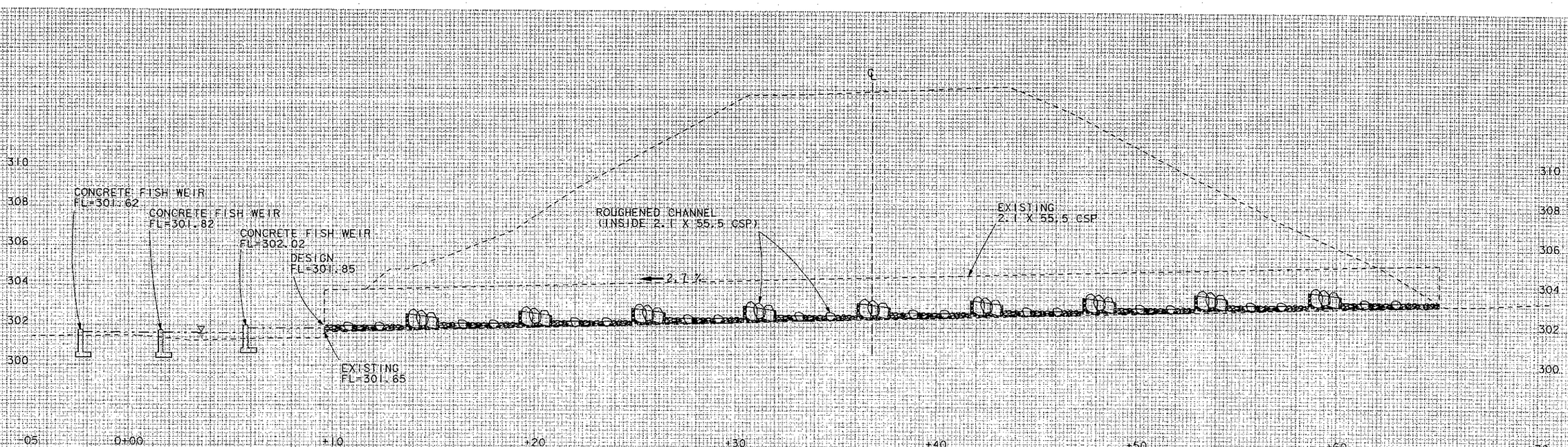


DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
01	Men	128	39.88	1	4

FOR DESIGN STUDY ONLY

Caltrans Metric





DRAINAGE SYSTEM DETAILS
D-1

SCALE 1:100

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS

PROJECT ENGINEER
Sebastian Cohen

CALCULATED/ DESIGNED BY

CHECKED BY

DATE	REVISED BY	DATE REVISED

LAST REVISION 00-00-00

DATE PLOTTED => 17-SEP-2003

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => fldonh
DGN FILE => 128_3988_001.dgn

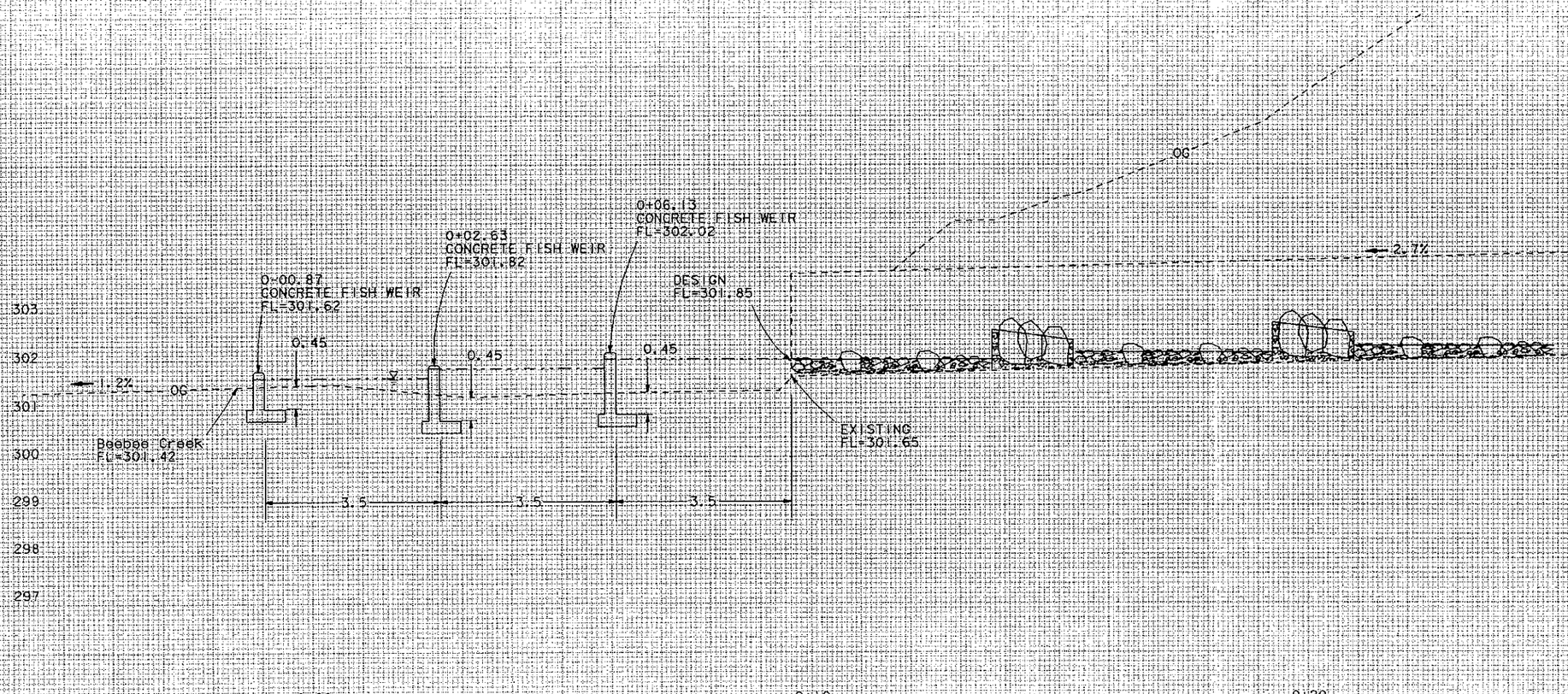
CU 03230

EA 378101

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
01	Men	128	39.88	2	4

FOR DESIGN STUDY ONLY

Caltrans Metric



NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

DRAINAGE SYSTEM DETAILS
D-2

SCALE 1:50

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	PROJECT ENGINEER
Caltrans HYDRAULICS	Sebastian Cohen

DATE	REVISED BY	DATE REVISED

CALCULATED/ DESIGNED BY

CHECKED BY

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => tldonh
DGN FILE => 128_3998_002.dgn

CU 03230

EA 378101

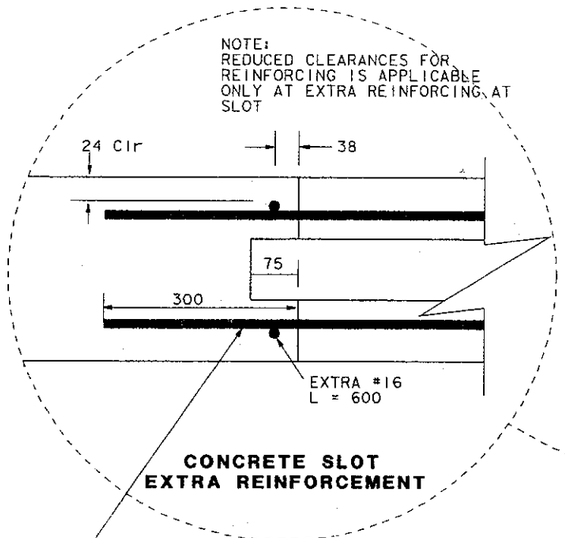
LAST REVISION 10-01-200-

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
01	Men	128	39.88	3	4

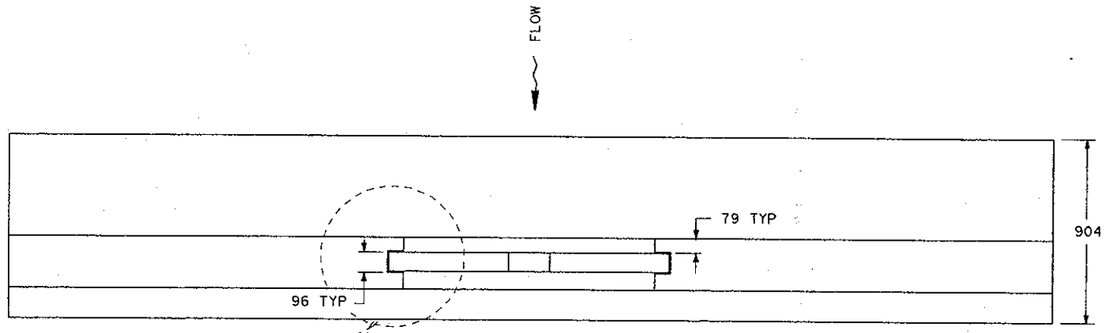
FOR DESIGN STUDY ONLY

Caltrans Metric

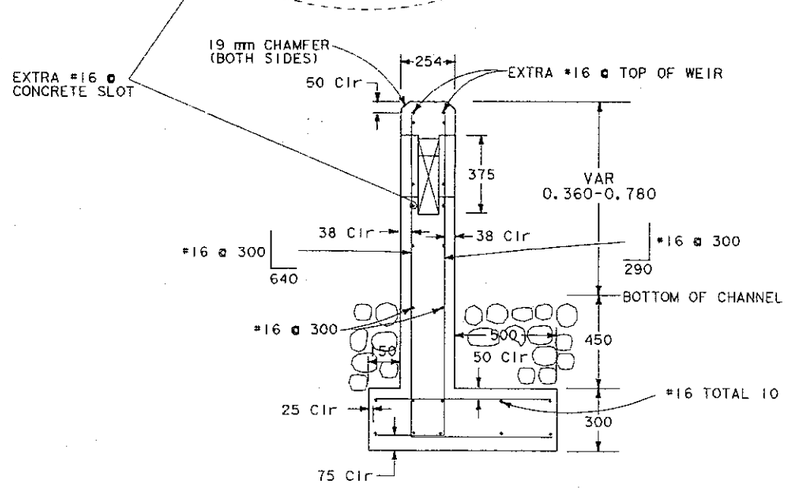
CONCRETE WEIR		
WEIR STATION	H	L
	m	
0-0.87	0.6	6.00
0+2.63	1.0	6.40
0+6.13	1.2	4.85



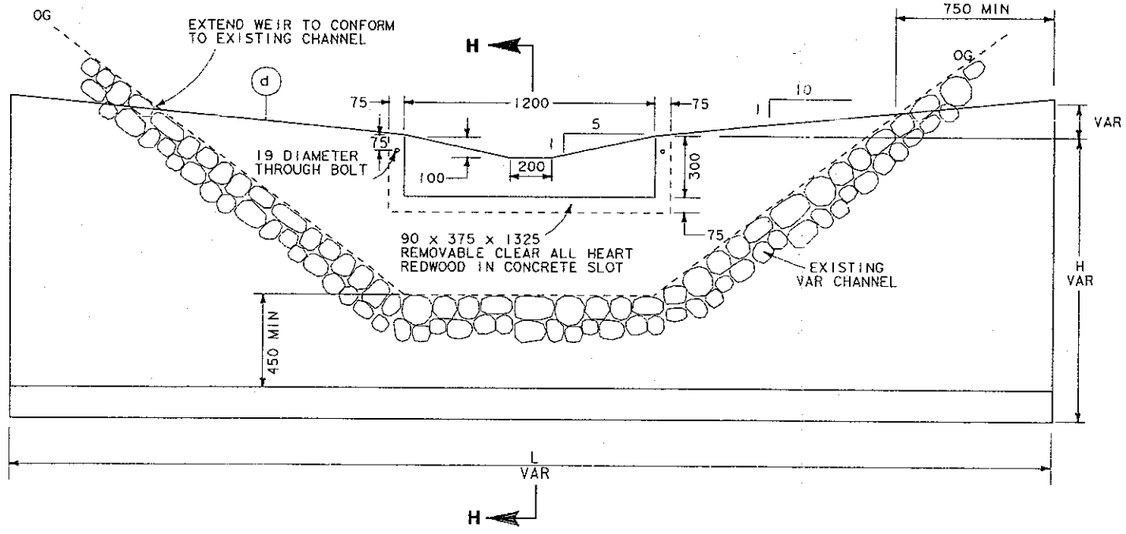
CONCRETE SLOT EXTRA REINFORCEMENT



PLAN



SECTION H-H CONCRETE REINFORCEMENT



ELEVATION

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

FISH WEIR DETAILS

D-3

NO SCALE

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS
PROJECT ENGINEER: Sebastian Cohen
CALCULATED/ DESIGNED BY
CHECKED BY
DATE REVISED BY
DATE REVISED

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => tidonn
DGN FILE => 128_3988_003.dgn

CU 03230

EA 378101

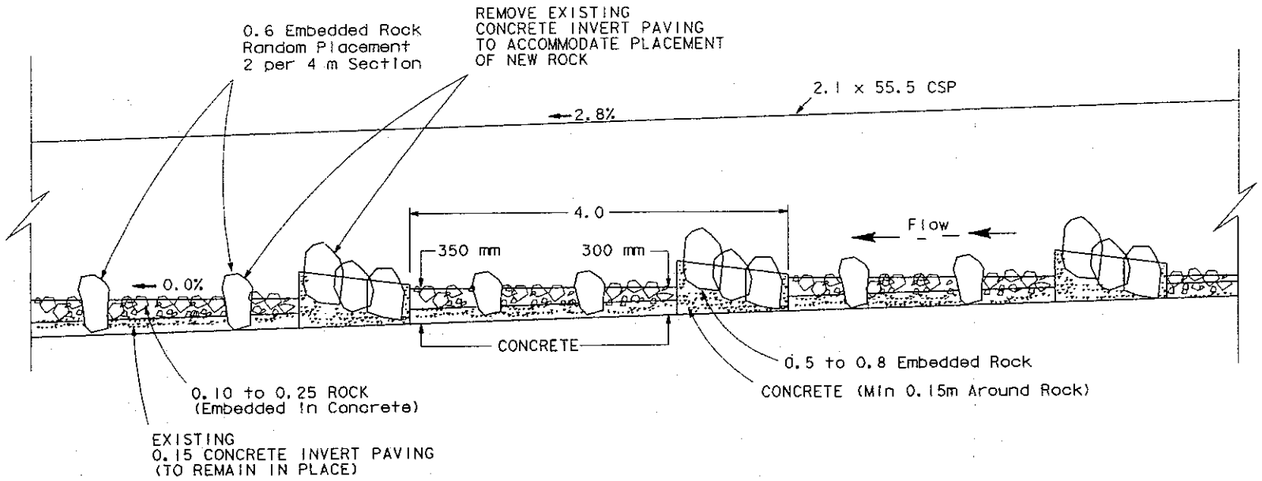
LAST REVISION 00-00-00

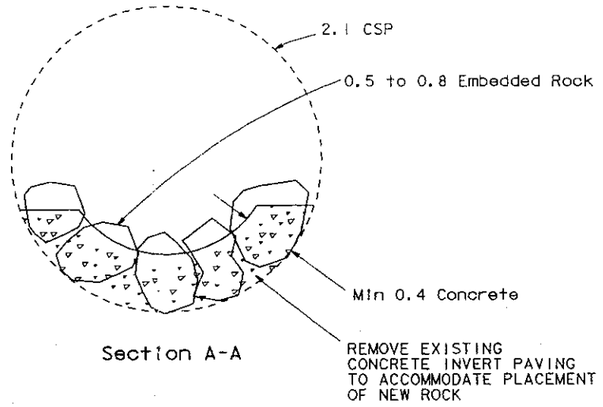
DATE PLOTTED => 17-SEP-2003

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
01	Men	128	39.88	4	4

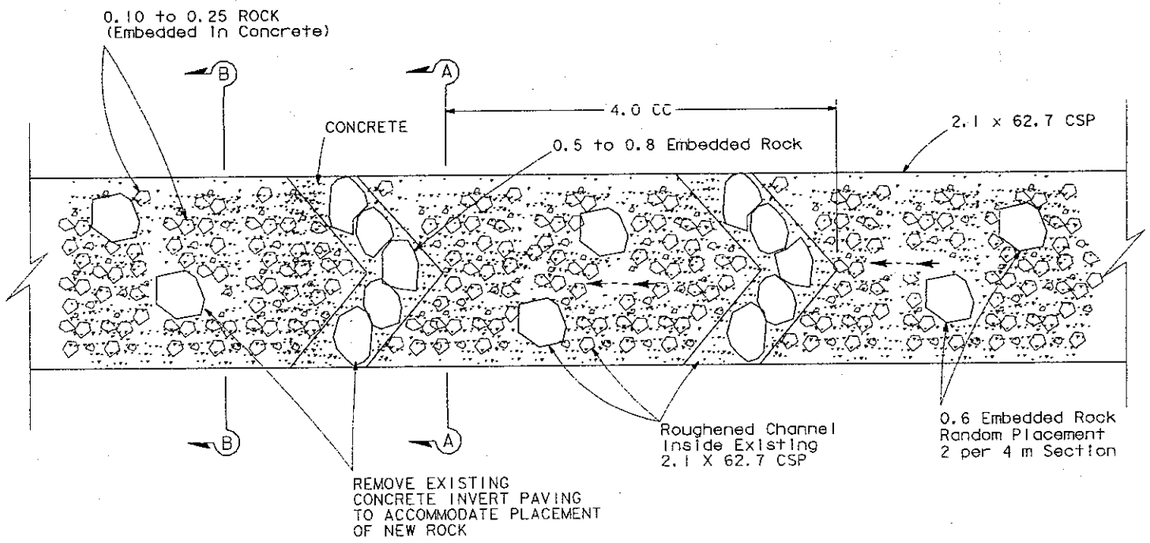
FOR DESIGN STUDY ONLY

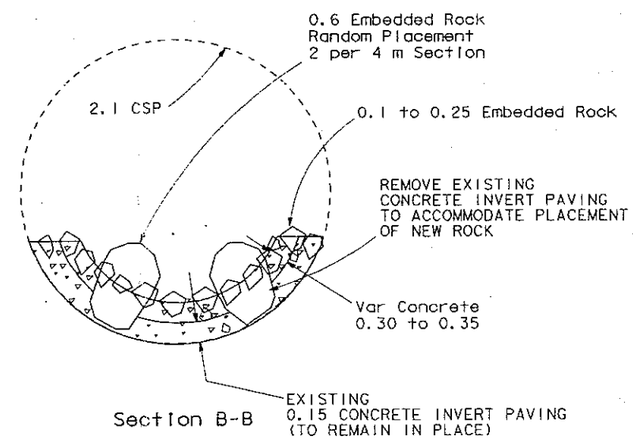
Caltrans Metric





Section A-A





Section B-B

ROUGHENED CHANNEL DETAILS
D-4

NO SCALE

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS

PROJECT ENGINEER: Sebastian Cohen

CALCULATED/DESIGNED BY | CHECKED BY | DATE | REVISED BY | DATE REVISED

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => tldanh
DGN FILE => 128_3988_004.dgn

CU 03230 | EA 378101

LAST REVISION | DATE PLOTTED => 12-SEP-2002

SR 128 / PM 49.66 Edwards Creek

Edwards Creek Trib

Men-128-PM 49.66

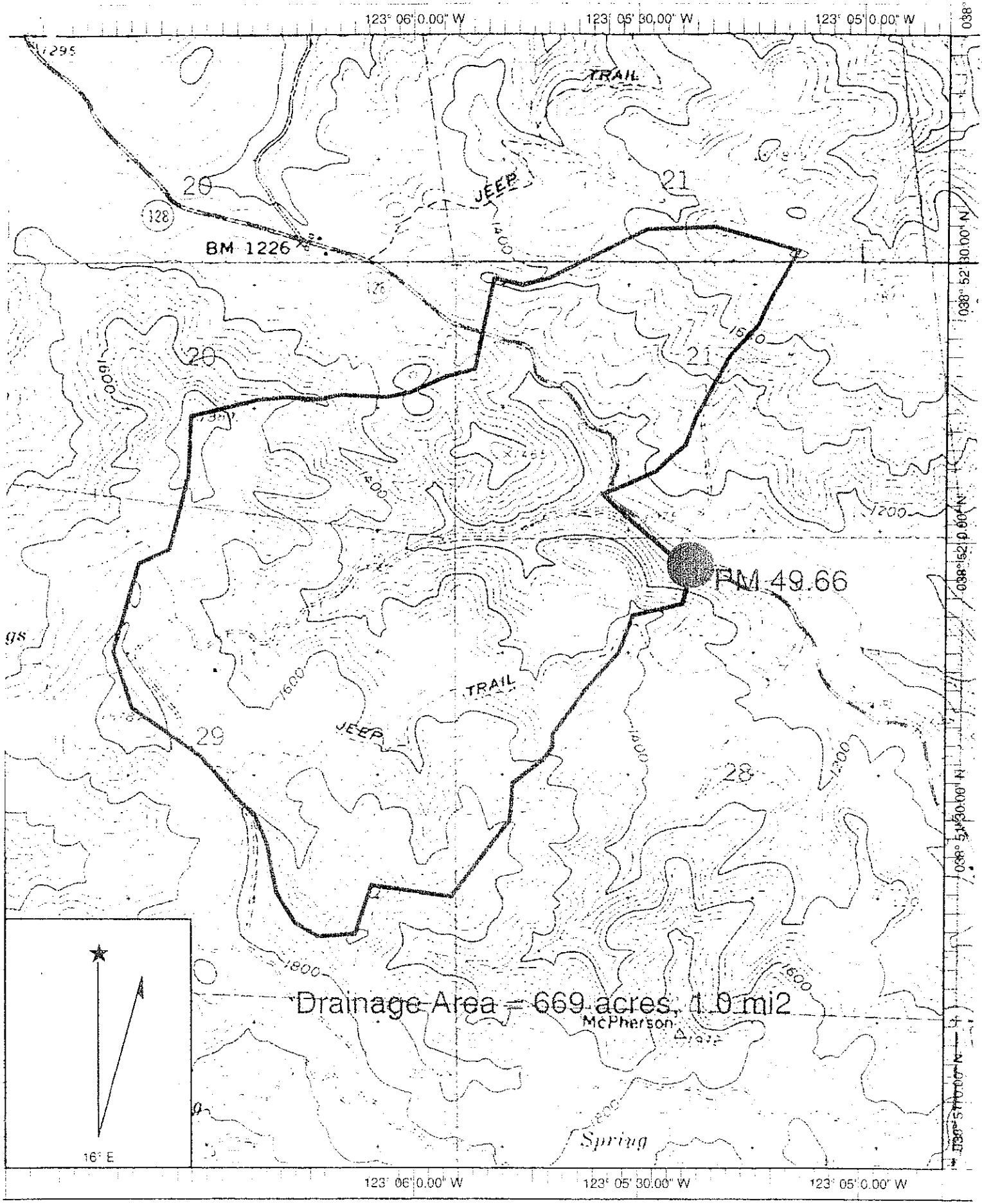
Existing: (1)- 50% embedded 1200mmCSP (2)-50% embedded 1500mmCSP
Active Channel Width = 13 ft
0.6 % US Channel Grade, 0.6% DS Channel Grade

Proposed: Embedded 4300mm x 2000mm RCB, concrete headwall and endwall
Import 3" Minus Cobble, Gradation Commensurate With Upstream and Downstream Stream Gradation

	*Existing Conditions (1200mm/1500mm)				**Proposed Conditions
Adult Anadromous	**Velocities (fps)**	**Depths (ft)**	**Flow Area (ft^2)**	**EDF**	
Lower Q50% (cfs) 3.00	2.59	0.31	0.37	0.51	**Embedded 4.3m (14 ft) Diameter RCB Culvert**
Upper Q1% (cfs/cfs) 23.38	4.39	0.87	1.04	1.40	
Resident Trout					
Lower Q90% (cfs) 2.00	2.34	0.25	0.3	0.42	
Upper Q5% (cfs) 7.92	3.32	0.51	0.61	0.81	
Juvenile Salmonids					
Lower Q95% (cfs) 1.00	1.96	0.18	0.22	0.28	
Upper Q10% (cfs) 4.03	2.84	0.37	0.44	0.57	

			Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D	Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D
Q10=	105.3	cfs	7.52	2.18	Outlet	1.2	3.37	2.23	Outlet	0.74
Q100=	426.5	cfs	17.12	3.08	Outlet	5.1	5.09	4.52	Outlet	1.51

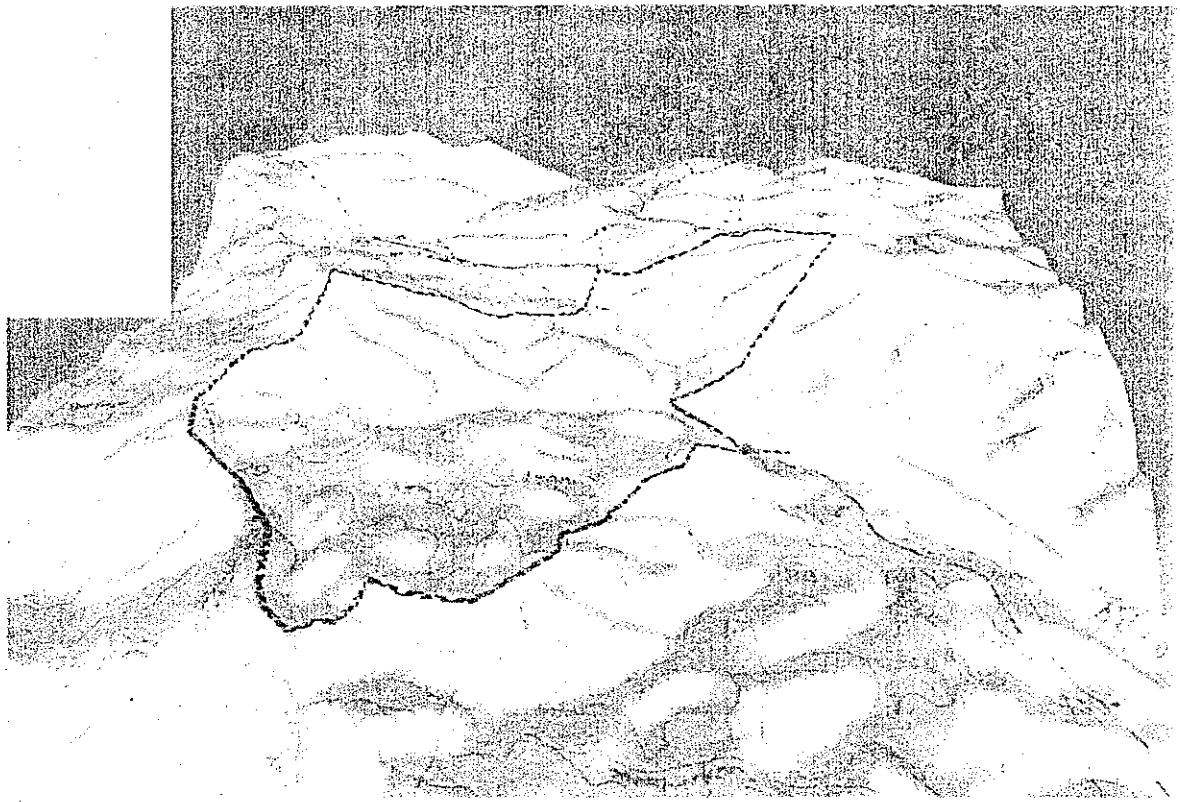
NOTES:
* Velocities and depths determined using Culvert Master software program (FHWA Equations) and FHWA Visual Urban Software Program.
* Stream Flow was assumed to be equally split between both existing culverts (velocities and depths are for each individual culvert, EDF stated is for 1200mm CSP)
** Velocities and depths not necessary for Stream Simulation designs
Fish Design Flow Rates determined from Exceedence flow curves derived from local gauge stations
Q10 and Q100 flow rates detrmined from Regional Method, based on Q annual of 50 in/yr



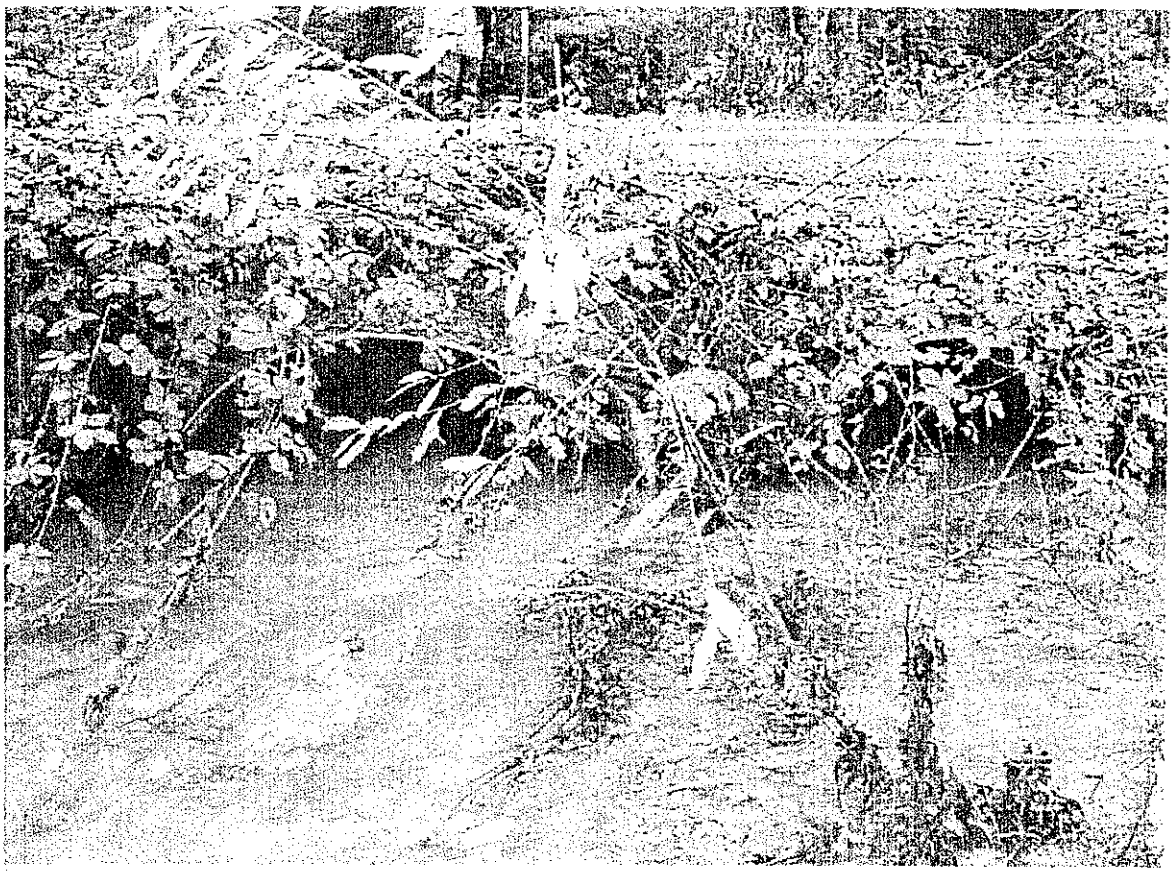
Name: CLOVERDALE
Date: 4/8/2003
Scale: 1 inch equals 1333 feet

Location: 038° 51 53.5" N 123° 05 52.0" W
Caption: Drainage Area = 669 acres, 1.0mi2

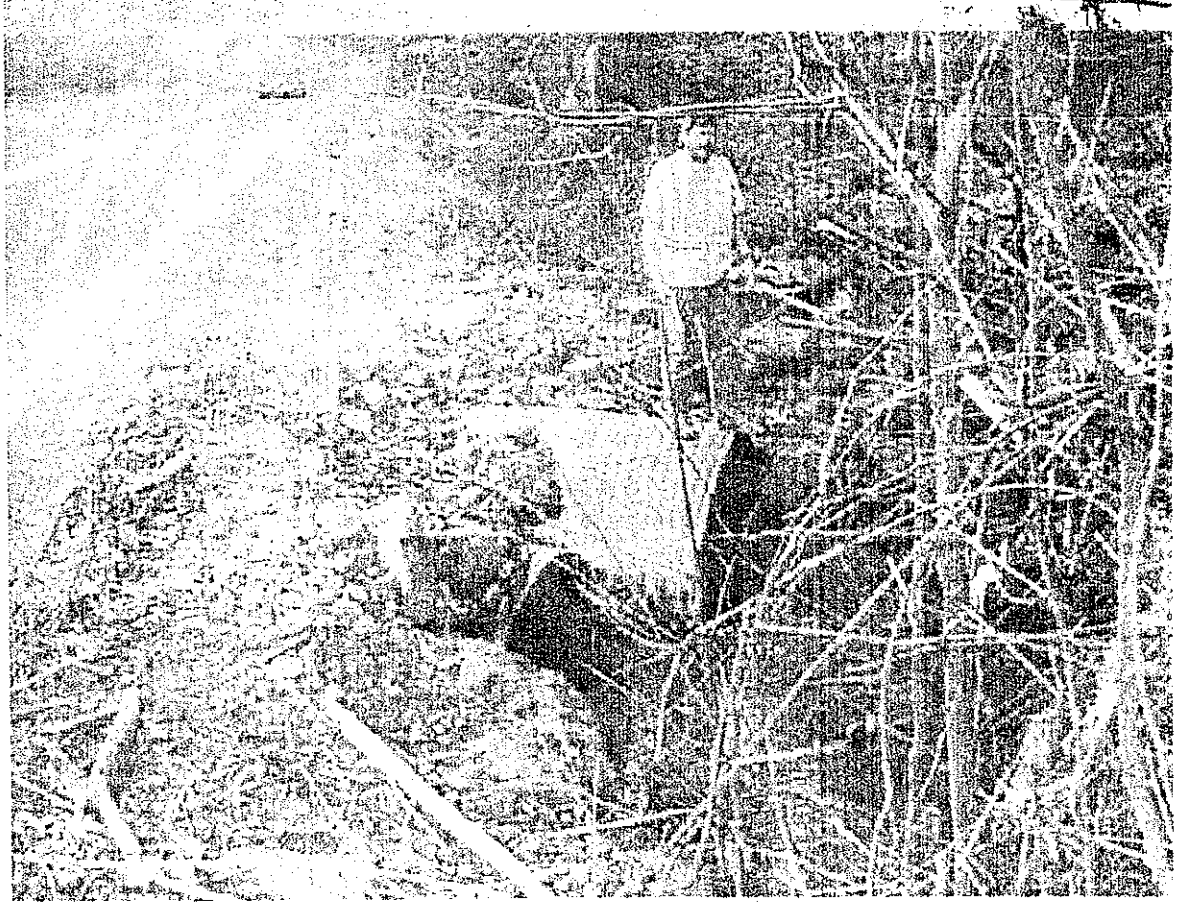
PM 36.63 Lost Creek, 1800mm (72") x 17.6m and 1200mm (48") x 17.6m CSP -50% embedded.
Drainage Area = 669 acres, 1.0 mi2
01-378100

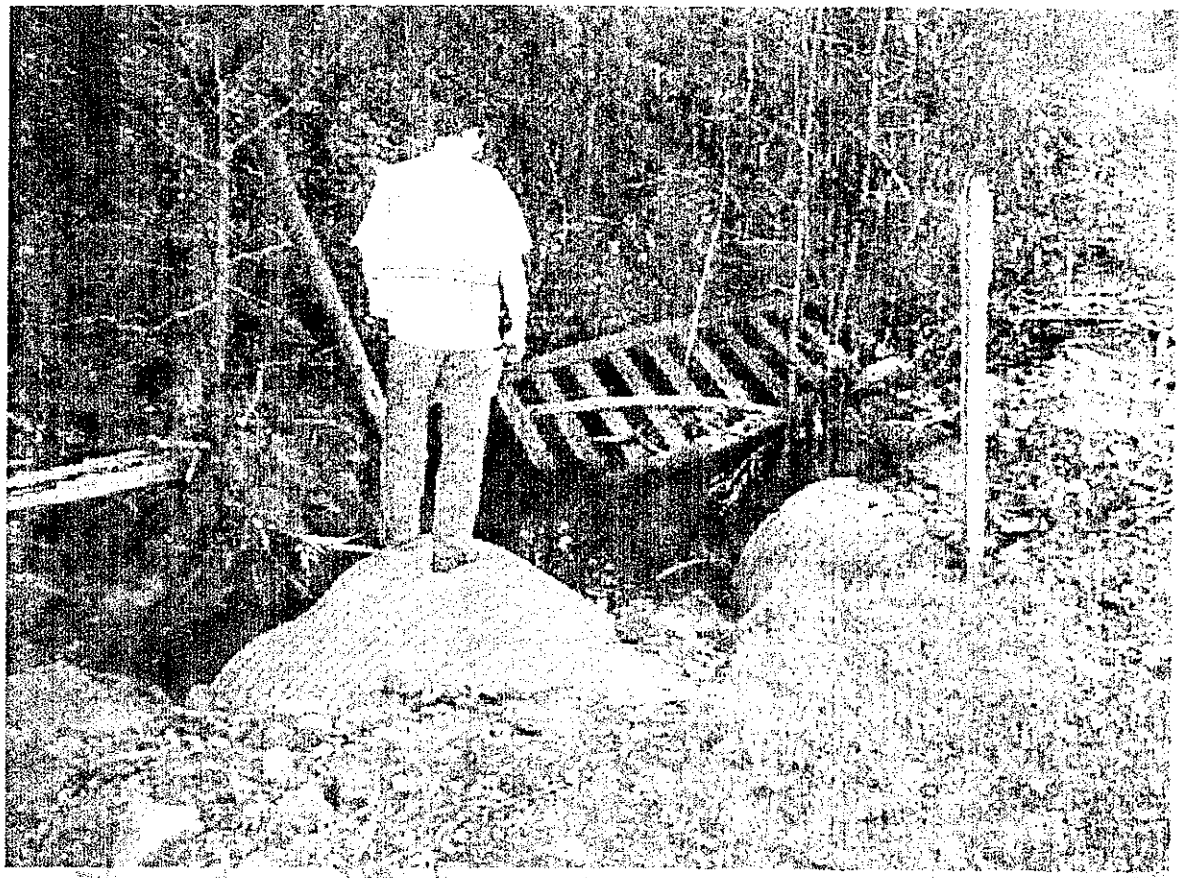


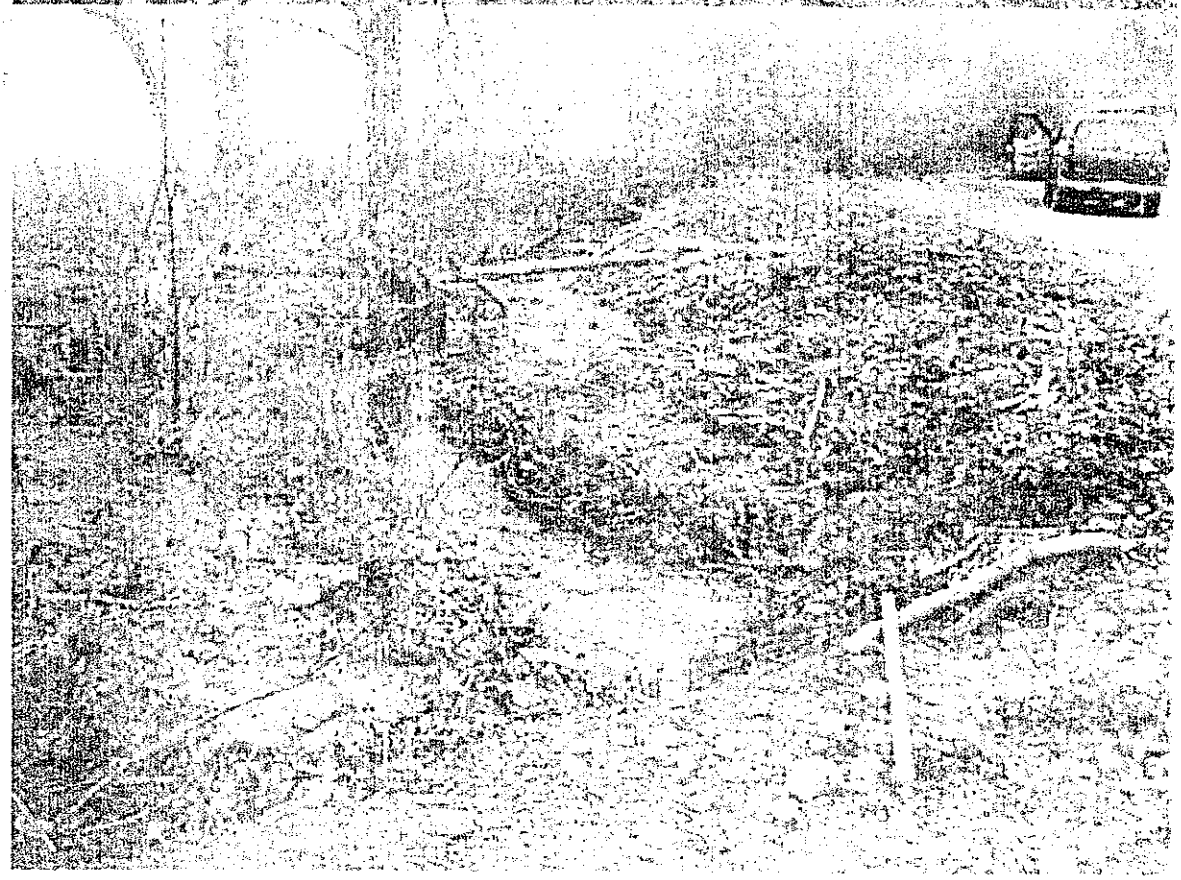
Men-128-PM 49.66, Edwards Creek Tributary
1- 1.2m CSP, 1-1.8m CSP Both 50% + Embedded
0 % Slope
Projecting inlet and outlet

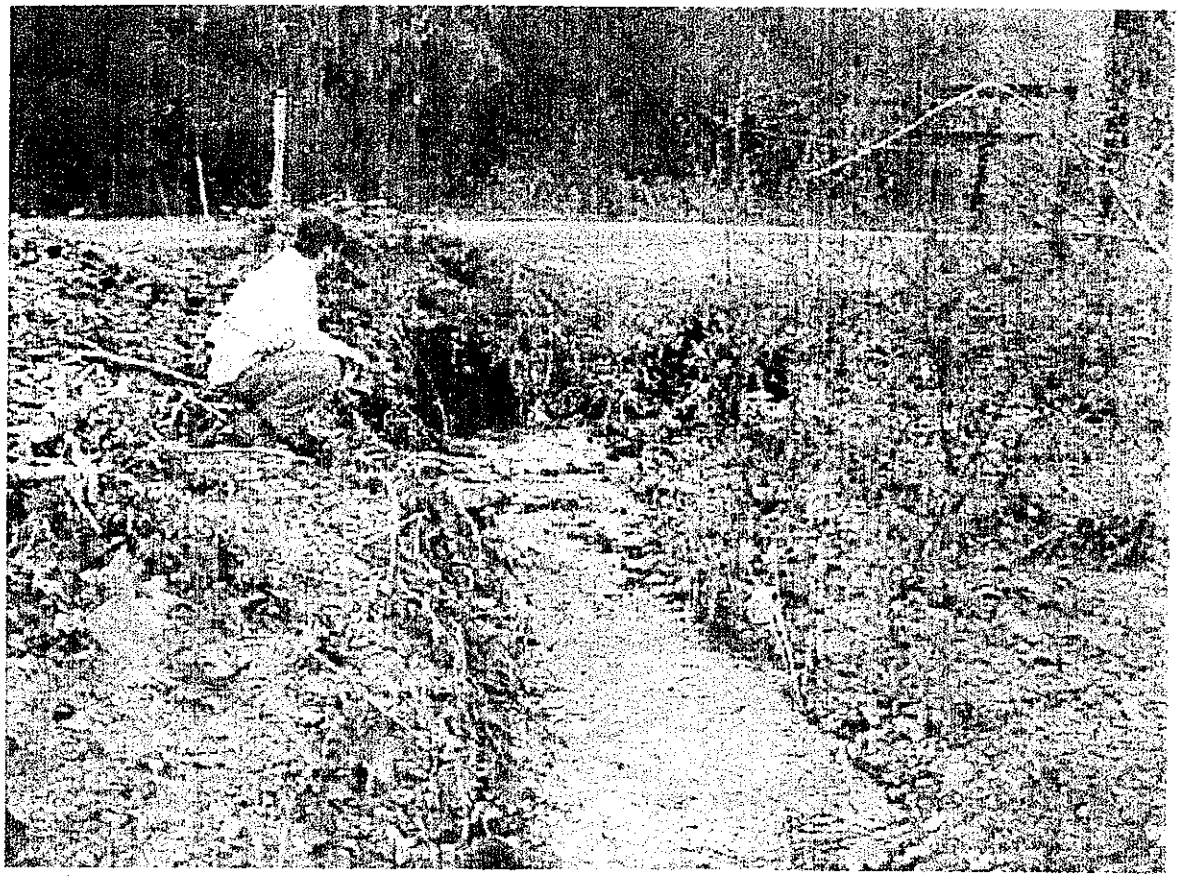


2002 1 7





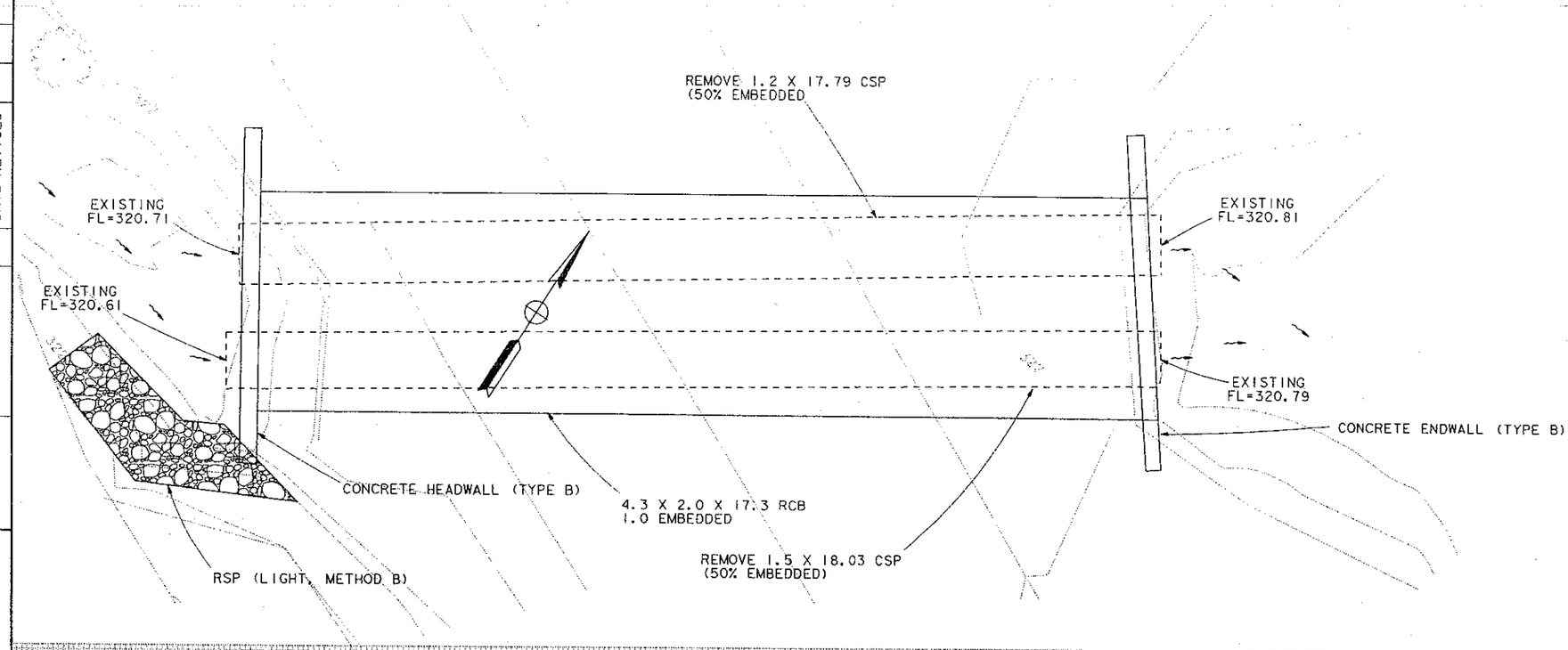


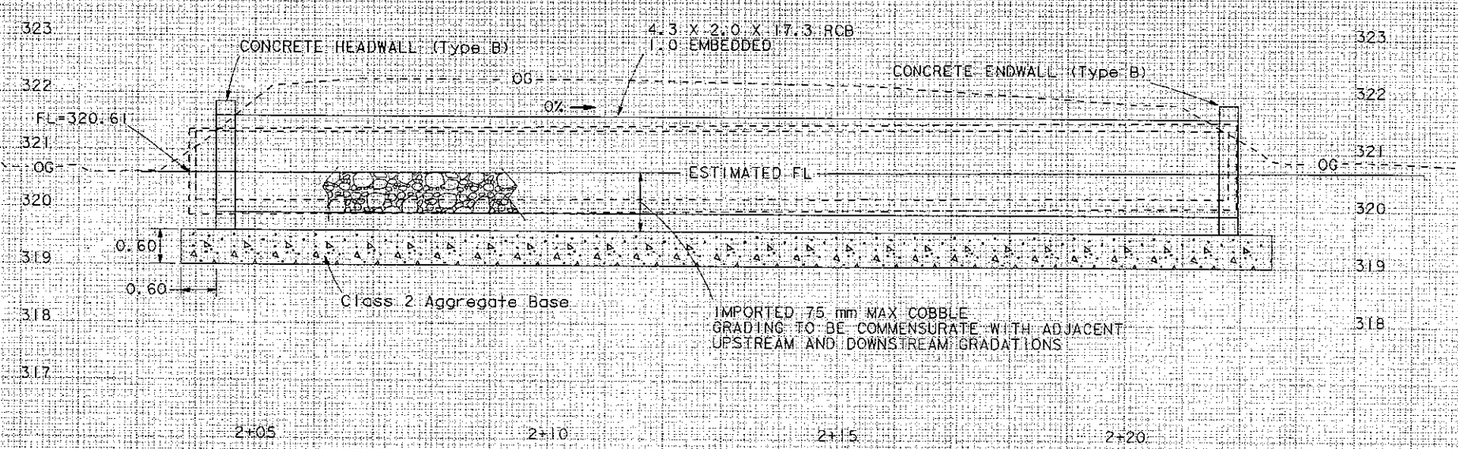


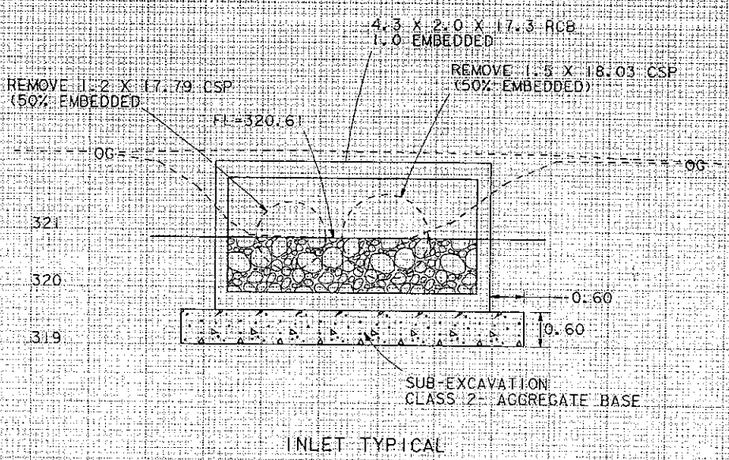
DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
01	Men	128	49.66	1	1

FOR DESIGN STUDY ONLY

Caltrans Metric







INLET TYPICAL

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

DRAINAGE SYSTEM DETAILS
D-1

SCALE 1:200

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS

PROJECT ENGINEER
Sebastian Cohen

CALCULATED/DESIGNED BY
CHECKED BY
DATE
REVISED BY
DATE REVISED

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => tldonh
DGN FILE => 128_4966_001.dgn

CU 03230

EA 378101

LAST REVISION 00-00-00

DATE PLOTTED => 17-SEP-2003

Summary of Hydraulic Analyses

						Regional Method Hydrology			Adult Anadromous		Resident Trout		Juvenile Salmonids	
Post Mile	Trib Name or Description	Drainage Area (Acres)	Drainage Area (Mi2)	Average Annual Precip. (in/yr)	Altitude Index	Q2 (cfs)	Q10 (cfs)	Q100 (cfs)	LP	HP 50% of Q2	LP	HP 30% of Q2	LP	HP 10 % of Q2
21.80	Clow Creek	485	0.76	50	1	89.2	185.0	322.4	3.0	44.6	2.0	26.8	1.0	8.9
27.54	Graveyard Creek	438	0.68	50	1	81.4	169.1	295.1	3.0	40.7	2.0	24.4	1.0	8.1
36.63	Lost Creek	588	0.92	50	1.6	85.0	193.0	381.2	3.0	42.5	2.0	25.5	1.0	8.5
39.88	[illegible] Creek	729	1.14	50	1.8	97.6	225.9	459.6	3.0	48.8	2.0	29.3	1.0	9.8
49.66	Edwards Creek	669	1.05	50	1.3	105.3	228.7	426.5	3.0	52.6	2.0	31.6	1.0	10.5

						Exceedence Flow Hydrology		Adult Anadromous		Resident Trout		Juvenile Salmonids	
Post Mile	Trib Name or Description	Drainage Area (Acres)	Drainage Area (Mi2)	MAP (in/yr)	PET (in/yr)	Average Annual Runoff (in)	Qave (cfs)	Lower Q50% (cfs/cfs)	Upper Q1% (cfs/cfs)	Lower Q90% (cfs/cfs)	Upper Q5% (cfs/cfs)	Lower Q95% (cfs/cfs)	Upper Q10% (cfs/cfs)
	Dimensionless Flow Duration (cfs/cfs)							0.13	12.4	0.02	4.2	0.01	2.14
21.80	Clow Creek	485	0.76	50	41	24.5	1.37	0.18	16.95	0.03	5.74	0.01	2.92
27.54	Graveyard Creek	438	0.68	50	41	24.5	1.23	0.16	15.31	0.02	5.18	0.01	2.64
36.63	Lost Creek	588	0.92	50	41	24.5	1.66	0.22	20.55	0.03	6.96	0.02	3.55
39.88	[illegible] Creek	729	1.14	50	41	24.5	2.05	0.27	25.48	0.04	8.63	0.02	4.40
49.66	Edwards Creek	669	1.05	50	41	24.5	1.89	0.25	23.38	0.04	7.92	0.02	4.03

Flow Duration Summary - Highway 128

USGS Station Number	Stream Name	Latitude (ddmmss)	Longitude (dddmmss)	Record Length (years)	Coverage (WY)	Drainage Area (sq. miles)	MAP (in/yr)	PET (in/yr)	Ave Annual Runoff (in)	Qave (cfs)	Fish Passage Flows Q/Qave: Adult Anadromous Lower Q50% (cfs/cfs)	Adult Anadromous Upper Q1% (cfs/cfs)	Resident Trout/2+yr Steelhead Lower Q90% (cfs/cfs)	Resident Trout/2+yr Steelhead Upper Q5% (cfs/cfs)	Young of the Year Salmonids Lower Q95% (cfs/cfs)	Young of the Year Salmonids Upper Q10% (cfs/cfs)
11468600	Mf Tenmile R Nr Fort Bragg Ca	393422	1234157	9	1955-73	32.90	58	39.0	33.3	80.7	0.22	13.02	0.04	4.75	0.03	2.55
11466540	Pudding C Nr Fort Bragg Ca	392725	1234320	8	1964-71	12.50	50	38.0	25.7	23.6	0.08	13.16	0.00	4.42	0.00	2.11
NFC (USFS)	NF Casper Creek	392140	1234402	33	1963-95	1.83	50	37.5	25.9	3.5	0.14	13.10	0.02	4.46	0.02	2.17
SFC (USFS)	SF Casper Creek	392031	1234509	33	1963-95	1.64	50	37.5	25.9	3.1	0.15	14.11	0.03	4.56	0.02	2.23
11468010	Albion R Nr Comptche	391540	1233700	8	1962-69	14.40	60	39.0	35.3	37.4	0.04	6.55	0.00	2.67	0.00	1.36
11468070	SF Big R Nr Comptche	391347	1232753	11	1961-71	36.20	50	41.0	24.5	65.3	0.12	11.99	0.02	3.84	0.01	1.89
11467850	Soda C Trib Nr Boonville Ca	390132	1231725	4	1965-68	1.53	48	41.0	22.5	2.5	0.08	12.94	0.00	3.95	0.00	2.39
11467800	Rancheria C Nr Boonville Ca	385935	1232600	9	1960-68	65.60	52	41.0	26.5	128.0	0.18	14.17	0.02	4.83	0.01	2.50

Flow Duration Table for Coastal Mendocino Streams

% of time indicated Q/Qave is equalled or exceeded	MF Tenmile River	Pudding Creek	NF Casper Creek	SF Casper Creek	Albion River	SF Big River	Soda Creek	Rancheria Creek	Regional median	Regional average	+1 Standard Deviation	-1 Standard Deviation
0%	53.1	56.2	60.0	61.8	36.3	84.5	106.5	102.4	60.9	70.1	95.10	45.13
1%	13.0	13.2	13.1	14.1	6.5	12.0	12.9	14.2	13.1	12.4	14.84	9.92
2%	8.5	7.9	8.6	9.1	4.9	7.7	8.6	9.4	8.5	8.1	9.50	6.66
3%	6.6	6.2	6.6	6.8	3.9	5.8	6.3	7.3	6.4	6.2	7.20	5.18
4%	5.5	5.2	5.4	5.5	3.1	4.6	5.5	5.6	5.4	5.1	5.92	4.21
5%	4.8	4.4	4.5	4.6	2.7	3.8	3.9	4.8	4.4	4.2	4.89	3.48
6%	4.1	3.8	3.7	3.9	2.3	3.2	3.6	4.2	3.7	3.6	4.20	2.97
7%	3.5	3.2	3.2	3.3	2.0	2.8	3.3	3.7	3.3	3.1	3.65	2.60
8%	3.2	2.8	2.8	2.9	1.7	2.4	2.9	3.2	2.9	2.7	3.22	2.26
9%	2.8	2.5	2.5	2.5	1.5	2.2	2.6	2.9	2.54	2.4	2.86	2.01
10%	2.6	2.1	2.2	2.2	1.4	1.9	2.3	2.5	2.20	2.14	2.52	1.76
11%	2.3	1.9	1.9	2.0	1.2	1.7	2.1	2.3	1.93	1.92	2.28	1.57
12%	2.2	1.6	1.7	1.7	1.0	1.5	2.0	2.0	1.73	1.73	2.08	1.38
13%	2.0	1.4	1.5	1.6	0.9	1.3	1.8	1.9	1.57	1.55	1.89	1.22
14%	1.8	1.3	1.4	1.4	0.8	1.2	1.6	1.6	1.41	1.39	1.70	1.09
15%	1.7	1.1	1.2	1.3	0.7	1.1	1.5	1.5	1.25	1.26	1.56	0.96
16%	1.6	1.0	1.1	1.1	0.7	1.0	1.3	1.3	1.14	1.14	1.42	0.87
17%	1.5	0.9	1.0	1.0	0.6	0.9	1.3	1.2	1.03	1.05	1.32	0.78
18%	1.4	0.8	0.9	0.9	0.5	0.8	1.2	1.1	0.93	0.96	1.23	0.69
19%	1.3	0.8	0.8	0.9	0.5	0.8	1.1	1.0	0.85	0.88	1.13	0.63
20%	1.2	0.7	0.8	0.8	0.4	0.7	1.0	0.9	0.78	0.81	1.04	0.58
21%	1.1	0.6	0.7	0.7	0.4	0.6	0.9	0.9	0.72	0.74	0.96	0.53
22%	1.0	0.6	0.7	0.7	0.3	0.6	0.9	0.8	0.67	0.69	0.90	0.49
23%	0.9	0.5	0.6	0.6	0.3	0.6	0.8	0.8	0.62	0.64	0.83	0.46
24%	0.9	0.5	0.6	0.6	0.3	0.5	0.7	0.7	0.58	0.60	0.77	0.43
25%	0.8	0.5	0.5	0.5	0.3	0.5	0.7	0.6	0.54	0.56	0.72	0.39
26%	0.8	0.5	0.5	0.5	0.3	0.4	0.6	0.6	0.51	0.52	0.67	0.37
27%	0.8	0.4	0.5	0.5	0.2	0.4	0.5	0.6	0.47	0.49	0.63	0.34
28%	0.7	0.4	0.4	0.4	0.2	0.4	0.5	0.5	0.45	0.46	0.60	0.31
29%	0.7	0.4	0.4	0.4	0.2	0.4	0.5	0.5	0.42	0.43	0.56	0.30
30%	0.6	0.3	0.4	0.4	0.2	0.4	0.4	0.5	0.39	0.40	0.53	0.28
31%	0.6	0.3	0.4	0.4	0.2	0.3	0.4	0.4	0.37	0.38	0.49	0.26
32%	0.6	0.3	0.3	0.4	0.2	0.3	0.4	0.4	0.35	0.35	0.46	0.24
33%	0.5	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.32	0.33	0.44	0.22
34%	0.5	0.3	0.3	0.3	0.1	0.3	0.3	0.4	0.29	0.31	0.41	0.21
35%	0.5	0.2	0.3	0.3	0.1	0.3	0.2	0.4	0.28	0.29	0.39	0.19
36%	0.4	0.2	0.3	0.3	0.1	0.3	0.2	0.3	0.27	0.28	0.37	0.18
37%	0.4	0.2	0.3	0.3	0.1	0.2	0.2	0.3	0.25	0.26	0.35	0.17
38%	0.4	0.2	0.2	0.3	0.1	0.2	0.2	0.3	0.24	0.25	0.33	0.16
39%	0.4	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.23	0.23	0.32	0.14
40%	0.4	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.21	0.22	0.30	0.13
41%	0.4	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.21	0.21	0.29	0.13
42%	0.3	0.1	0.2	0.2	0.1	0.2	0.2	0.3	0.19	0.20	0.28	0.12
43%	0.3	0.1	0.2	0.2	0.1	0.2	0.1	0.3	0.19	0.19	0.27	0.11
44%	0.3	0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.18	0.17	0.25	0.09
45%	0.3	0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.17	0.16	0.24	0.09
46%	0.3	0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.16	0.16	0.23	0.08
47%	0.3	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.15	0.15	0.22	0.08
48%	0.2	0.1	0.2	0.2	0.0	0.1	0.1	0.2	0.14	0.14	0.21	0.08
49%	0.2	0.1	0.1	0.2	0.0	0.1	0.1	0.2	0.14	0.13	0.19	0.07
50%	0.2	0.1	0.1	0.2	0.0	0.1	0.1	0.2	0.13	0.13	0.19	0.07
51%	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.12	0.12	0.17	0.06
52%	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.11	0.11	0.17	0.06
53%	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.11	0.10	0.16	0.05
54%	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.10	0.10	0.15	0.05
55%	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.10	0.09	0.14	0.04
56%	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.09	0.09	0.13	0.04
57%	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.09	0.08	0.12	0.04
58%	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.08	0.08	0.12	0.04
59%	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.07	0.07	0.11	0.03
60%	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.07	0.07	0.11	0.03
61%	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.06	0.07	0.10	0.03
62%	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.06	0.06	0.10	0.02
63%	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.05	0.06	0.09	0.02
64%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.05	0.05	0.09	0.02
65%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.05	0.05	0.08	0.02
66%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.05	0.05	0.08	0.01
67%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.04	0.04	0.08	0.01
68%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.04	0.04	0.07	0.01
69%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.04	0.04	0.07	0.01
70%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.03	0.04	0.07	0.01
71%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.03	0.04	0.06	0.01
72%	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.03	0.03	0.06	0.01
73%	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.03	0.03	0.06	0.01
74%	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.03	0.03	0.06	0.01
75%	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.03	0.03	0.05	0.01
76%	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.03	0.03	0.05	0.00
77%	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.03	0.03	0.05	0.00
78%	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.03	0.03	0.05	0.00
79%	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.03	0.05	0.00
80%	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.04	0.00
81%	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.04	0.00
82%	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.04	0.00
83%	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.04	0.00
84%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.04	0.00
85%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.04	0.00
86%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.03	0.00
87%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.03	0.00
88%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.03	0.00
89%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.03	0.00
90%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.03	0.00
91%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.03	0.00
92%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.03	0.00
93%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.03	0.00
94%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.02	0.00
95%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.02	0.00
96%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.02	0.00
97%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.02	0.00
98%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.02	0.00
99%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.01	0.00
100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

APPENDIX B – REVEGETATION GUIDELINES

A. Prior to any planting or seeding, all exotic plants/weeds will be removed from all areas to be revegetated. Mechanical control methods should be employed, if feasible; however, heavy equipment (e.g., bulldozers, backhoes) should not be used to eradicate exotic plants and weeds. In circumstances where mechanical control is not effective, it will be necessary to utilize systemic herbicides that have been approved by the U.S. Environmental Protection Agency (EPA) for use in aquatic situations (e.g., Rodeo by Monsanto).

B. Plant materials for the revegetation effort will be locally obtained. The use of locally obtained materials, which are adapted to local conditions, increases the likelihood that revegetation will be successful, and maintains the genetic integrity of the local ecosystem. For widespread herbaceous species (e.g., California poppy) that are more likely to be genetically homogeneous, site specificity is a less important consideration, and stock from commercial sources may be used.

C. Arrangements will be made well in advance of the start of revegetation to ensure that plant materials are available at the appropriate time. Sufficient time will be allocated for seed collection and contract growing, if necessary (up to 12 months may be required for some woody species).

D. Appropriate native species (as shown in Table E) will be planted and seeded in locations where they are most likely to persist without human assistance after a period of establishment. Most trees and shrubs will be planted from containers or cuttings. Grasses and herbs will be hydroseeded or broadcast seeded and raked into the soil. Trees and shrubs will be planted in random groups to more closely resemble a natural setting and to take advantage of favorable microclimate conditions. Prior to implementation, separate plant palettes and seed mixes will be prepared and will include specific information such as percent purity/germination, application rates, container plant spacing, etc.

E. During placement of RSP, willow tubes will be inserted between the rock to allow for will cutting installation upon completion of construction

F. Planting and seeding will take place following completion of final grading and/or site preparation (i.e., weed removal and respreading of topsoil), preferably between November 15 and December 31 but not before October 15 or after February 1. These periods may be altered based on an assessment of the current and projected weather pattern at the time of installation.

G. Revegetation areas will be maintained for a minimum of three years following installation. In general, maintenance will include any activities required to meet the performance standards set for this revegetation program.

H. The final success criteria for implementation of this plan will be developed as a goal to determine whether the revegetation effort is successful. Success criteria will include survival and coverage criteria for native vegetation.

I. The revegetation effort will continue for three to five years following installation, based on length of time needed for the revegetation to meet the performance standards. Monitoring will include regular site visits to monitor the maintenance activities and annual performance monitoring to collect data and assess the progress of the revegetation effort.

Revegetation Plant Palettes

SCIENTIFIC NAME	COMMON NAME	CONTAINER SIZE
Riparian Areas		
Salix lasiolepis	Arroyo willow	Cutting or D-40
Alnus rubra	Red alder	D-40
Acer macrophyllum	Big-leaf maple	D-40
Umbellularia californica	California bay	D-40
Rubus ursinus	California blackberry	D-40
Rubus parviflorus	Thimbleberry	D-40
Urtica diocea	Stinging nettle	Seed
Stachys bullata	Hedgenettle	Seed
Lotus purshianus	Spanish clover	Seed
Lupinus nanus	Lupine	Seed
Lupinus bicolor	Miniature lupine	Seed
Claytonia perfoliata	Miner's lettuce	Seed
Bromus carinatus	California brome	Seed
Hordeum brachyantherum	Meadow barley	Seed
Elymus X triticum	Regreen	Seed
Upland/Cismontane Areas		
Stachys bullata	Hedgenettle	Seed
Lotus purshianus	Spanish clover	Seed
Lupinus nanus	Sky lupine	Seed
Lupinus bicolor	Miniature lupine	Seed
Claytonia perfoliata	Miner's lettuce	Seed
Eschscholzia californica	California poppy	Seed
Nassella pulchra	Purple needlegrass	Seed
Bromus carinatus	California brome	Seed
Hordeum brachyantherum	Meadow barley	Seed
Elymus X triticum	Regreen	Seed

APPENDIX C – SUMMARY OF AVOIDANCE AND MINIMIZATION MEASURES

ALL SITES

1. Riparian areas outside the designated work areas will be designated as Environmentally Sensitive Areas (ESA's) and clearly indicated as such on project construction plans. Project specifications will include a requirement that ESA's are clearly delineated with brightly colored fencing, rope or equivalent prior to beginning construction.
2. Water for dust abatement (if necessary) will be acquired from an off-site source. No drafting will be permitted.
3. Measures consistent with the current Caltrans' Construction Site Best Management Practices (BMPs) Manual (including the Storm Water Pollution Prevention Plan [SWPPP] and Water Pollution Control Program [WPCP] Manuals (http://www.dot.ca.gov/hq/construc/Construction_Site_BMPs.pdf]) will be implemented to minimize effects to anadromous fish habitat (e.g., siltation, etc.) during construction.

NON-FISH PASSAGE SITES

1. No work will be conducted in the live channel of perennial anadromous fish-bearing streams (e.g., the Navarro River).
2. Work in non-fish bearing streams (i.e., intermittent or ephemeral streams) will be conducted when the channel is dry. In the event of sudden thunderstorms or other unusual rain event, temporary dewatering (using sandbags or bladders) may be used to avoid siltation of the channel.
3. Work on the bank of fish-bearing streams (e.g., the Navarro River) will be conducted between June 15 and October 15.
4. For those sites located in the redwood forest (i.e., along the Navarro River and North Fork Navarro River), impacts are primarily limited to minor grading of mostly unvegetated understory areas that are covered by a thick layer of duff. At these sites, the duff within the proposed work area will be collected and stockpiled prior to the start of work, and then re-spread on the graded/bare areas following construction. Provided sufficient duff is available to cover all graded/bare areas, no compensatory measures is proposed at these sites.
5. With the exception of item 6 above, graded or otherwise bare areas resulting from construction activities will be revegetated using native species. At least six months prior to the start of project construction, Caltrans will prepare detailed construction drawings and specifications for implementation of the revegetation effort. The guidelines in Appendix B have been prepared to outline the revegetation strategy to be implemented by Caltrans for temporary impacts to riparian vegetation during construction.

FISH PASSAGE SITES

1. Instream work and work on the banks of perennial anadromous fish-bearing streams will be conducted between June 15 and October 15.

2. Dewatering, if necessary, will consist of using sandbags or equivalent method to construct a temporary cofferdam upstream of the work area at the inlet, and downstream of the work area at the outlet. Following construction of the cofferdams, a gravity siphon hose system will be installed to transport upstream flows through the work area to the channel downstream of the work area. If necessary, a pump will be used to convey flows through the hose.
3. Graded or otherwise bare areas resulting from construction activities will be revegetated using native species. At least six months prior to the start of project construction, Caltrans will prepare detailed construction drawings and specifications for implementation of the revegetation effort. The guidelines in Appendix B have been prepared to outline the revegetation strategy to be implemented by Caltrans for temporary impacts to riparian vegetation during construction.
4. At Men 128 PM 21.8, equipment staging for removal of the exitisting culvert will occur in the outlet channel; the temporary access road to the staging area will be constructed down the road embankment west of the existing culvert.
5. At Men 128 PM 27.54, the temporary access road at the inlet will be constructed down the road embankment east of the existing culvert; at the outlet, the temporary access road will be constructed down the road embankment west of the existing culvert
6. At Men 128 PM 36.63, the temporary access road will be constructed on the west side of the channel from an existing gravel road that connects to SR 128.
7. At Men 128 PM 39.88, the temporary access road to the outlet will be constructed on the SR 128 embankment west of the existing culvert.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

JAN 14 2005

In Response Reply To:
151422SWR2004SR20089:DJL

Gene K. Fong
Division Administrator
United States Department of Transportation
Federal Highway Administration
980 Ninth Street, Suite 400
Sacramento, California 95814-2724

Dear Mr. Fong:

This document transmits the National Marine Fisheries Service's (NOAA Fisheries) biological opinion (Enclosure) based on its review of the Federal Highway Administration's (FHWA) and California Department of Transportation's (CalTtrans) proposed retrofit or replacement of 274 culverts along State Routes 128 and 253 in Mendocino County, California (FHWA reference: HDA-CA, File # 01-MEN-128/253-VAR, EA 01-378100, Document # P49070) and its effects on threatened Northern California steelhead (*Oncorhynchus mykiss*), threatened Central California Coast steelhead, threatened Central California Coast coho salmon (*O. kisutch*), and designated critical habitat for Central California Coast coho salmon in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*). In addition, this letter documents the result of NOAA Fisheries' Essential Fish Habitat (EFH) consultation pursuant to section 305(b)(2) of the Magnuson-Stevens Fisheries Conservation and Management Act (MSFCMA).

Endangered Species Act Consultation

CalTrans has determined that the proposed culvert retrofit or replacement actions at 225 locations will have no effect on listed salmonids; these actions are not analyzed in the enclosed biological opinion. In the enclosed opinion, NOAA Fisheries concurs with CalTrans' determination that 44 of the culvert projects are not likely to adversely affect listed salmonids. In addition, NOAA Fisheries concludes that the five projects likely to adversely affect listed salmonids and critical habitat are not likely to jeopardize the continued existence of these species or destroy or adversely modify designated critical habitat. However, take of listed species as a result of these five remaining projects is anticipated. An incidental take statement with non-discretionary terms and conditions is included with the enclosed biological opinion.

Essential Fish Habitat Consultation

NOAA Fisheries has evaluated the proposed projects for potential adverse effects to EFH pursuant to section 305(b)(2) of the MSFCMA. After reviewing the effects of the projects as described in the enclosed biological opinion, NOAA Fisheries has determined that the proposed action will have a minimal adverse effect on EFH of Pacific Coast salmon in the Navarro and Russian River watersheds.

Section 305(b)(4)(A) of the MSFCMA authorizes NOAA Fisheries to provide EFH Conservation Recommendations that will minimize adverse effects of an activity on EFH. For this project, conservation measures were already included in the project description. In addition, the enclosed biological opinion contains non-discretionary terms and conditions that will minimize adverse effects to EFH. Therefore, NOAA Fisheries has not provided EFH Conservation Recommendations.

If you have any questions about this section 7 consultation and EFH consultation, or if you require additional information, please contact Mr. Daniel Logan at (707) 575-6053.

Sincerely,

Rodney R. McInnis
Regional Administrator

Enclosure

cc: Lena Ashley, California Department of Transportation, Eureka
NOAA Fisheries, Long Beach

Enclosure

BIOLOGICAL OPINION

ACTION AGENCY: California Department of Transportation and the Federal Highway Administration, California Division

ACTION: Highways 128 and 253 culvert rehabilitation project, Mendocino County, California.

CONSULTATION CONDUCTED BY: National Marine Fisheries Service, Southwest Region

FILE NUMBER: 151422SWR2004SR20089

DATE ISSUED: JAN 4 2005

I. CONSULTATION HISTORY

On January 3, 2003, the National Marine Fisheries Service (NOAA Fisheries) received some preliminary maps and information on the proposed project from LSA Associates, a contractor of the California Department of Transportation (CalTrans). On January 7, 2003, and April 15, 2003, staff from NOAA Fisheries, CalTrans, the California Department of Fish and Game (CDFG), and LSA Associates met to discuss design and consultation under section 7 of the Endangered Species Act of 1973, as amended (ESA). On May 11, 2004, NOAA Fisheries received from CalTrans a biological assessment and request for concurrence and request for initiation of section 7 consultation.

Given the complex nature and scope of the proposed action the consultation process was extended in order to gather additional information. On May 12, 2004, and September 15, 2004, staff from NOAA Fisheries and CalTrans met at the fish passage sites to discuss the project and to identify potential impacts to salmonids. On September 23, 2004, NOAA Fisheries requested additional information relative to the proposed activities on Clow Creek at the sites CalTrans determined that there would be no effect on ESA-listed salmonids. On October 4, 2004, CalTrans offered some information on the no effect determinations, and hand delivered the Clow Creek information on October 5, 2004. On October 26, 2004, NOAA Fisheries requested additional information relative to factors affecting the action area; CalTrans replied on October 27, 2004. On October 28, 2004, CalTrans notified NOAA Fisheries that one of the fish passage projects (on an unnamed creek at post mile 20.15) had been modified to include only a minor repair of the outlet – an action not leading to take. On November 23, 2004, NOAA Fisheries asked for clarification on the amount of stream channel dewatered at each site; CalTrans provided that information on November 24, 2004. On December 7, 2004, NOAA Fisheries

requested information on projected sound levels related to Clow Creek activities and the anticipated level of barotrauma on ESA-listed salmonids; CalTrans responded the same day.

This biological opinion is based on information provided in the submitted document titled *Men 128/253 Culvert Rehabilitation Project Biological Assessment for National Marine Fisheries Service Consultation (January 2004)*, subsequent discussions and submissions, and other sources of scientific and commercial information. A complete administrative record of this consultation is on file in the NOAA Fisheries Santa Rosa Area Office, Santa Rosa, California.

II. DESCRIPTION OF THE PROPOSED ACTION

The FHWA proposes to provide funding to CalTrans for retrofitting or replacing deteriorated culverts and appurtenant structures at 274 locations along State Route (SR) 128 and SR 253 in Mendocino County, California (FHWA reference: HDA-CA, File # 01-MEN-128/253-VAR, EA 01=378100, Document # P49070). The proposed work on SR 128 is located between Post Miles (PM) 0.18 and 50.59, and involves culvert rehabilitation or replacement at 216 locations. The proposed work on SR 253 includes 58 locations for culvert rehabilitation or replacement between PM 0.99 and 17.15. The purpose of the proposed project is to retrofit or replace 30 to 45-year old pipes that are deteriorating and have reached the end of their maximum useful life. If the culverts are not replaced or retrofitted, further deterioration will take place. The deterioration will eventually lead to the pipes collapsing under the weight of the roadway and the roadway itself will deteriorate, possibly resulting in unsafe conditions and increasing the costs of repair. Also, substantial environmental damage could result if the roadway fill and/or road surface materials erode into a stream before the culverts are repaired or replaced. CalTrans anticipates that the proposed construction actions will take three consecutive construction seasons to complete. The proposed work is scheduled to be implemented between 2007 and 2010.

CalTrans evaluated 274 culverts and concluded that the proposed actions at 225 locations will have no effect on ESA-listed salmonids because the project sites are in areas above barriers to anadromy or ephemeral streams with no surface flow during the proposed construction period. These projects will not be discussed further in this biological opinion. At 44 construction sites, the presence of ESA-listed salmonids is not likely because of high channel gradient or because the streams are intermittent many years. Even if ESA-listed salmonids use these 44 sites during some time of the year, the projects will be completed during the driest time of year. Also, these projects are small in scope, and the anticipated amount of sediment attributable to construction activities is negligible. Based on this information, CalTrans determined that adverse effects to listed species at these sites is unlikely.

At the remaining five sites, all of which occur along SR 128, CalTrans concludes that the streams support or potentially support ESA-listed species during the proposed construction time; therefore, repair, replacement or retrofitting of these five culverts (PMs 21.8, 27.54, 36.63, 39.88, and 49.66) is likely to adversely affect ESA-listed salmonids. Given that ESA-listed salmonids

are likely present at the construction site, CalTrans has proposed to incorporate design elements to improve fish passage.

Because the existing culverts convey water beneath roadways, most of the required work at the remaining five sites will occur within CalTrans' right-of-ways. Work may extend away from the road and outside of right-of-ways where deemed necessary, depending upon final design determinations. Some drainage work will be done at inlets and outlets to culverts, and minor vegetation removal may be performed to improve water flow. Minor grading may also be performed when deemed necessary to prevent water buildup at inlets and/or outlets. At most sites, work will be confined to an area within 15 meters (m) of either side of the road, and within 15 m on either side of the culvert, for a maximum total impact area (excluding the road surface) of about 0.09 hectares (ha). At the Clow Creek site work will be confined to an area within 15 m of either side of the road, within 15 m of the upstream end of the existing culvert, and within 35 m of the downstream end of the existing culvert, for a maximum total impact area (excluding the road surface) of about 0.21 ha. Rubber tire backhoes are the most common equipment employed for this type of work, though crawler mounted excavators may also be used when the depth or reach of excavation is greater than 4.5 m. At most of the following sites, temporary access roads will need to be built. The access roads will require no imported material, with all necessary construction equipment driving on existing earthen material. The contractor assumes ownership of and responsibility for disposal of any and all excess material generated on a project. Any excess material generated on a project will be disposed of an approved offsite location. Some vegetation will be removed to build temporary roads; however any bare areas resulting from construction activities will be revegetated using native species.

Work associated with the five proposed sites may involve dewatering the stream at the construction site. Dewatering, if necessary, will be achieved by constructing temporary cofferdams both upstream and downstream of the work area. Following construction of the cofferdams, a gravity siphon hose system will be installed to transport any residual stream flow around the work area to the channel downstream of the work area. If necessary, a pump will be used to convey flows through the hose. All of the water between the cofferdams will be removed and returned to the stream downstream of the construction site. Before the water between the cofferdams is pumped out, all fish between the cofferdams will be captured and relocated to another section of the creek in which water flow and other habitat parameters are sufficient for their survival. Dewatering the construction site will occur prior to any work within the stream channel.

A. Description of Proposed Work

Although the conceptual design for culvert replacement or rehabilitation is described in this opinion, design details will be developed during the engineering phase of the project. The engineering design and placement will consider the expected flow regimes, channel sinuosity and gradient, opportunity for fish passage, and aesthetics. The engineering design will begin once the proposed conceptual design is accepted by NOAA Fisheries. All components of the

proposed actions related to fish passage will meet or exceed NOAA Fisheries fish passage guidelines. Removal or retrofitting of the existing culverts at the fish passage sites will be constructed in the same location as the existing culverts and will utilize standard methods of construction to be determined during the design phase of the project. The method of construction will conform to the conditions provided by NOAA Fisheries regarding construction windows protection of the water in the creek.

1. MEN 128 - PM 21.80 Clow Creek

Proposed work at this site consists of replacing the existing 1.5 m by 44.3 m corrugated steel pipe (CSP) with 3.0 m by 44.0 welded steel pipe. The new pipe will be installed under SR 128 from the outlet side. A temporary access road will be constructed at the outlet side of the culvert. The road will be cut out of the existing roadway fill prism. It will begin west of the culvert and continue down to the existing outlet pool area. To stage equipment at the outlet pool area, an area approximately 10 m by 30 m will be cleared for placement of trenchless construction equipment. This area will begin at the exit of the existing culvert and continue downstream. The clearing will include excavation, leveling and removal of vegetation. The excavation will be a maximum of 2 m below the elevation of the existing pool. Existing earthen material will be used for leveling and no imported material will be used. Excavated material, not used during construction activities, will be stored adjacent to the cleared area temporarily. This work pad area is temporary and once construction is completed the creek bed will be restored to its original topographical configuration and revegetated with native species.

The new culvert (3 m diameter) will be installed over the existing 1.5 m diameter culvert. Horizontal jacking or hydraulic ramming equipment will be used, avoiding the need to dig a trench in the existing road prism. Jacking is a method for installation of culverts utilizing horizontal jacks on the work pad to apply constant and uniform pressure onto the culvert to push the culvert through the present soils; whereas, ramming is a method in which a pneumatic tool is used to hammer or vibrate the culvert into place. Approximately 10 steel piles, 30 centimeters (cm) by 30 cm in cross-section, will be driven vertically at the end of the cleared area to provide horizontal support for the trenchless construction equipment. Additional piles (approximately 4) will be used to construct a landing directly above the culvert outlet to allow for a crane to place new culvert segments into the trenchless installation equipment. As the new culvert is installed, the existing culvert and accompanying material will be removed and disposed of off site. Cobble, approximately 8 cm in diameter, will be imported to place in the culvert bottom.

2. MEN 128 - PM 27.54 Graveyard Creek

The proposed retrofits at this site will consist of removal of 9.5 m of the 71.1 m long culvert at the inlet, construction of a new concrete headwall, and roughening the culvert invert. The section of the channel where the culvert is removed will be regraded to natural contours. Two concrete fish weirs will be constructed in the outlet channel and a new concrete headwall will be constructed. In addition, a roughened channel bottom will be installed in the existing CSP.

Temporary access roads will be required at both the inlet and outlet. At the inlet, an access road will be constructed down the road embankment east of the existing culvert. At the outlet, an access road will be constructed down the road embankment west of the existing culvert.

3. MEN 128 - PM 36.63 Lost Creek

The existing 2.4 m by 24.6 m square reinforced concrete box (RCB) will be retrofitted with baffles to improve salmonids passage. Work will include invert paving and installation of six concrete weirs immediately downstream of the existing concrete outlet apron of the RCB. A temporary access road will be required at the outlet to construct the weirs. The access road will be constructed on the west side of the channel from an existing gravel road that connects to SR 128.

4. MEN 128 - PM 39.88 John Hiatt Creek

The existing 2.1 m by 55.5 m CSP will be retrofitted with installation of a roughened channel bottom in the existing CSP and construction of three concrete weirs in the outlet channel. Approximately 32 m^2 of quarter-ton and smaller rock slope protection (RSP) will be placed on the banks at the outlet. A temporary access road will be required at the outlet to construct the weirs. The access road will be constructed on the SR 128 embankment west of the existing culvert.

5. MEN 128 - PM 49.66 Edwards Creek

Proposed work at this site consists of replacing the existing 1.2 m by 17.8 m and 1.5 m by 18.0 m CSPs with a 2 m by 17.3 m double RCB. Cobble, approximately 8 cm in diameter, will be imported and placed in the culvert bottom. New concrete headwall and endwalls will be constructed and approximately 24 m^2 of light RSP will be placed on the banks at the inlet. A temporary access road is not required as the site is accessible from the highway and movement of the equipment off the shoulder is not anticipated.

In order to keep traffic moving throughout construction actions, this culvert will be replaced in two stages to allow continued use of the roadway during the construction activities. CalTrans will shift traffic into one shared lane, then dig through the road surface in the unused lane to access and remove the existing culvert. The new culvert segment will be placed at the planned grade and backfilled with native soils or concrete slurry; when slurry backfill is used, earth plugs will be used to contain the slurry within the trench. Lastly, the road surface will be repaired. After completing the first phase, traffic will be shifted to the repaired portion of the roadway and the remaining portion of the existing culvert will be replaced as described for the first portion.

B. Summary of Avoidance and Minimization Measures

CalTrans has proposed the following measures to avoid and minimize disturbance to aquatic habitats associated with the proposed construction activities:

1. Riparian areas outside the designated work areas will be designated as Environmentally Sensitive Areas and clearly indicated as such on project construction plans. Project specifications will include a requirement that Environmentally Sensitive Areas are clearly delineated with brightly colored fencing, rope or equivalent prior to beginning construction.

2. Graded or otherwise bare areas resulting from construction activities will be revegetated using native species. At least six months prior to the start of project construction, CalTrans will prepare detailed construction drawings and specifications for implementation of the revegetation effort.

3. Water for dust abatement, if necessary, will be acquired from an off-site source. No water drafting will be permitted.

4. Measures consistent with the current CalTrans Construction Site Best Management Practices (BMPs) will be implemented to minimize effects to anadromous fish habitat during construction. The manual is available at: http://www.dot.ca.gov/hq/construc/Construction_Site_BMPs.pdf.

5. Equipment staging/storage area will be outside of the creek bed and bank.

6. Instream work and work on the banks of fish-bearing streams will be conducted between June 15 and October 15.

7. No work will be conducted in the live channel of perennial anadromous fish-bearing streams.

C. Description of the Action Area

The action area is defined as all areas affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area is located within the Navarro River and Russian River watersheds in Mendocino County, California and is distributed at the discrete sites at which SR 128 crosses Clow, Graveyard, Lost, John Hiatt, and Edwards Creeks (Figure 1). Edwards Creek is a tributary of the Russian River; the other sites are in the Navarro River watershed. Clow Creek enters the Navarro River approximately 2 kilometers (km) northwest of Philo. Graveyard Creek enters the Navarro River approximately 3 km northwest of Boonville. Lost Creek enters Rancheria Creek approximately 6 km northwest of Yorkville. John Hiatt Creek enters Beebe Creek approximately 2.5 km northwest of

Yorkville. Although direct impacts to ESA-listed salmonids are anticipated to be localized to the areas within the five sets of cofferdams (described previously), the action area has been extended 100 m downstream of the project sites due to the anticipated indirect effects of the project, such as the relocation of steelhead and the possibility of measurable turbidity associated with the proposed action.

III. STATUS OF THE SPECIES AND CRITICAL HABITAT

This biological opinion analyzes the effects of the proposed action on the following Evolutionarily Significant Units (ESU)[1] of Pacific salmonids and critical habitat:

1. Threatened Central California Coast (CCC) steelhead (62 FR 43937; August 18, 1997).

2. Threatened Northern California (NC) steelhead (65 FR 36074; June 7, 2000).

3. Threatened Central California Coast (CCC) coho salmon (61 FR 56138; October 31, 1996).

4. Designated critical habitat for Central California Coast (CCC) coho salmon (64 FR 24049; May 5, 1999).

NOAA Fisheries found no records of Chinook salmon from the Navarro River and assumes that threatened California Coastal (CC) Chinook salmon (*O. tshawytscha*) (September 16, 1999; 64 FR 50394) are not likely to be present in the action area and, therefore, not likely to be adversely affected by the proposed action. Chinook salmon will not be considered further in this opinion.

A. Species Description and Life History

Coho salmon and steelhead are anadromous fish, spending some time in both fresh- and saltwater. The older juvenile and adult life stages occur in the ocean, until the adults ascend freshwater streams to spawn. Eggs (laid in gravel nests called redds), alevins (gravel dwelling hatchlings), fry (juveniles newly emerged from stream gravels), and young juveniles all rear in freshwater until they become large enough to migrate to the ocean to finish rearing and maturing to adults. Juveniles migrating to the ocean are called smolts. Both smolts and adults go through physiological changes as they emigrate from fresh- to saltwater (smolts) and immigrate from

[1] For purposes of conservation under the Endangered Species Act, an Evolutionarily Significant Unit (ESU) is a distinct population segment that is substantially reproductively isolated from other conspecific population units and represents an important component in the evolutionary legacy of the species (Waples 1991).

salt- to freshwater (adults). The timing of migrations, freshwater habitat preferences for spawning and rearing, the duration of freshwater and ocean rearing, distribution in the ocean, age at maturity, and other traits vary by species. Coho salmon die after spawning, whereas steelhead can sometimes survive to spawn again (Shapovalov and Taft 1954, Sandercock 1991, Busby *et al.* 1996).

1. Coho Salmon

The life history of the coho salmon in California has been well documented (Shapovalov and Taft 1954, Hassler 1987, Weitkamp *et al.* 1995). In contrast to the life history patterns of other anadromous salmonids, coho salmon in California generally exhibit a relatively simple 3-year life cycle. Adult salmon typically begin the immigration from the ocean to their natal streams after heavy late-fall or winter rains breach the sand bars at the mouths of coastal streams (Sandercock 1991). Coho salmon are typically associated with small to moderately-sized coastal streams characterized by heavily forested watersheds; perennially-flowing reaches of cool, high-quality water; dense riparian canopy; deep pools with abundant overhead cover; instream cover consisting of large, stable woody debris and undercut banks; and gravel or cobble substrates (Sandercock 1991). Immigration continues into March, generally peaking in December and January, with spawning occurring shortly after arrival at the spawning ground (Shapovalov and Taft 1954).

The eggs generally hatch after four to eight weeks, depending on water temperature. Survival and development rates depend, in part, on fine sediment levels within the redd. Under optimum conditions, mortality during this period can be as low as 10 percent; under adverse conditions of high scouring flows or heavy siltation, mortality may be close to 100 percent (Baker and Reynolds 1986). McMahon (1983) found that egg and fry survival drops sharply when fines make up 15 percent or more of the substrate. The newly-hatched fry remain in the redd from two to seven weeks before emerging from the gravel (Shapovalov and Taft 1954). Upon emergence, fry seek out shallow water, usually along stream margins. As they grow, juvenile coho salmon often occupy habitat at the heads of pools, which generally provide an optimum mix of high food availability and good cover with low swimming cost (Nielsen 1992). Chapman and Bjornn (1969) determined that larger juveniles tend to occupy the head of pools, whereas smaller juveniles are found further down the pools. As the fish continue to grow, they move into deeper water and expand their territories until, by July and August, they reside exclusively in deep pool habitat. Preferred rearing habitat has little or no turbidity and high sustained invertebrate forage production. Juvenile coho salmon feed primarily on drifting terrestrial insects, much of which are produced in the riparian canopy, and on aquatic invertebrates growing within the interstices of the substrate and in leaf litter in pools. Juvenile coho salmon prefer well shaded pools at least 1 m deep with dense overhead cover; abundant submerged cover composed of undercut banks, logs, roots, and other woody debris; and preferred water temperatures of 12-15° celsius (C) (Brett 1952, Bell 1973, Reiser and Bjornn 1979, McMahon 1983), but not exceeding 22-25°C

(Brungs and Jones 1977) for extended time periods. Growth is slowed considerably at 18°C and ceases at 20°C (Stein *et al.* 1972, Bell 1973).

In the spring, as yearlings, juvenile coho salmon undergo a physiological process, or smoltification, which prepares them for living in the marine environment. They begin to migrate downstream to the ocean during late March and early April; emigration usually peaks in mid-May, if conditions are favorable. Emigration timing is correlated with peak upwelling currents along the coast. Entry into the ocean at this time facilitates more growth and, therefore, greater marine survival (Holtby *et al.* 1990).

2. Steelhead

General reviews for steelhead in California document much variation in life history (Shapovalov and Taft 1954, Barnhart 1986, Busby *et al.* 1996, McEwan 2001). Juvenile steelhead live 1 to 4 years in freshwater before smolting and emigrating, then spend 1 to 4 years maturing in the ocean. Steelhead spawn at 2 to 8 years, and may spawn 1 to 4 times over their life. Although variation occurs, in coastal California, steelhead usually live in freshwater for 2 years, then spend 1 or 2 years in ocean before returning to their natal stream to spawn. Steelhead exhibit much variation in migration timing too. Steelhead can be divided into two reproductive ecotypes, based upon their state of sexual maturity at the time of river immigration and the duration of their spawning migration: stream maturing and ocean maturing. Stream maturing steelhead enter freshwater in a sexually immature condition and require several months to mature and spawn; whereas, ocean maturing steelhead enter freshwater with well developed gonads and spawn shortly after river entry. These two reproductive ecotypes are more commonly referred to by their season of freshwater entry (*i.e.*, summer [stream maturing] and winter steelhead [ocean maturing]). Summer steelhead typically immigrate between May and October and spawn in January and February; winter steelhead typically immigrate between November and April spawning soon after reaching the spawning grounds. Only winter steelhead are found in the Navarro and Russian River.

Survival to emergence of steelhead embryos is inversely related to the proportion of fine sediment in the spawning gravels. However, steelhead are slightly more tolerant than other salmonids, with significant reductions in survival when fines of less than 6.4 millimeters (mm) comprise 20-25 percent of the substrate. Fry typically emerge from the gravel two to three weeks after hatching (Barnhart 1986). Upon emerging from the gravel, fry rear in edgewater habitats and move gradually into pools and riffles as they grow larger. Older fry establish territories which they defend. Cover is an important habitat component for juvenile steelhead, both as a velocity refuge and as a means of avoiding predation (Shirvell 1990, Meehan and Bjornn 1991). Steelhead, however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. In winter, juvenile steelhead become inactive and hide in available cover, including gravel or woody debris. Rearing steelhead juveniles prefer water temperatures of 7.2-14.4°C and have an

upper lethal limit of 23.9°C (Barnhart 1986, Bjornn and Reiser 1991). They can survive in water up to 27°C with saturated dissolved oxygen conditions and a plentiful food supply. Fluctuating diurnal water temperatures also aid in survivability of salmonids (Busby *et al.* 1996).

Steelhead emigration timing is similar to coho salmon (Fukushima and Lesh 1998). In Waddell Creek, Shapovalov and Taft (1954) found steelhead juveniles migrating downstream at all times of the year, with the most juvenile steelhead emigrating during spring and summer.

B. Status of Species and Critical Habitat

In this opinion, NOAA Fisheries assesses the status of each species by examining four types of information, all of which help us understand a population's ability to survive. These population viability parameters are: abundance, population growth rate, spatial structure, and diversity (McElhaney *et al.* 2000). While there is insufficient information to evaluate these population viability parameters in a quantitative sense, NOAA Fisheries has used existing information to determine the general condition of each population and factors responsible for the current status of each ESU.

1. CCC Coho Salmon

A comprehensive review of estimates of historic abundance, decline, and present status of coho salmon in California is provided by Brown *et al.* (1994). They estimated that coho salmon annual spawning population in California ranged between 200,000 and 500,000 fish in the 1940s, which declined to about 100,000 fish by the 1960s, followed by a further decline to about 31,000 fish by 1991. Brown *et al.* (1994) concluded that the California coho salmon population had declined more than 94 percent since the 1940s, with the greatest decline occurring since the 1960s. More recent population estimates vary from approximately 600 to 5,500 adults (Brown *et al.* 1994). Recent NOAA Fisheries status reviews (NOAA Fisheries 2001, NOAA Fisheries 2003a) indicate that the CCC coho salmon ESU is likely continuing to decline in number.

CCC coho salmon have also experienced acute range restriction and fragmentation. Adams *et al.* (1999) found that in the mid 1990s coho salmon were present in 51 percent (98 of 191) of the streams where they were historically present, and documented an additional 23 streams, within the CCC coho salmon ESU, in which coho salmon were found for which there were no historical records.

Recent genetic research in progress by both the NOAA Fisheries Southwest Fisheries Science Center and the Bodega Marine Laboratory, has documented a reduction in genetic diversity within subpopulations of the ESU (Daniel Logan, NOAA Fisheries, personal communication, 2003). The influence of hatchery fish on wild stocks has also contributed to the lack of diversity through outbreeding depression[2] and disease.

[2]Outbreeding depression is the loss of genetic and behavioral diversity in a population through the

Available information suggests that CCC coho salmon abundance is very low, and the ESU is not able to produce enough offspring to maintain itself (population growth rates are negative). CCC coho salmon have experienced range constriction, fragmentation, and a loss genetic diversity. Many subpopulations that may have acted to support the species' overall numbers and geographic distribution, have likely been lost. The extant subpopulations of CCC coho salmon may not have enough fish to survive additional natural and human caused environmental change. While the amount of data supporting these conclusions is not extensive, NOAA Fisheries is unaware of information that suggests a more positive assessment of the condition of the ESU and its critical habitat. Recent status reviews for CCC coho salmon conclude that this ESU is presently in danger of extinction (NOAA Fisheries 2001, NOAA Fisheries 2003a), and on June 14, 2004 NOAA Fisheries proposed to change the ESA designation of this ESU to endangered (69 FR 33102).

2. NC Steelhead

Based on the limited data available (dam counts of portions of stocks in several rivers), NOAA Fisheries' initial status review of NC steelhead (Busby *et al.* 1996) determined that population abundance was very low relative to historical estimates (1930s and 1960s dam counts), and recent trends were downward in most stocks. Overall, population numbers are severely reduced from pre-1960s levels, when approximately 198,000 adult steelhead migrated upstream to spawn in the major rivers of this ESU (Busby *et al.* 1996, 65 FR 36074). Updated status reviews reach the same conclusion, and noted the poor amount of data available, especially for winter run steelhead (NOAA Fisheries 1997a, Adams 2000, NOAA Fisheries 2003a). The information available suggests that the population growth rate is negative.

Comprehensive geographic distribution information is not available for this ESU, but steelhead are considered to remain widely distributed (NOAA Fisheries 1997a). It is known that dams on the Mad River and Eel River block large amounts of habitat historically used by NC steelhead (Busby *et al.* 1996). Hatchery practices in this ESU have exposed the wild population to genetic introgression and the potential for deleterious interactions between native stock and introduced steelhead. Historical hatchery practices at the Mad River hatchery are of particular concern, and included out-planting of non-native Mad River hatchery fish to other streams in the ESU and the production of non-native summer steelhead (65 FR 36074).

The conclusion of the most recent status review (NOAA Fisheries 2003a) echoes that of previous reviews. Abundance and productivity in this ESU are of most concern, relative to NC steelhead

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introduction of parental genomes that are not well adapted to local environments. Less native genetic material is passed to subsequent generations when native fish hybridize with hatchery fish instead of propagating with other purely native salmon.

spatial structure (distribution on the landscape) and diversity (level of genetic introgression). The lack of data available also remains a risk because of uncertainty regarding the condition of some stream populations. Recently, NOAA Fisheries evaluated the listing status of NC steelhead and proposed maintaining the threatened listing determination (69 FR 33102).

3. CCC Steelhead

While there are no specific estimates of abundance at the population scale, CCC steelhead numbers are substantially reduced from historical levels. A total of 94,000 adult steelhead were estimated to spawn in the rivers of this ESU in the mid-1960s, including 50,000 fish in the Russian River and 19,000 fish in the San Lorenzo River (Busby *et al.* 1996). Recent estimates for the Russian River are on the order of 4,000 fish (NOAA Fisheries 1997b). Abundance estimates for smaller coastal streams in the ESU indicate low but stable levels with recent estimates for several streams (Lagunitas Creek, Waddell Creek, Scott Creek, San Vincente Creek, Soquel Creek, and Aptos Creek) of individual run sizes of 500 fish or less (62 FR 43937).

Overall, the abundance of the CCC steelhead ESU has declined precipitously, from an estimated 94,000 returning adults in the 1960s to estimates less than 5,350 in recent times (Busby *et al.*1996; NOAA Fisheries 1997b). These numbers indicate over a 94 percent decline in the population of steelhead spawning in the ESU. Absent information indicating a recent upward trend in numbers ESU wide, NOAA Fisheries assumes that the overall population growth rate may continue to be negative. For more detailed information on the population trend of CCC steelhead, see: Busby *et al.* 1996, NOAA Fisheries 1997b, and NOAA Fisheries 2003a.

CCC steelhead have maintained a wide distribution throughout the ESU. Presence/absence data show that in a subset of streams sampled in the CCC region, most contain steelhead (NOAA Fisheries 1997b). Of streams in the ESU for which there is current presence/absence data on steelhead, 218 of 264 streams currently support some juveniles. Species with broad distributions are more likely to survive environmental fluctuations and stochastic events, even if they suffer local extirpation (Pimm *et al.* 1988). Many streams in and around the San Francisco Bay region, however, no longer support steelhead. The interbasin transfer of hatchery steelhead has persisted in various locations and at various times within the CCC steelhead ESU (NOAA Fisheries 1997b). This has likely affected the genetic composition of existing stocks. Although some genetic research is being done on CCC steelhead, little information is available to assess the diversity of the species.

While CCC steelhead have experienced significant declines in abundance, and long-term population trends suggest a negative growth rate, they have maintained a wide distribution throughout the ESU. This suggests that, while there are significant threats to the population, they possess a resilience that is likely to slow their decline. A recent status review concludes that steelhead in the CCC steelhead ESU remain "likely to become endangered in the foreseeable future" (NOAA Fisheries 2003a). In June 2004, NOAA Fisheries evaluated the listing status of CCC steelhead and proposed maintaining the threatened listing determination (69 FR 33102).

4. Coho Salmon Critical Habitat

Critical habitat is defined in section 3(5)(A) of the Endangered Species Act (ESA) as "(I) the specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species . . . upon a determination by the Secretary of Commerce (Secretary) that such areas are essential for the conservation of the species" (see 16 U.S.C. 1532(5)(A)). The term 'conservation', as defined in section 3(3) of the ESA, means ". . . to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary" (see 16 U.S.C. 1532(3)). Therefore, critical habitat is the geographic area and habitat functions necessary for the recovery of the species.

The condition of CCC coho salmon critical habitat, specifically its ability to provide for their conservation, has been degraded from conditions known to support viable salmonid populations. NOAA Fisheries has determined that present depressed population conditions are, in part, the result of the following human-induced factors affecting critical habitat[3]: logging, agricultural and mining activities, urbanization, stream channelization, dams, wetland loss, and water withdrawals, including unscreened diversions for irrigation. Impacts of concern include alteration of stream bank and channel morphology, alteration of water temperatures, loss of spawning and rearing habitat, fragmentation of habitat, loss of downstream recruitment of spawning gravels and large woody debris, degradation of water quality, removal of riparian vegetation resulting in increased stream bank erosion, increases in erosion entry to streams from upland areas, loss of shade (higher water temperatures) and loss of nutrient inputs (Weitkamp *et al.* 1995, CDFG 2004. 61 FR 56138). Depletion and storage of natural river and stream flows have drastically altered natural hydrologic cycles in many of the streams in the ESU. Alteration of flows results in migration delays, loss of suitable habitat due to dewatering and blockage; stranding of fish from rapid flow fluctuations; entrainment of juveniles into poorly screened or unscreened diversions, and increased water temperatures harmful to salmonids (61 FR 56138).

C. Status of the Species in the Navarro and Russian River Watersheds

1. CCC Coho Salmon

The present distribution of coho salmon within the Navarro River and Russian River watersheds is substantially less than that recorded historically (Weitkamp *et al.* 1995; CDFG 2002; CDFG 2004). Fourteen of the 19 Navarro River watershed streams listed by Brown and Moyle (1991)

[3]Other factors, such as over fishing and artificial propagation have also contributed to the current population status of these species. All these human induced factors have exacerbated the adverse effects of natural environmental variability from such factors as drought and poor ocean conditions.

as historical coho salmon streams were surveyed in 2001. Coho salmon were observed in only six of those streams: mainstem Navarro River, Flynn Creek, South Branch of the North Fork, North Branch of the North Fork, Little North Fork, and John Smith Creek. Coho salmon populations are now restricted to the western portion of the Navarro River watershed. The risk of extinction for coho salmon populations from the Navarro River is high (CDFG 2004; Figure 6-26). Coho salmon are present in the Russian River at very low levels, population distribution appears restricted to the westernmost portions of the watershed, and all populations have missing year-classes (Weitkamp *et al.* 1995; CDFG 2004). The most upstream collections of coho salmon from the Russian River watershed have been from Maacama Creek which enters the Russian River near Healdsburg. The risk of extinction for coho salmon from the Russian River is high (CDFG 2004; Figure 6-26). In response, the CDFG and NOAA Fisheries have started a captive breeding program for Russian River coho salmon.

2. NC Steelhead

Steelhead, while less abundant than historically, are distributed in many streams of the Navarro River watershed (Mendocino County Water Agency *et al.* 1998, unpublished CDFG stream surveys).

3. CCC Steelhead

Steelhead are found throughout the Russian River basin, though at reduced abundance (Busby *et al.* 1996). The Russian River has the highest steelhead productivity within the CCC steelhead ESU (62 FR 43937).

D. Status of Coho Salmon Critical Habitat in the Navarro and Russian River

Forestry, urban and rural residential development, and agricultural activities likely contribute to excessive sedimentation, low woody debris abundance and recruitment, elevated water temperature, chemical toxicity, and atypical stream hydrology throughout the Navarro River and Russian River watersheds (California Regional Water Quality Control Board 2001; www.epa.gov). Also, there are some in-channel gravel mining operations in the Russian River watershed. The effects of land-use activities are exacerbated by natural erosive geology, poorly consolidated sediments, and the mountainous and rugged terrain. Many rivers in northern California, including the Navarro and Russian rivers, naturally carry high loads of sediment during winter storm events -- some of the highest sediment discharge volumes versus watershed area within the United States (Kelsey 1977). Brown and Moyle (1991) reported that logging and mining in combination with naturally erosive geology have led to significant aggradation of up to 10 feet in some areas of Austin Creek - a lower Russian River tributary. Increased sedimentation affects spawning gravels, pool formation, and rearing habitat throughout both watersheds and are likely limiting production and recovery of coho salmon in the action area.

The Navarro River and Russian River have many anthropogenic migration barriers which deny coho salmon access to potential habitat, affect sediment transport, and affect water flow and temperature (Mendocino County Water Agency *et al.* 1998, CDFG 2004, unpublished CDFG stream surveys). Two large dams are on Russian River tributaries blocking access to anadromous fish habitat: Coyote Valley Dam and Warm Springs Dam. Steiner Environmental Consulting (1996) cites unpublished data from the California State Water Resources Control Board which state that there are over 500 small dams on the Russian River and its tributaries. These dams have a variety of functions including residential, commercial, and agricultural water supply; flood and/or debris control, and recreation. The US Army Corps of Engineers (1982) concluded that the loss of tributary habitat was the primary factor limiting the recovery of the anadromous fishery in the Russian River.

Besides creating migration barriers, improperly designed or maintained culverts can be a significant source of sediment to a stream (Furniss *et al.* 1991). Road-related erosion is responsible for about 60 percent of the total sediment production (Mendocino County Water Agency *et al.* 1998). Stream crossings and ditch relief culverts are the most common sources of road-related potential erosion in the Navarro River watershed (www.krisweb.com). Over 45,000 m^3 of potential road-related erosion in the Navarro River watershed from stream crossings and ditch relief culverts alone. Stream crossing failures present the greatest risk of episodic, catastrophic erosion potential. NOAA Fisheries assumes that culvert conditions and erosion potential for the Russian River watershed are similar to those in the Navarro River watershed.

The Navarro River is included on the 2002 Clean Water Act section 303(d) list of water quality limited segments. The pollution factors for the Navarro River are sedimentation and temperature. Forestry, agriculture, residence and land development, and nonpoint sources are listed as the potential sources for these factors. The Russian River is included on the 2002 Clean Water Act section 303(d) list of water quality limited segments. The pollution factors for the Russian River are sedimentation, temperature, and pathogens. Forestry, agriculture, dams with flow regulation, urban and land development, and nonpoint sources are listed as the potential sources for these factors. Lake Sonoma, a reservoir impounded by Warm Springs Dam, is included on the section 303(d) list because of elevated levels of mercury associated with historic mining. The Laguna de Santa Rosa is limited by dissolved oxygen, nitrogen, and phosphorus. The US Environmental Protection Agency has approved Total Maximum Daily Load (TMDL) guidelines for sediment and temperature for the Navarro River, however, there are no approved TMDLs for the Russian River watershed (www.epa.gov).

During the past two years NOAA Fisheries has completed several ESA consultations within the Navarro River and Russian River watersheds. Among other consultations, NOAA Fisheries has consulted with CalTrans on bank stabilization and culvert replacement projects, with the National Resources Conservation Service for a coordinated permit program covering bank stabilization, culvert repair, road rehabilitation, and invasive vegetation management projects for agricultural landowners, and with the US Army Corps of Engineers for a nationwide permit for stream and riparian restoration activities. NOAA Fisheries anticipates that these projects will

improve the habitat conditions for coho salmon by reducing sediment sources and improving riparian vegetation.

IV. ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the status of the species, its habitat, and the ecosystem in the action area. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area; the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation; and the impact of State or private actions which are contemporaneous with the consultation in process (50 CFR §402.02).

The action area is located within the Navarro and Russian River watersheds. Edwards Creek is a small tributary of the Russian River entering the mainstem near the town of Cloverdale; all other project sites are within the Navarro River watershed. Precipitation in the Navarro River watershed and Cloverdale area is approximately 100 cm of precipitation per year, with most occurring between December 15 and March 31 (CDFG 2004). Most of the land use in the Navarro River and Edwards Creek watersheds is forestry (70%), in both commercial and small private holdings. The second dominant type of land use is rangeland (25%), followed by agricultural and rural development (5%). The Clow Creek and Graveyard Creek sites are within the Anderson Valley - a broad alluvial valley within the Navarro River watershed. Slopes on the east side of the valley are dominated by woodlands of various oaks (*Quercus* spp.). Slopes to the west are a mixture of Douglas Fir (*Pseudotsuga menziesii*) and oaks. Historically, the valley itself contained grasslands and oak woodlands. The Lost Creek and John Hiatt Creek sites are in constrained, forested portions of the Navarro River watershed, and the Edwards Creek site is in a constrained, forested, upland portion of the Russian River watershed. Riparian tree species at all five sites include species typical of inland coast ranges: red alder (*Alnus rubra*), various willows (*Salix* spp.), big-leaf maple (*Acer macrophyllum*), and California laurel (*Umbellularia californica*).

A. Status of Listed Species/Critical Habitat in the Action Area

NOAA Fisheries searched many sources (Weitkamp *et al.* 1995, Mendocino County Water Agency *et al.* 1998, CDFG 2002, CDFG 2004, unpublished CDFG stream surveys) and found no fisheries survey information for Clow, Graveyard, Lost, or John Hiatt Creeks. Currently, coho salmon populations are restricted to the western portion of the Navarro River watershed in streams entering the Navarro River approximately 15 stream km west of the westernmost project site, Clow Creek. Although NOAA Fisheries found no documentation of coho salmon from these four project site streams, the distance from documented sites is small and NOAA Fisheries is not aware of any complete barriers to migration between streams with coho salmon and the project site streams; therefore, NOAA Fisheries will assume that coho salmon have access to

these project sites. NOAA Fisheries staff observed steelhead at Clow Creek during a September 15, 2004, site visit and assumes that steelhead can access the other Navarro River projects sites, as steelhead are well distributed throughout the Navarro River watershed.

NOAA Fisheries found no documentation of coho salmon from Edwards Creek (Weitkamp *et al.* 1995, CDFG 2002, CDFG 2004, unpublished CDFG stream surveys). The closest documented collection of coho salmon from the Russian River watershed is from Maacama Creek, approximately 50 stream km from the Edwards Creek site. Although coho salmon probably could access the Edwards Creek site, given the small and declining populations of coho salmon in the Russian River watershed, and the distance from a potential source stock, NOAA Fisheries assumes that the likelihood of coho salmon being at the Edwards Creek site is small. Steelhead are found in low densities in Edwards Creek (unpublished CDFG stream surveys).

B. Salmonid Habitat/Critical Habitat Within the Action Area

The stream channels at the project sites are shallow with few pools, reduced surface flow in the summers and fall, and provide limited habitat for juvenile salmonids during that low flow period. Some instream cover is likely provided by large cobble. Instream large woody debris appears mostly lacking in the action area. Overwinter and outmigration habitat conditions are also poor because the channel lacks habitat complexity and velocity refuge. Based on current channel conditions, NOAA Fisheries believes that CCC coho salmon critical habitat within the action area is degraded from properly functioning condition due to lack of riparian and instream cover, excessive loading of fine sediment, and reduced surface flow. The CDFG has ranked the restoration potential for coho salmon populations throughout California by determining whether or not potential habitat exists in the watershed. The Navarro River and Russian River have a moderately high potential for restoration and management (CDFG 2004, Figure 6-28).

C. Factors Affecting Species Environment Within the Action Area

All of the existing culverts, with the exception of those at the Edwards Creek site, are barriers to migration. The culvert at the Clow Creek site is not properly sized and exacerbates sediment loading by accelerating water velocity. All of the streams become intermittent in some or most years at the project locations, reducing rearing habitat and migration corridors. Most sites have well developed riparian corridors within the action area. All of the sites are near rural residential and agricultural development; land uses which contribute to erosion, chemical toxicity, and atypical hydrology to the creeks. Anderson Valley Way crosses Graveyard Creek downstream of the project site; this crossing may be a barrier to fish migration.

V. EFFECTS OF THE PROPOSED ACTION

The purpose of this section is to identify the direct and indirect effects of the proposed action on threatened CCC steelhead, threatened CCC coho salmon, and on designated critical habitat for CCC coho salmon. Data to quantitatively determine the precise effects of the proposed action on steelhead, coho salmon, and coho salmon critical habitat, are limited or not available; the assessment of effects therefore focuses mostly on qualitative identification. This approach was based on a review of ecological literature concerning the effects of loss and alteration of habitat elements important to salmonids, including water, substrate, food, and adjacent riparian areas; the primary constituent elements of proposed critical habitat that will be affected. This information was then compared to the likely effects associated with the proposed project.

The project is anticipated to take three consecutive construction seasons to complete, beginning in 2007. Construction activities within the creek channel will be limited annually to June 15 through October 31. The work window begin date of June 15 is likely to avoid effects to salmonid smolts since emigration occurs prior to June 15. The work window end date of October 31 will avoid the immigration period for adult salmonids. Based on available data, NOAA Fisheries anticipates that a small number of juvenile salmonids will be within the action area during project implementation.

As noted above in the *Description of the Proposed Action*, CalTrans determined that its actions are not likely to adversely affect ESA-listed salmonids at 44 construction sites. These projects will be in places not likely utilized by salmonids during the proposed construction window. Even if ESA-listed salmonids use these 44 sites outside of the proposed construction window, these projects are small in scope and will be completed during the driest time of year. CalTrans has proposed BMPs to minimize project-related sedimentation at individual sites to a negligible level. These 44 sites are widely distributed throughout the Navarro River and Russian River watersheds and not concentrated in any one subwatershed. Also, the 44 projects will not be completed in a single year. Therefore, CalTrans does not anticipate additive or synergistic effects related to sedimentation or this project. NOAA Fisheries concurs with CalTrans determination related to those 44 projects. The remainder of this effects analysis is dedicated to the five sites described in section II A of this opinion.

A. Fish Relocation Activities

If water is present at the proposed sites during construction, then the project work site will be dewatered. Before the project site is dewatered, qualified biologists will capture and relocate fish away from the project work site to avoid direct mortality and minimize the possible impact of take of listed species. Fish in the immediate project area will be captured by seine, dip net and/or electrofisher, and then transported and released to a suitable instream location. Data to precisely quantify the amount of fish that will be relocated prior to implementation of each individual construction project are not available. However, NOAA Fisheries can narrow the life stage to which effects are anticipated. Fish relocation activities will occur during the summer low-flow

period after emigrating smolts have left and before adults have immigrated to the proposed project sites. Therefore, the listed salmonids that will be captured during relocation activities will be young of the year (YOY), although there is a potential of one or two year old steelhead being present.

Fish relocation activities pose a risk of injury or mortality to rearing juvenile salmonids. Any fish collecting gear, whether passive (Hubert 1983, Hubert 1996) or active (Hayes 1983, Hayes *et al.* 1996) has some associated risk to fish, including stress, disease transmission, injury, or death. The amount of unintentional injury and mortality attributable to fish capture varies widely depending on the method used, the ambient conditions, and the expertise and experience of the field crew. NOAA Fisheries anticipates that mortality rates for juvenile coho salmon and steelhead are similar. The effects of seining and dipnetting on juvenile salmonids include stress, scale loss, physical damage, suffocation, and desiccation. Electrofishing can kill juvenile salmonids, and researchers have found serious sublethal effects including spinal injuries (Reynolds 1996, Nielsen 1998). The long-term effects of electrofishing on salmonids are not well understood. Although chronic effects may occur, it is assumed that most impacts from electrofishing occur at the time of sampling. Since fish relocation activities will be conducted by qualified fisheries biologists following both CDFG and NOAA Fisheries electrofishing guidelines, direct effects to and mortality of juvenile salmonids during capture will be minimized. Data from two years of similar salmonid relocation activities in Humboldt County indicate that average mortality rate is below one percent (Collins 2004).

Although sites selected for relocating fish should have similar water temperature as the capture site and should have ample habitat, in some instances relocated fish may endure short-term stress from crowding at the relocation sites. Relocated fish may also have to compete with other fish causing increased competition for available resources such as food and habitat. Some of the fish released at the relocation sites may choose not to remain in these areas and may move either upstream or downstream to areas that have more habitat and a lower density of fish. As each fish moves, competition remains either localized to a small area or quickly diminishes as fish disperse. Also, the migrating fish may enter some underseeded habitat. NOAA Fisheries cannot accurately estimate the number of fish affected by competition, but does not believe this impact will cascade through the watershed populations of these species based on the small area that will likely be affected and the small number of salmonids likely relocated.

B. Dewatering

NOAA Fisheries anticipates temporary changes in stream flow within and downstream of project sites during dewatering activities. These fluctuations in flow are anticipated to be small, gradual, and short-term. Stream flow in the vicinity of each project site should be the same as free-flowing conditions except during dewatering and at the dewatered reach where stream flow is bypassed. Stream flow diversion and project work area dewatering are expected to cause temporary loss, alteration, and reduction of aquatic habitat. NOAA Fisheries anticipates that only a small reach of stream at each project site will be dewatered for in-channel construction

activities, as the great majority of the total area dewatered is within the existing culverts – habitat not currently utilized by salmonids. With the exception of the Clow Creek site, the coffer dams will be placed both 15 m upstream and downstream beyond the limit of the proposed facilities. At Clow Creek, 35 m downstream of the existing channel will be dewatered. The longest area dewatered is the Graveyard Creek site: 108.1 m, however, 71.1 m of that distance is the length of the existing culvert. Stream flow diversions could harm individual rearing juvenile coho salmon and steelhead by concentrating or stranding them in residual wetted areas) before they are relocated (Cushman 1985). Rearing juvenile salmonids could be killed or injured if crushed during diversion activities, though direct mortality is expected to be minimal due to relocation efforts prior to installation of the diversion. Juvenile salmonids that avoid capture in the project work area will die during dewatering activities.

Benthic (*i.e.*, bottom dwelling) aquatic macroinvertebrates within the project site may be killed or their abundance reduced when creek habitat is dewatered (Cushman 1985). However, effects to aquatic macroinvertebrates resulting from stream flow diversions and dewatering will be temporary because construction activities will be relatively short-lived, and rapid recolonization (about one to two months) of disturbed areas by macroinvertebrates is expected following rewatering (Cushman 1985, Thomas 1985, Harvey 1986). In addition, the effect of macroinvertebrate loss on juvenile salmonids is likely to be negligible because food from upstream sources (via drift) would be available downstream of the dewatered areas since stream flows will be maintained around the project work site and food sources derived from the riparian zone will not be effected by the project. Based on the foregoing, the loss of aquatic macroinvertebrates as a result of dewatering activities is not expected to adversely effect ESA-listed salmonids.

C. Increased Mobilization of Sediment within the Stream Channel

Culvert construction and road building activities may cause temporary increases in turbidity (reviewed in Furniss *et al.* 1991, Reeves *et al.* 1991, and Spence *et al.* 1996). NOAA Fisheries anticipates that short-term increases in turbidity will occur during proposed dewatering activities, construction and removal of coffer dams, construction and removal of a work pad at one site, and construction and decommissioning of temporary roads. Sediment may affect salmonids by a variety of mechanisms. Excessive fine sediment can interfere with development and emergence of salmonids (reviewed by Reiser and Bjornn 1979 and Chapman 1988). High concentrations of suspended sediment can disrupt normal feeding behavior and efficiency (Cordone and Kelly 1961; Bjornn *et al.* 1977, Berg and Northcote 1985), reduce growth rates (Crouse *et al.* 1981), and increase plasma cortisol levels (Servizi and Martens 1992). High turbidity concentrations can reduce dissolved oxygen in the water column, result in reduced respiratory functions, reduce tolerance to diseases, and can also cause fish mortality (Sigler *et al.* 1984, Berg and Northcote 1985, Gregory and Northcote 1993, Velagic 1995, Waters 1995). Even small pulses of turbid water will cause salmonids to disperse from established territories (Waters 1995), which can displace fish into less suitable habitat and/or increase competition and predation, decreasing

chances of survival. Increased sediment deposition can fill pools and reduce the amount of cover available to fish, decreasing the survival of juveniles (Alexander and Hansen 1986).

Much of the research discussed in the previous paragraph focused on turbidity levels higher than those likely to result from the proposed construction activities. Recent monitoring of newly replaced culverts within Humboldt County generally detailed temporary increases in turbidity following winter storm events, the measured turbidity was generally less than the turbidity threshold commonly cited as beginning to cause minor behavioral changes (Henley *et al.* 2000), and always less than turbidity levels necessary to injure or kill salmonids. CalTrans proposes to minimize the effects of these activities by following CalTrans approved BMPs, using no imported material, decommissioning the roads after completion of the construction project, minimizing the loss of native riparian vegetation, and replanting any disturbed soils with native vegetation. NOAA Fisheries expects some limited behavioral effects, such as temporarily vacating preferred habitat or temporarily reduced feeding efficiency, to be the most likely results from implementation of the proposed action. These behavioral changes are not likely to reduce the survival chances of individual salmonids.

D. Toxic Chemicals

Equipment refueling, fluid leakage, and maintenance activities within and near the stream channel pose some risk of contamination and potential take. NOAA Fisheries anticipates that CalTrans and its contractors will maintain any and all fuel storage and refueling sites in upland locations well away from the stream channel; that vehicles and construction equipment be in good working condition, showing no signs of fuel or oil leaks, and that any and all servicing of equipment be conducted in an upland location. CalTrans may use bentonite as a lubricant if culvert jacking is used at the Clow Creek site and accidental release of bentonite may occur. Bentonite is a potentially lethal irritant to fish. Sigler *et al.* (1984) reported that steelhead and coho salmon show reduced growth rates or increased emigration rates when exposed to 125 to 175 mg/l bentonite. In addition to toxic chemicals associated with construction equipment, water that comes into contact with wet cement during construction can adversely affect water quality and cause harm and potential take of listed salmonids. NOAA Fisheries does not anticipate any localized or appreciable water quality degradation from toxic chemicals or take of ESA-listed salmonids associated with the proposed projects, as the stream will be dewatered near the construction sites giving CalTrans and its contractors ample opportunity to attend to any spill.

E. Sound

CalTrans proposes placing fourteen 30 cm by 30 cm steel piles at the Clow Creek site. Ten of the piles will be driven vertically in the temporary work pad to provide support of the trenchless construction equipment required at that site. Four additional piles will be driven directly above the culvert outlet to construct a landing for a crane to place new culvert segments into the trenchless installation equipment. The piles will be driven into dewatered portions of the stream or the existing road prism. No piles will be driven nearer than 15 m to the downstream

cofferdam. All fourteen piles would be removed after the construction is completed. CalTrans has not determined which method of placement will be used for the new culvert on Clow Creek, though will use either a jacking or ramming technique, and both methods will create sound over ambient levels.

Pile driving, culvert jacking, and hydraulic ramming cause high sound pressure levels and may affect fish. The degree to which an individual fish exposed to sound will be affected is dependent on a number of variables, including, but not limited to: species and size of the fish, size and type of hammer used, size and material of the pile, distance from the source, peak sound pressure and frequency, depth of the water around the pile, bottom substrate composition and texture, and effectiveness of any sound attenuation technology (reviewed in NOAA Fisheries 2003b). Depending on these factors, effects on fish can range from immediate mortality to a startle response. CalTrans has not identified the specific methodology to be used for driving piles at the Clow Creek site. CalTrans has concluded that since the piles at the Clow Creek site are being driven upland or in a dewatered channel and since the downstream cofferdam would be approximate 27 m from the sound source, the sediment should substantially attenuate the energy to which the fishes would be subjected, and, therefore, not lead to trauma or mortality of listed salmonids. CalTrans offered information from the Noyo Bridge construction project, where 30 cm by 30 cm steel piles were driven in earth 23 m from open water and generated 174 peak decibels (dB_{peak}) and 165 root mean square decibels (dB_{RMS}) once the sound reached water. Caltrans anticipates similar sound levels at the Clow Creek site.

NOAA Fisheries (2003b) reviewed pile driving effects for fish and concluded that underwater sound levels between 150 dB_{RMS} and 190 dB_{peak} in Carquinez Strait are expected to cause stress, agitation, and behavioral changes. Underwater sound pressure levels greater than 190 dB_{peak} are expected to cause direct permanent injury or mortality of salmonids. In Carquinez Strait, salmonids exposed to pile driving may respond by avoiding the area of greatest sound levels by swimming away from the sound source. However, Clow Creek may be intermittent during the proposed construction window blocking emigration opportunities for salmonids exposed to pile driving. Therefore, if salmonids are present and trapped in residual pools in Clow Creek directly adjacent to the coffer dam; they would likely experience adverse impacts, including injury. NOAA Fisheries concludes that the number of fish affected, if any are present, will likely be less than 10 given the poor habitat conditions near this work site.

F. Additional Effects (Benefits of Each Project)

Watershed recommendations for the Navarro River include developing and implementing sediment reduction plans (Mendocino County Water Agency *et al.* 1998, CDFG 2004). Appropriately designed culverts, as those proposed by CalTrans, will reduce road-related erosion - an integral part of a sediment reduction plan. The culverts are deteriorating and have reached the end of their maximum useful life. If the culverts are not replaced further deterioration will occur and complete failure of the structures is possible. Failed culverts may lead the roadways to fail causing increased sediment loading to the streams.

The existing culverts at the five proposed sites prevent ESA-listed salmonids from accessing historic spawning and rearing habitat located upstream of the structures. At Graveyard Creek, Lost Creek, and John Hiatt Creek sites, CalTrans proposes to install permanent weirs to improve passage of salmonids; the weirs will create step pools below the culverts and ease migration of salmonids. Although these weirs will be constructed in areas designated as critical habitat for CCC coho salmon, the current condition of the habitat at those sites is poor. The resulting step pools will improve salmonid rearing habitat at the sites and allow access to currently unavailable habitat upstream of the sites. Installing instream habitat structures and improving fish passage are recommended in Navarro River watershed plans (Mendocino County Water Agency *et al.* 1998, CDFG 2004). Reintroducing listed salmonids into previously unavailable upstream habitat will likely increase reproductive success, increasing the populations of salmonids that inhabit these streams.

G. Interdependent and Interrelated Actions

NOAA Fisheries does not anticipate any interdependent or interrelated actions associated with the proposed action.

VI. CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. NOAA Fisheries is not aware of any additional actions that would cause cumulative effects beyond those that are ongoing, including rural and agricultural development, and have been analyzed in the Environmental Baseline section of this biological opinion.

VII. INTEGRATION AND SYNTHESIS OF EFFECTS

Habitat conditions for anadromous salmonids within the action area, including critical habitat for CCC coho salmon, are generally poor. Spawning habitat is not present in the action area and given the timing of the proposed project, the project will not effect spawning behavior. Rearing habitat within the action area is marginal, primarily due to intermittent flow in many summers, high sediment loading, and elevated stream temperatures. The existing culverts are complete barriers to migration. Overwinter and outmigration habitat conditions are also poor because the channel lacks habitat complexity and velocity refuge. Without improvement, the action area provides relatively little useable habitat for the NC steelhead, CCC steelhead, and CCC coho salmon populations. In the action area during the proposed construction time, NC steelhead and CCC steelhead are likely uncommon, and CCC coho salmon are likely rare. All construction activities will occur during the summer low-flow period after emigrating smolts have left and

before adults have immigrated to the proposed project sites; therefore, only rearing juvenile salmonids will be exposed to any potential negative effects of the project.

The replacement and retrofitting of the culverts will directly affect ESA-listed salmonids and their habitat. The proposed construction actions are, for the most part, intended to fix chronic watershed problems that are presently, and will likely continue, degrading valuable aquatic habitat. Nevertheless, inherent within the proposed practices are risks to ESA-listed salmonids. Most of the take associated with the proposed activities is anticipated to be non-lethal, however, a very small number of rearing juvenile (mostly YOY) salmonids may be injured or die.

NOAA Fisheries expects that the likelihood that juvenile salmonids will be killed as a result of stranding during site dewatering activities is very low. Water (hence fish) may not be present all years at each site. The area affected during dewatering at each site is small, and low numbers of juvenile salmonids are expected to be present within each project site due to relocation activities and degraded habitat. Fish relocation activities are expected to minimize individual project impacts to juvenile salmonids by removing them from construction sites where they would have experienced high rates of injury and mortality. Fish relocation activities are anticipated to only affect a small number of rearing juvenile salmonids within a small stream reach at and near the construction site and relocation release site(s). Rearing juvenile salmonids present in the immediate project work areas will be subject to disturbance, capture, relocation, and related short-term effects. Those, if any, directly downstream of the Clow Creek site are likely to be adversely affected by sound waves from pile driving. Less than 10 juvenile fish may be harmed by exposure to sound waves at that site.

With the proposed impact minimization measures, the effects of the project are expected to result in minimal adverse affects to threatened NC steelhead, CCC steelhead, and CCC coho salmon. The one time loss of a small number of salmonids from the action area is not expected to appreciably reduce the number, distribution, or reproduction of NC steelhead, CCC steelhead, and CCC coho salmon in the Navarro River or Russian River watersheds in future years. Few salmonids are expected within the action area and they likely make up a small proportion of salmonids from their respective streams and watersheds. Due to the relatively large number of juveniles produced by each spawning pair, salmonids spawning in these streams and watersheds in future years are likely to produce enough juveniles to replace the few that will be lost at the project sites. NOAA Fisheries anticipates that the proposed project will improve the survival chances of the salmonids using streams in the action area in the following ways: (1) restored migration to areas formerly used by anadromous salmonids, but cut off by the original placement of the culverts; (2) improved and increased rearing habitat by virtue of the planned weirs; and (3) reduction of sediment input from improved culvert sizing and design. Completion of this project as proposed will likely increase reproductive success and ultimately salmonid populations in these streams in the Navarro and Russian rivers watersheds. In consideration of the above, the proposed project is not anticipated to appreciably reduce the likelihood of the survival and recovery of the salmonid populations in the action area or the survival and recovery of the NC steelhead, CCC steelhead, and CCC coho salmon ESUs.

Although coho salmon have not been documented from the action area, the action area is included as habitat designated as critical for their survival and recovery of CCC coho salmon. Impacts to critical habitat designated for coho salmon include a short term loss of habitat from sedimentation or dewatering that is not expected to cause a long term loss in the essential features of critical habitat. Because the effects are short-term, and flow will resume at the completion of construction, adverse effects will not rise to a level which will appreciable diminish the value of critical habitat for conservation of the CCC coho salmon ESU. In the future, the restoration of passage at these culverts will improve the value of critical habitat in the action area.

VIII. CONCLUSION

After reviewing the best available scientific and commercial data, the current status of the species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is NOAA Fisheries' biological opinion that the proposed summer dam project is not likely to jeopardize the continued existence of threatened NC steelhead, CCC steelhead, or CCC coho salmon, or result in the destruction or adverse modification of CCC coho salmon critical habitat.

IX. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by NOAA Fisheries as an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are nondiscretionary, and must be undertaken by the FHWA, CalTrans, and their designees for the exemption in section 7(o)(2) to apply. The FHWA and CalTrans have a continuing duty to regulate the activity covered by this incidental take statement. If the FHWA and CalTrans: (1) fail to assume and implement the terms and conditions, or (2) fail to require any designee to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to any permit, grant document, or contract, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the FHWA and CalTrans must report the progress of the action and its impact on the species to NOAA Fisheries as specified in the incidental take statement (50 CFR §402.14(i)(3)).

A. Amount or Extent of Take

The replacement and retrofitting of five culverts under SR 128 and the installation of fishway weirs is expected to result in minimal incidental take of threatened CCC coho salmon, NC steelhead, and CCC steelhead. Fish in the vicinity of the project could be adversely affected by the project construction activities. Juvenile salmonids that are displaced due to the diversion may suffer an increase risk of competition and predation.

The number of ESA-listed salmonids that may be incidentally taken during project activities cannot be accurately quantified due to: (1) the unknown number of fish that may be present; (2) the unknown number of fish that may be stranded; and (3) the level of harm or mortality that might occur when juvenile fish are displaced to other habitat areas of the stream. In instances where NOAA Fisheries cannot quantify the amount of incidental take, surrogates such as the extent of habitat affected or modified by the proposed action are used.

Therefore, take is quantified as: All fish present in the action area between June 15 and October 31 (during the years that the project occurs) may be captured and/or harassed by relocation activities. Based on the low mortality rates for relocation efforts and the small number of salmonids present in the action area, NOAA Fisheries anticipates no more than 3 juvenile salmonids will be harmed or killed during relocation efforts. NOAA Fisheries expects that the number of juvenile salmonids that will be killed as a result of stranding during dewatering activities will be less than those killed during relocation. This is due to the small area affected, the relocation efforts and the low numbers of juvenile salmonids expected to be present within the action area. If listed salmonids are present directly adjacent to the cofferdams on Clow Creek, no more than 10 will be harmed by sound waves from pile driving.

B. Effect of the Take

In the accompanying opinion, NOAA Fisheries determined that this level of anticipated take is not likely to result in jeopardy to the species.

C. Reasonable and Prudent Measures

NOAA Fisheries believes the following reasonable and prudent measures are necessary and appropriate to minimize take of CCC coho salmon, NC steelhead, and CCC steelhead:

1. Undertake measures to ensure that harm and mortality to listed salmonids resulting from fish relocation and dewatering activities is low.

2. Undertake measures to minimize harm to listed salmonids resulting from culvert replacement activities and other instream construction work.

3. Undertake measures to assure that adverse effects to water quality are minimized.

4. Prepare and submit an annual report to document effects of construction and relocation activities and performance.

D. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the FHWA, CalTrans, and their designees must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

1. The following terms and conditions implement Reasonable and Prudent Measure 1 undertaken to ensure that harm and mortality to listed salmonids resulting from fish relocation and dewatering activities is low:

   a. The FHWA and CalTrans shall retain a qualified biologist with expertise in the areas of anadromous salmonid biology, including handling, collecting, and relocating salmonids; salmonid/habitat relationships; and biological monitoring of salmonids. The FHWA and CalTrans shall ensure that all biologists working on this project be qualified to conduct fish collections in a manner which minimizes all potential risks to ESA-listed salmonids. Electrofishing, if used, shall be performed by a qualified biologist and conducted according to the *NOAA Fisheries Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act*, June 2000.

   b. The biologist shall monitor the construction site during placement and removal of channel diversions and cofferdams to ensure that any adverse effects to salmonids are minimized. The biologist shall be on site during all dewatering events to ensure that all ESA-listed salmonids are captured, handled, and relocated safely. The biologist shall notify NOAA Fisheries biologist Daniel Logan at (707) 575-6053 or dan.logan@noaa.gov one week prior to capture activities in order to provide an opportunity for NOAA Fisheries staff to observe the activities.

   c. ESA-listed fish shall be handled with extreme care and kept in water to the maximum extent possible during rescue activities. All captured fish shall be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream and fish shall not be removed from this water except when released. To avoid predation the biologist shall have at least two containers and segregate young-of-year fish from larger age-classes and other potential aquatic predators. Captured salmonids will be relocated, as soon as possible, to a suitable instream location in which suitable habitat condition are present to allow for adequate survival of transported fish and fish already present.

   d. If any salmonids are found dead or injured, the biologist shall contact NOAA Fisheries biologist Daniel Logan by phone immediately at (707) 575-6053 or the

NOAA Fisheries Santa Rosa Area Office at (707) 575-6050. The purpose of the contact is to review the activities resulting in take and to determine if additional protective measures are required. All salmonid mortalities shall be retained, placed in an appropriately-sized sealable plastic bag, labeled with the date and location of collection, fork length, and be frozen as soon as possible. Frozen samples shall be retained by the biologist until specific instructions are provided by NOAA Fisheries. The biologist may not transfer biological samples to anyone other than NOAA Fisheries Santa Rosa Area Office without obtaining prior written approval from the Santa Rosa Area Office, Supervisor of the Protected Resources Division. Any such transfer will be subject to such conditions as NOAA Fisheries deems appropriate.

2. The following terms and conditions implement Reasonable and Prudent Measure 2 undertaken to minimize harm to listed salmonids resulting from culvert replacement and retrofitting activities.

   a. The FHWA or CalTrans shall notify the NOAA Fisheries Santa Rosa Area Office, by letter stating the project commencement date, at least fourteen days prior to implementation. The letter shall be sent to the NOAA Fisheries Santa Rosa Area Office, Attention: Supervisor of Protected Resources Division 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528.

   b. The FHWA or CalTrans shall allow any NOAA Fisheries employee(s) or any other person(s) designated by NOAA Fisheries, to accompany field personnel to visit the construction sites during activities provided for in this opinion.

   c. The FHWA or CalTrans shall conduct a worker education program prior to construction activities on the importance of protecting salmonids and their habitat and the project measures to do so.

   d. A biologist shall monitor inchannel activities and performance of sediment control or detention devices for the purpose of identifying and reconciling any condition that could adversely affect salmonids or their habitat. The FHWA or CalTrans and their contractors, upon notification from the biologist, shall halt the work activity causing the condition affecting salmonids and recommend measures for avoiding the condition. Work can resume when NOAA Fisheries agrees that the proposed measures are appropriate for avoiding the condition.

   e. Prior to commencement of work FHWA or CalTrans shall submit the final engineering design for the boulder weir habitat enhancement structures and culvert retrofit structures related to fish passage to NOAA Fisheries for evaluation and approval prior to implementation. The designs should be sent to the NOAA Fisheries Santa Rosa Area Office, Attention: Supervisor of Protected Resources Division, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528.

f. For revegetation activities the standard for success is 80 percent survival of plantings or 80 percent ground cover for broadcast planting of seed after a period of three years.

g. The FHWA and CalTrans shall ensure that a hydroacoustic monitoring program is implemented at the Clow Creek site if, during the actual construction period, there is some wetted channel downstream of the downstream cofferdam. The hydroacoustic monitoring plan shall include measurements of underwater sound levels, both peak decibels and root mean square decibels, at several locations in the wetted channel of Clow Creek downstream of the downstream cofferdam.

h. If during the first day of pile driving activities residual pools are left in Clow Creek downstream of the downstream cofferdam, a biologist must observe those residual pools for evidence of adverse responses by salmonids to the pile driving activities. That biologist shall rescue and relocate any salmonids from those which appear to expressing an adverse response to pile driving.

i. Once construction is finished for each construction season, all project introduced material (pipe, gravel, false work, filter fabric, demolition debris, etc.) must be removed, leaving the creek as it was before construction. Excess materials will be disposed of at an approved disposal site.

3. The following terms and conditions implement Reasonable and Prudent Measure 3 taken to assure that adverse effects to water quality are minimized.

a. Erosion control and sediment detention devices shall be incorporated into the project and implemented at the time of the project action. These devices shall be in place during the project action, and after if necessary, for the purpose of minimizing fine sediment and sediment/water slurry input to flowing water. The devices shall be placed at all locations where the likelihood of sediment input exists.

b. Sediment shall be removed from sediment controls once it has reached one-third of the exposed height of the control. Whenever straw bales are used, they shall be staked and dug into the ground 12 cm. Catch basins shall be maintained so that no more than 15 cm of sediment depth accumulates within traps or sumps.

c. Contractors must have a supply of erosion control materials onsite to facilitate a quick response to unanticipated storm events or emergencies.

d. Bentonite shall be prevented from entering the stream channel. Any bentonite that does enter the stream during construction shall be immediately removed in a manner that has minimal impact to the streambed and water quality.

e. Water that comes in contact with wet concrete and has a pH greater than 9.0 must not be allowed to enter the ground or stream but shall be either: (1) pumped to a separate, lined basin, and then pumped to a truck or upland for disposal or treatment (not within the bank to bank of any waterway); or (2) pumped directly to a truck for disposal at a site that is not within the top of bank to top of bank of any waterway.

f. Construction equipment used within the creek channel will be checked each day prior to work within the creek channel (top of bank to top of bank) and if necessary action will be taken to prevent fluid leaks. If leaks occur during work in the channel (top of bank to top of bank), FHWA, CalTrans, or their contractor will contain the spill and remove the affected soils.

4. The following term and condition implements Reasonable and Prudent Measure 4 of submitting a report annually to document status of construction and relocation activities and performance.

a. The US Army Corps of Engineers and SCVWD shall provide a written report to NOAA Fisheries by January 15 following completion of each construction season. The report shall be submitted to the NOAA Fisheries Santa Rosa Area Office Attention: Supervisor of Protected Resources Division, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528. The report shall contain, at a minimum, the following information:

Construction related activities – The report shall include the dates construction began and was completed; a discussion of any unanticipated effects or unanticipated levels of effects on salmonids, a description of any and all measures taken to minimize those unanticipated effects and a statement as to whether or not the unanticipated effects had any affect on ESA-listed fish; the number of salmonids killed or injured during the project action; and photographs taken before, during, and after the activity from photo reference points.

Revegetation – The report shall include a description of the locations planted or seeded, the area (m^2) revegetated, a plant palette, planting or seeding methods, the efforts taken to ensure success of new plantings, performance or success criteria, and pre- and post-planting color photographs of the revegetated area.

Fish Relocation – The report shall include a description of the location from which fish were removed and the release site including photographs; the date and time of the relocation effort; a description of the equipment and methods used to collect, hold, and transport salmonids; if an electroshocker was used for fish collection, a copy of the logbook must be included; the number of fish relocated by species; the number of fish injured or killed by species and a brief narrative of the circumstances surrounding ESA-listed fish injuries or mortalities; and a description of any problems which may have arisen during the relocation

activities and a statement as to whether or not the activities had any unforeseen effects.

Sound -- The report shall include measurements of underwater sound levels at wetted channel units downstream of the downstream cofferdam on Clow Creek reported in both peak decibels and root mean square decibels; a description of data collection methods, including, at a minimum, the type of pile driving system, pile size and type, hydrophone type, distance to hydrophone, depth of hydrophone; quality assurance and quality control measures taken; a description of the habitat sampled; and the number of fish observed and rescued.

X. REINITIATION NOTICE

This concludes formal consultation on the proposed replacement or retrofitting of five culverts under SR 128 in Mendocino County. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

XI. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitat, or develop additional information.

NOAA Fisheries offers the following Conservation Recommendations:

1. The FHWA and CalTrans should consult with NOAA Fisheries to develop a long range planning approach, perhaps a programmatic approach, which seeks to minimize and avoid the impacts of road maintenance projects on ESA-listed salmonids.

2. The FHWA and CalTrans should identify other culverts under their jurisdiction that currently do not meet the NOAA Fisheries guidelines for salmonid passage, and to

prioritize nonconforming culverts for replacement or retrofitting to meet or exceed the NOAA Fisheries guidelines for salmonid passage.

3. The FHWA and CalTrans should consult with NOAA Fisheries to identify funding sources and collaborative partners to assist with replacing or retrofitting culverts, under the jurisdiction of the FHWA and CalTrans, which do not conform to the NOAA Fisheries guidelines for salmonid passage.

4. Any new stream crossing, under the jurisdiction of the FHWA and CalTrans, should meet or exceed design criteria of the NOAA Fisheries guidelines for salmonid passage.

5. The FHWA and CalTrans should identify and prioritize any maintenance and construction projects which, if implemented, can improve salmonid migration or in-stream environmental conditions.

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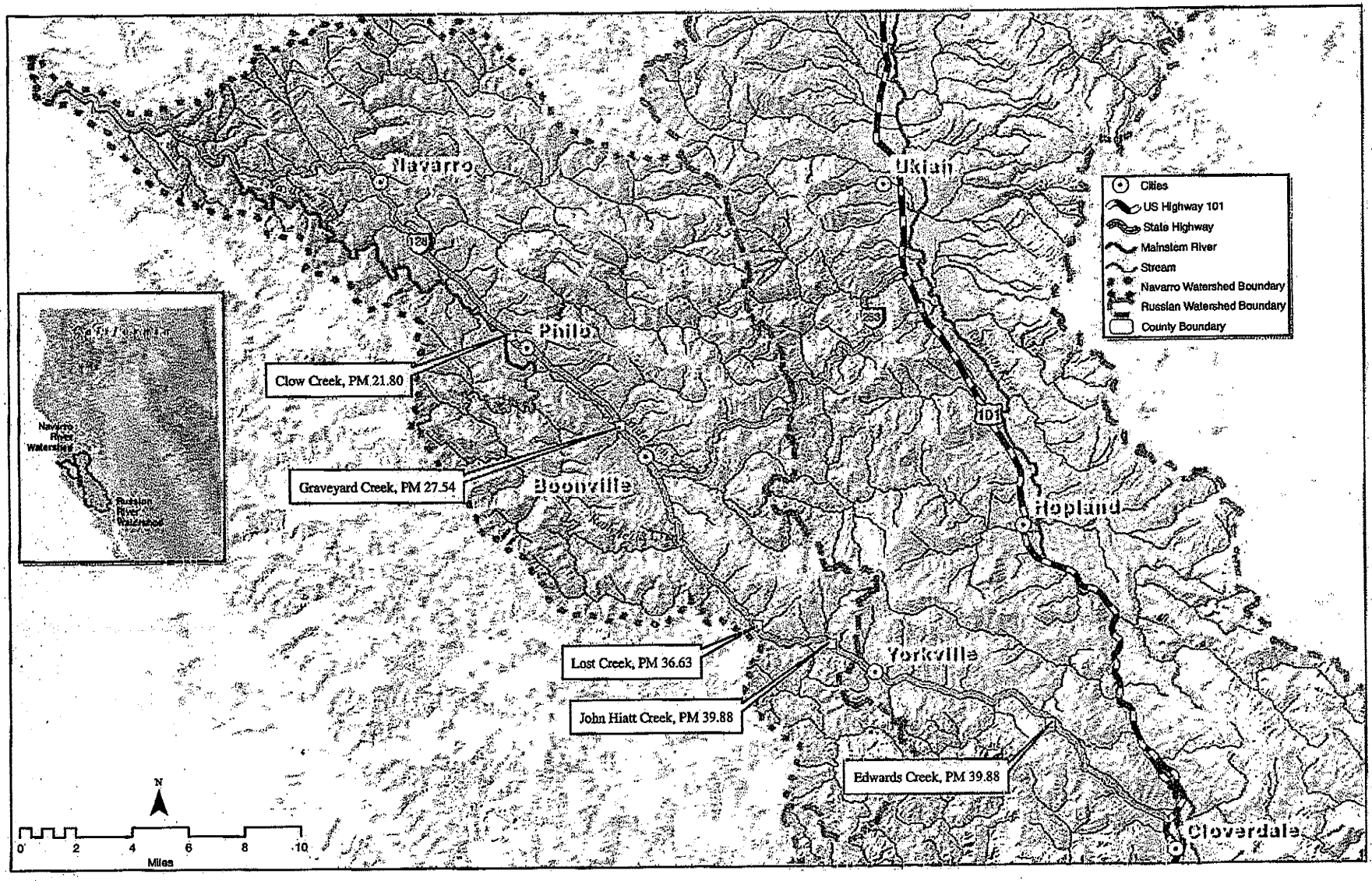


Figure 1. Navarro River watershed showing the location of the five proposed fish passage sites from CalTran's highways 128 and 253 culvert rehabilitation project, in Mendocino County, California. The project sites are identified by name and post mile (PM).

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
650 Capitol Mall, Suite 4-100
Sacramento, CA. 95814

February 23, 2006

IN REPLY REFER TO
HDA-CA
File # 01-MEN-128/253
Document # P53962

Mr. Rodney R. McInnis, Regional Administrator
National Marine Fisheries Service
501 West Ocean Blvd., Suite 4200
Long Beach, CA 90802-4213

Dear Mr. McInnis:

The Federal Highway Administration (FHWA) received a biological opinion (151422SWR2004SR20089) dated January 4, 2005 for work that would entail retrofitting or replacing 274 culverts along State Routes 128 and 253 in Mendocino County. FHWA determined that adverse impacts to salmonids would occur at five project locations and initiated formal Section 7, Endangered Species Act, consultation.

Due to litigation and changes in species' status, we are re-initiating formal consultation on the federally listed Northern California steelhead, Central California Coast steelhead, Central California Coast coho salmon and designated critical habitat for the coho salmon. Informal consultation will be conducted by the California Department of Transportation for all other projects identified in your December 7, 2005 letter. By copy of this letter, we are informing your Arcata Area Office of this re-initiation.

If you have any questions, please contact Lanh Phan, at (916) 498-5046 or e-mail lanh.phan@fhwa.dot.gov or Gary Sweeten, at (916) 498-5128.

Sincerely,

/s/ Larry Vinzant

For
Gene K. Fong
Division Administrator

Enclosure

BUCKLE UP AMERICA

cc: (E-mail w/o Enclosure)
Irma Lagomarsino, NOAA-Fisheries
Jay Norvell, Caltrans
Deborah McKee, Caltrans
Gregg Erickson, Caltrans
Jo Braden, Caltrans
Lee Dong, FHWA
Gary Sweeten, FHWA
Lanh Phan, FHWA
Larry Vinzant, FHWA

United States Army Corps of Engineers

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103-1398

MAR 24 2015

Regulatory Division

SUBJECT: File Number 2009-00447N

Ms. Adele Pommerenck
California Department of Transportation (Caltrans), District 3
703 B Street
Marysville, California 95901

Dear Ms. Pommerenck:

This letter is written in response to your submittal of January 29, 2015 concerning Department of the Army authorization to rehabilitate 72 drainage systems located along State Route (SR) 128, as Phase III of the SR 128/253 Culvert Rehabilitation Project in Mendocino County, California (39.158°N, -123.595°W and 39.116°N, -123.589°W). These culverts along SR 128 are located between Post Mile (PM) 2.80 and 23.40 (37814 and 37817).

Phase III of the SR 128/253 Culvert Rehabilitation Project includes work within U.S. Army Corps of Engineers' jurisdiction estimated to permanently impact 0.04 acre of wetlands and temporarily disturb an additional 0.08 acre of wetlands during construction. It is also estimated that this season's construction will permanently impact 0.07 acre of other waters of the U.S. and temporarily impact another 0.07 acre of other waters of the U.S.

Based on a review of the information you submitted, your project qualifies for authorization under Department of the Army Regional Permit (RGP) No. #16 for *Rehabilitation or Replacement of Culverts in Mendocino County* pursuant to Section 404 of the Clean Water Act, 33 U.S.C. Section 1344 (enclosure 1). All work shall be completed in accordance with the plans and drawings titled "USACE File #2009-00447, March 6, 2015, Figures 1 to 105" provided as enclosure 2. A Preliminary JD has been completed for each culvert location. Preliminary JDs are written indications that there may be waters of the U.S. on a parcel or indications of the approximate location(s) of waters of the U.S. on a parcel. Preliminary JDs are advisory in nature and may not be appealed.

Special Condition 3 of RGP #16 requires that compensatory mitigation for unavoidable impacts to wetlands and waters of the U.S. shall occur through creation, restoration, riparian planting, or enhancement of the appropriate tributaries and/or wetlands within the watershed where impacts are proposed to occur. The "*Seaside Beach Roadside Repair (EA 47490), Anchor Bay Drainage Repair (EA 44650), SR 128/253 Culvert Rehabilitation, (EA's 37812, 37813, 37814, 37816, 37817), and Men 20 Left-Turn Shoulder Widening (EA 29200) Off-site Wetland Mitigation at California State Parks, Inglenook Fen-Ten Mile Dunes Natural Preserve, Mitigation and Monitoring Plan*" dated April 2013 has been approved to provide compensatory mitigation for the permanent fill of 0.007 acre of wetland through creation of 0.007 acre of

seasonal wetland. Performance standards are outlined on page 20 of the above referenced plan. The 5-year monitoring program shall be implemented as outlined in the Ten Mile Dune Mitigation Plan. Annual monitoring reports shall be submitted to the Corps by November 31st, of each year. The Anderson Valley Elementary School (AVES)/ Con Creek mitigation project which includes re-vegetation and invasive weed control within 0.33 acre of riparian area associated with Con Creek has been approved to provide compensatory mitigation for the permanent fill of 0.17 acre of other waters of the U.S. The AVES mitigation shall be considered successful when 1) 75% relative cover of native plant species and 2) 50% viable planting establishment with at least 5 different native species present is obtained at the conclusion of the 5-year period. Annual monitoring reports for both mitigation projects shall be submitted to the Corps by November 31st, of each year.

Special Condition 5 of RGP #16 stipulates that project authorization under the RGP does not allow for the incidental take of any federally-listed species in the absence of a biological opinion with incidental take provisions. As the principal federal lead agency for this project, Caltrans initiated consultation with the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) to address project related impacts to list species, pursuant to Section 7(a) of the Endangered Species Act of 1973, as amended, 16 U.S.C. Section 1531 *et seq*. The U.S. Fish and Wildlife Service (USFWS) BO dated April 15, 2005, USFWS Informal Consultation letter dated October 6, 2004, National Marine Fisheries Service (NMFS) BOs dated January 4, 2005 and January 10, 2007 contain mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BOs. Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take authorized by the attached BOs, whose terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BOs, where a 'take' of the listed species occurs, would constitute an unauthorized take and it would also constitute non-compliance with this Corps permit. The USFWS and NMFS are the appropriate authorities to determine compliance with the terms and conditions of their BOs and with the ESA.

Special condition # 14 requires Caltrans to restore temporarily impacted areas post construction. Caltrans shall implement its re-vegetation plan titled "*Mendocino County State Route 128 Culvert Rehabilitation Project- Phase II (EA 378161) Revegetation Plan*". A 5-year management and monitoring program will be implemented as outlined in the above mentioned plan. Annual monitoring reports shall be submitted to the Corps by February 1, of each year.

The project must be in compliance with the all permit conditions cited in RGP #16 for the authorization to remain valid. Non-compliance with any condition could result in the suspension, modification or revocation of the authorization for your project, thereby requiring you to obtain a Nationwide or Individual Permit from the Corps.

You shall comply with all terms and conditions set forth by the "*California Department of Transportation Highway 128 and 253 – Culvert Rehabilitation Project Phase Two: WDID No. 1B11189WNME*" and "*California Department of Transportation Highway 128 PM 14.30—49.28 Culvert Rehab 55 Culverts in Mendocino County Project WDID No. 1B13026WNME Caltrans EA No.: 01 - 378161*" issued by the North Coast Regional Water Quality Control Board on February 22, 2012 (enclosure 3) and May 29, 2013 (enclosure 4); respectively. You shall consider such conditions to be an integral part of the authorization for your project.

You may refer any questions on this matter to Daniel Breen of my Regulatory staff by telephone at 415-503-6769 or by e-mail at daniel.b.breen@usace.army.mil. All correspondence should be addressed to the Regulatory Division, North Branch, referencing the file number at the head of this letter. If you would like to provide comments on our permit review process, please complete the Customer Survey Form available online at http://www.spn.usace.army.mil/Missions/Regulatory.aspx.

Sincerely,

Jane M. Hicks
Chief, Regulatory Division

Enclosures

Copies furnished:

US EPA, San Francisco, CA
US FWS, Arcata, CA
US NMFS, Arcata, CA
CA CC, Eureka, CA
CD DFG, Redding, CA
CA RWQCB, Santa Rosa, CA

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103-1398

REPLY TO
ATTENTION OF:

NOV - 5 2012

Regulatory Division

SUBJECT: File Number 2009-00447N

Ms. Sharon Stacey
California Department of Transportation (Caltrans), District 1
North Region Environmental Planning
1031 Butte Street, MS 30
Redding, California 96001

Dear Ms. Stacey:

Enclosed is your signed copy of a Department of the Army (DA) Regional General Permit (RGP) to rehabilitate and/or replace approximately deteriorated culverts in Mendocino County, California.

Should you have any questions regarding this matter, please call Paula Gill of our Regulatory Division at 415-503-6776 or by email at Paula.C.Gill@usace.army.mil. Please address all correspondence to the Regulatory Division and refer to the File Number at the head of this letter. If you would like to provide comments on our permit review process, please complete the Customer Survey Form available online at http://per2.nwp.usace.army.mil/survey.html.

Sincerely,

jane m. Hicks

for John Baker, P.E.
Lieutenant Colonel, U.S. Army
Commander and District Engineer

Enclosure

Copies Furnished (w/encl 1 only):

US EPA, San Francisco, CA
US FWS, Arcata, CA
US NMFS, Arcata, CA
CA CC, Eureka, CA

CA DFG, Redding, CA
CA RWQCB, Santa Rosa, CA

DEPARTMENT OF THE ARMY REGIONAL GENERAL PERMIT 16 FOR THE REHABILITATION OR REPLACEMET OF CULVERTS IN MENDOCINO COUNTY

PERMITTEE: Ms. Sharon Stacey, California Department of Transportation (Caltrans)

PERMIT NO.: 2009-00447N

ISSUING OFFICE: San Francisco District

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate District or Division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below:

PROJECT DESCRIPTION:

This Regional General Permit (RGP) authorizes the rehabilitation and/or replacement of deteriorated culverts and installation of standard drainage inlet and outlet structures located in Mendocino County. Culvert sizes will range from 18" to 6' by 12' box culverts. Some drainage work will be completed at inlets and outlets, and minor vegetation removal may be performed to improve water flow. Minor grading may also be performed at various locations when deemed necessary to prevent water buildup at inlets and/or outlets. Either half-width construction or jacking construction methods will be utilized. Some specific designs may call for modifying the ends of the culvert with a headwall, a flared end section, an inlet structure, or a downdrain. Rock slope protection, rock energy dissipaters, and rock weirs may also be commonly required. Temporary flow diversions on perennial streams would also be required. Authorization also includes off-pavement work pads for construction at inlets and outlets that cannot be reached with equipment from the road. Typically, work shall be completed in accordance with the plans and drawings titled, "*USACE File #2009-00447N, State Routes 128 and 253 Culvert Replacement, March 28, 2012, Figures 1 to 4.*"

Impacts to wetlands and waters of the U.S. associated with each culvert replacement will vary depending on specific site conditions associated with each culvert replacement. The maximum authorized discharge of fill material into wetlands and waters of the U.S. is 0.05 acre or 50 linear feet of permanent fill (i.e. placement of hardscape material beyond the existing culvert) for an individual culvert replacement. Over the 5-year authorization period, no more than 1.0 acre of permanent impact to wetlands and waters of the U.S. associated with culvert replacements will be authorized. Activities required for culvert replacement that would not constitute placement of fill or a permanent impact (e.g. dewatering, culvert replacement) will be limited to 300 linear feet of work within a water of the U.S., this includes the length of the culvert and additional upstream and downstream associated work.

PROJECT LOCATION: Mendocino County, California

PERMIT CONDITIONS:

GENERAL CONDITIONS:

1. The time limit for completing the work authorized ends on June 15, 2017.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

6. You understand and agree that, if future operations by the United States require the removal, relocation or other alteration of the structure or work authorized herein, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, you will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

SPECIAL CONDITIONS:

1. Two annual reports are required. The first annual report (advanced notice) will contain a work plan for the coming year. This report shall be submitted prior to April 15 of each year. Along with other information this advanced notice will include work locations, any proposed off-pavement work pad locations and size, estimates of impact to jurisdictional wetlands and/or to other Waters of the U.S. (in mapped format), construction methods, and proposed work timeframes. Specific project drawings for each culvert replacement including any required rock slope protection, any culvert modifications, or grading plans shall be provided. Additionally, a Wetland Delineation Report prepared in accordance with the Corps of Engineers' 1987 Wetland Delineation Manual and the appropriate Regional Supplement for the project study area for proposed culvert repair locations shall be provided. The proposed compensatory mitigation plan for impacts associated with the upcoming year shall be provided with the advanced notice completed in accordance with "*Compensatory Mitigation for Losses of Aquatic Resources; Final Rule,*" 33 C.F.R. pt. 332, published on April 10, 2008.

   Included with the advanced notice, Caltrans shall demonstrate compliance with Section 7 of the Endangered Species Act (ESA) of 1973 as amended, 16 U.S.C. §§ 1531-1544, and Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation, Management Act (EFH), 16 U.S.C. § 1855(b)(4)(B), and Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, 16 U.S.C. §§ 470-470. Caltrans shall provide all relevant documentation summarizing any previous consultation efforts, as it pertains to the Corps Regulatory permit area (for Section 7 and EFH compliance) and the Corps Regulatory area of potential effect (for Section 106 compliance). Additionally, copy of the Regional Water Quality Control Board (RWQCB) 401 Certification and the California Coastal Commission (CCC) Consistency Determination for the proposed culvert replacements shall also be provided, if available.

   The second annual report would summarize work completed in the previous year and will provide a running summary of mitigation efforts, including post-construction monitoring outlined in special condition 13. The second annual report shall be submitted prior to December 1 of each year.

2. After review of the Advanced Notice the Corps will provide specific written authorization of rehabilitation and/or replacement of deteriorated culverts. Within this written authorization the Corps will also approve the proposed compensatory mitigation plan. Approval of the Advanced Notice shall be contingent on appropriately proposed compensation for anticipated impacts, demonstration of successful implementation and reporting in accordance with any previously approved mitigation plan, and compliance with all federal and state regulatory requirements (ESA, EFH, NHPA, RWQCB, and CCC).

3. Compensatory mitigation for unavoidable impacts to wetlands and Waters of the U.S. shall occur through creation, restoration, riparian planting, or enhancement of the appropriate tributaries and/or wetlands within the watershed where impacts are proposed to occur. Compensatory mitigation may also be provided through the purchase of credits at a Corps approved mitigation bank. Your responsibility to complete the required compensatory mitigation upon approval of Advanced Notice and associated compensatory mitigation plans will not be considered fulfilled until you have demonstrated mitigation success and have received written verification from the U.S. Army Corps of Engineers.

4. You shall not begin work on any individual culvert replacement until specific written authorization is provided by USACE upon review of the advanced notice.

5. No activity is authorized under this RGP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any RGP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed. The Corps will review the documentation provided demonstrating compliance with the Section 7 consultation and determine whether it is sufficient to address ESA compliance for the RGP activity, or whether additional ESA consultation is necessary. Authorization of an activity by this RGP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., a Biological Opinion with "incidental take" provisions, etc.) from the United States Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS). Upon approval of the advanced notice Caltrans shall comply with the mandatory terms and conditions associated with incidental take. Failure to comply with the terms and conditions for incidental take, where a 'take' of a federally-listed species occurs, would constitute an unauthorized take and non-compliance with the RGP authorization. The USFWS and or NMFS are, however, the authoritative federal agency for determining compliance with the incidental take statement and for initiating appropriate enforcement actions or penalties under the ESA.

6. If the USFWS and/or NMFS concurred with the determination that the project was not likely to adversely affect listed species and designated critical premised on project work restrictions then these work restrictions shall be implemented to ensure unauthorized incidental take of species and loss of critical habitat does not occur.

7. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or Study River (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

8. Work will be conducted during the dry season (June 15 to October 15) to minimize potential impacts to any wet or running watercourses, when feasible. If work is occurring in a perennial creek or outside of the dry season then the waterway shall be de-watered.

9. Off-pavement work pads shall also be located outside of USACE jurisdictional wetlands and waters of the U.S.

10. Prior to any culvert rehabilitation a Section 401 water quality certification from the North Coast, Regional Water Quality Control Board shall be provided specifically authorizing the proposed culvert replacement.

11. Prior to any work on a culvert located within the jurisdiction of the California Coastal Commission, concurrence that the work will comply with California's Coastal Zone Management Act must be provided.

12. No fill shall be placed below the ordinary high water mark of the Navarro River, Rancheria Creek, Big River, Eel River, Gualala River including South Fork Gualala River, Mattole River, Russian River to ensure these rivers on the Nationwide Rivers Inventory are not adversely affected by project implementation.

13. The area immediately upstream and downstream of each culvert replacement shall be monitored post-construction at years 1, 3, and 5 to qualitatively assess channel conditions surrounding the work area. Photographs and a brief summary of conditions shall be provided with the annual summary of completed work. Any finding of channel instability (e.g. migrating headcuts, RSP failure, or bank erosion) shall be documented and remediation measures shall be proposed and submitted to USACE for review. After receiving approval from USACE, the proposed measures shall be implemented.

14. Application of compost blankets for erosion control will be implemented concurrently with project construction. All other revegetation activities will begin the fall after completion of culvert construction. If areas do not revegetate by the first year of post-construction monitoring (described in special condition 11 above), the Corps may require further monitoring, re-vegetation, and/or off-site mitigation.

FURTHER INFORMATION:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(x) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. Section 403).
(x) Section 404 of the Clean Water Act (33 U.S.C. Section 1344).
( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. Section 1413).

2. Limits of this authorization:

a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability: In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate. (See Item 4 above.)

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 C.F.R. Section 325.7 or enforcement procedures such as those contained in 33 C.F.R. Sections 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 C.F.R. Section 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

Sebastian Cohen _____ 10/31/12 _____

(PERMITTEE) (DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

for Jane M. Hicks _____ 11/5/12 _____

John Baker, P.E. (DATE)
Lieutenant Colonel, U.S. Army
Commander and District Engineer

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____ _____

(TRANSFEREE) (DATE)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Men	128,253	Var		

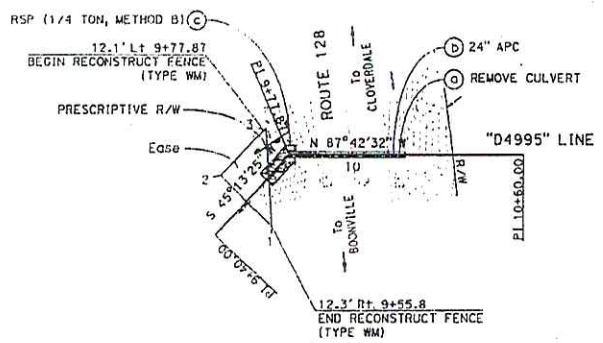
REGISTERED CIVIL ENGINEER — DATE

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

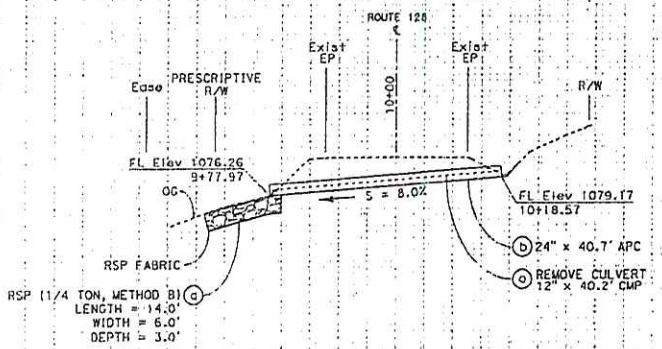
POINT	STATION	OFFSET
1	9+55.81	12.33' Rt
2	9+66.46	12.68' Lt
3	9+77.87	12.11' Lt

T12N R11W MDB&M
SECTION 28



DRAINAGE SYSTEM (6)

ROUTE 128
PM 49.95
PLAN SCALE: 1" = 20'



PROFILE SCALE: Horiz 1" = 10'
Vert 1" = 10'

9+40 9+60 9+80 10+00 10+20 10+40 10+60

DRAINAGE PLAN AND PROFILE

SCALE AS SHOWN

TYPICAL CULVERT REPLACEMENT

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

U.S. Army Corps of Engineers
San Francisco District
Regulatory Division

USACE File #2009-00447N
State Routes 128 and 253
Culvert Replacement
March 28, 2012
Figure 1 of 4

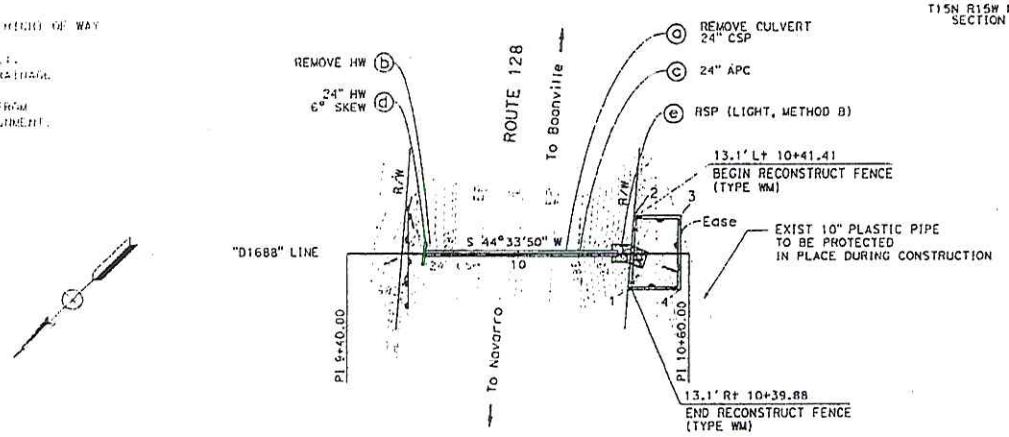
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
01	Men	128	Var		

REGISTERED CIVIL ENGINEER — DATE

PLANS APPROVAL DATE

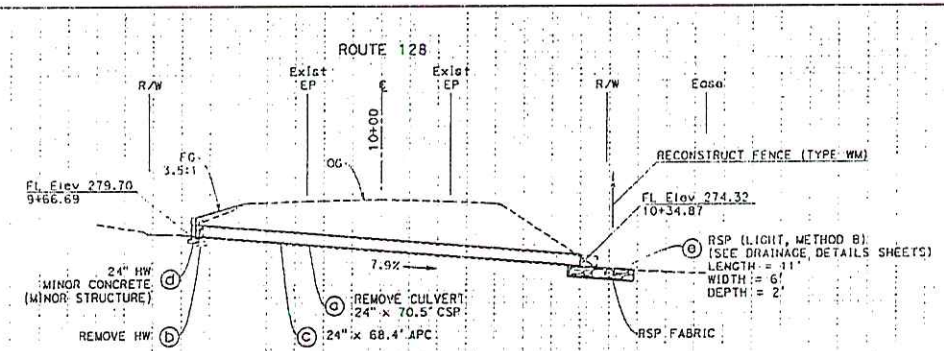
THE STATE OF CALIFORNIA AND ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN SHEET.

T15N R15W MDB&M
SECTION 33



POINT	STATION	OFFSET
1	10+38.48	13.12' Rt
2	10+40.54	13.13' Lt
3	10+56.94	13.13' Lt
4	10+56.94	13.12' Rt

DRAINAGE SYSTEM (12)
ROUTE 128
PM 16.88
SCALE: 1" = 20'



DRAINAGE SYSTEM (12)
SCALE: Horiz 1" = 10'
Vert 1" = 10'

DRAINAGE PLAN AND PROFILES
SCALE AS SHOWN
TYPICAL CULVERT REPLACEMENT

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

U.S. Army Corps of Engineers
San Francisco District
Regulatory Division

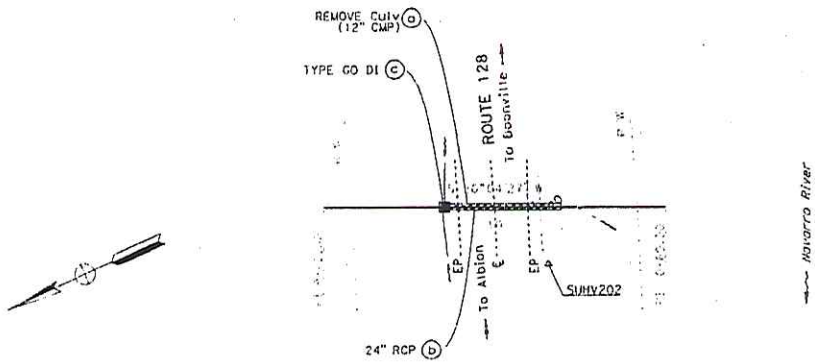
USACE File #2009400447N
State Routes 128 and 253
Culvert Replacement
March 28, 2012
Figure 2 of 4

Dist	County	Route	Post Miles Total Project	Sheet No.	Total Sheets
01	Men	128	YOH		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

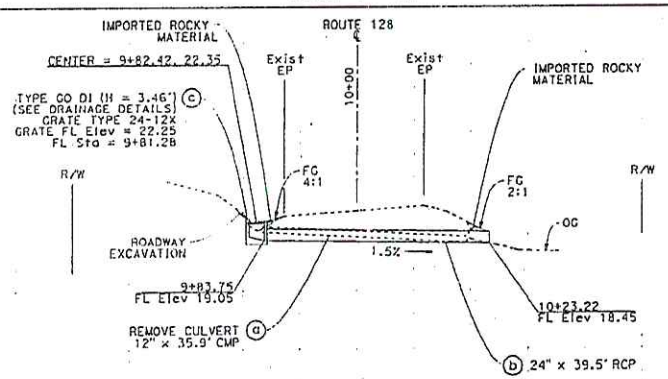


DRAINAGE SYSTEM No. 5

ROUTE 128
PM 00.59

PLAN

SCALE: 1" = 20'



PROFILE

SCALE: 1" = 10'

+20 +40 +60 +80 10+00 +20 +40 +60 +80

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

DRAINAGE PLAN AND PROFILE

SCALE AS SHOWN

TYPICAL CULVERT REPLACEMENT

U.S. Army Corps of Engineers
San Francisco District
Regulatory Division

USACE File #2009-00447N
State Routes 128 and 253
Culvert Replacement
March 28, 2012
Figure 3 of 4

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
01	Men	128	Var.		

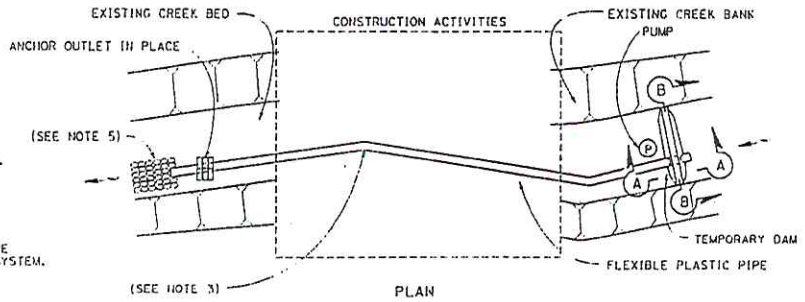
REGISTERED CIVIL ENGINEER — DATE

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

NOTES:

1. [illegible] OF PLASTIC PIPE TO BE DETERMINED BY THE ENGINEER.
2. [illegible] TO BE PLACED AT INTERMEDIATE [illegible] AS DETERMINED BY THE ENGINEER.
3. FLEXIBLE PIPE WITH WATER TIGHT JOINTS AS NECESSARY [illegible].
4. TEMPORARY DAM CAN BE CONSTRUCTED AS TYPE 1 OR TYPE 2.
5. WHERE [illegible] OR GREATER THAN 6 FT/S, A ROCK ENERGY DISSIPATOR SHALL BE PLACED AT THE OUTFALL OF THE PLASTIC PIPE.
6. METHOD OF ATTACHING TEMPORARY PLASTIC PIPE TO EXISTING CULVERT WALLS OR END OF CULVERT WALL TO BE APPROVED BY THE ENGINEER.
7. NO SEPARATE PAYMENT FOR CREEK DIVERSION SYSTEM IS INCLUDED IN [illegible] FOR BURIED 60" WELDED STEEL PIPE.
8. ADDITIONAL LOCATIONS NEEDING TEMPORARY CREEK DIVERSIONS ARE [illegible] FOR TEMPORARY CREEK DIVERSION SYSTEM.



PLAN

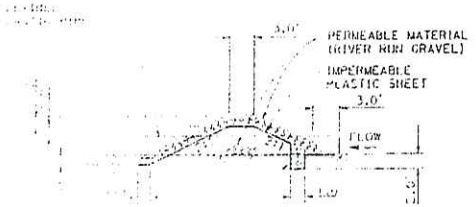
TEMPORARY CREEK DIVERSION SYSTEM

HYDROLOGIC SUMMARY

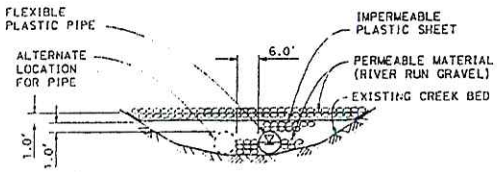
CONSTRUCTION WINDOW	PIPE Dia.
[illegible]	12" ϕ

[illegible] WATER YEARS DEPENDING ON WATER YEAR.

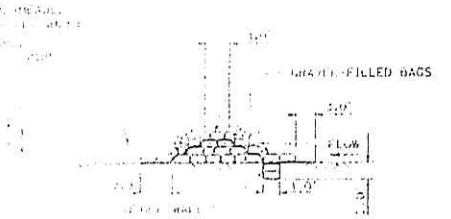
DRAINAGE SYSTEM No.	LOCATION PM
23	20.15
31	27.54
44	36.63
48	39.88



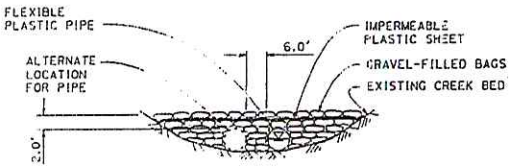
TEMPORARY DAM (TYPE 1)
SECTION A-A



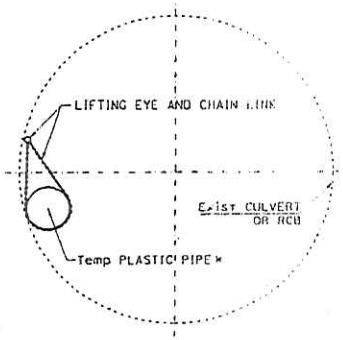
TEMPORARY DAM (TYPE 1)
SECTION B-B



TEMPORARY DAM (TYPE 2)
SECTION A-A



TEMPORARY DAM (TYPE 2)
SECTION B-B



TYPICAL SECTION

Temp PLASTIC PIPE INSTALLED IN CSP/RCB

DRAINAGE SYSTEM No.	LOCATION PM
23	20.15
31	27.54
44	36.63
48	39.88

TEMPORARY WATER POLUTION CONTROL DETAILS (TEMPORARY CREEK DIVERSION SYSTEM)

NO SCALE

TYPICAL STREAM DIVERSION

THIS PLAN ACCURATE FOR TEMPORARY WATER POLLUTION CONTROL WORK ONLY

NEGATIVE BORDER SCALE IS IN INCHES 0 1 2 3

U.S. Army Corps of Engineers
San Francisco District
Regulatory Division

USACE File #2009-00447N
State Routes 128 and 253
Culvert Replacement
March 28, 2012
Figure 4 of 4

California Regional Water Quality Control Board

March 27, 2015

In the Matter of

Water Quality Certification

for the

California Department of Transportation
State Route 128 Culvert Rehabilitation Project (Phase 3)
WDID No. 1B15008WNME, ECM PIN CW-812914
Caltrans EA Numbers: 01-37814, 01-37817
Caltrans EFIS Numbers: 0100000134, 0100000137

APPLICANT:	California Department of Transportation
RECEIVING WATER:	Navarro River
HYDROLOGIC AREA:	Navarro River Hydrologic Area No. 1113.50
COUNTY:	Mendocino
FILE NAME:	CDOT Highway 128 & Highway 253 Culvert Rehabilitation Project Phase III

FINDINGS BY THE EXECUTIVE OFFICER:

1. On January 30, 2015, the North Coast Regional Water Quality Control Board (Regional Water Board) received an application from the California Department of Transportation (Caltrans) requesting Federal Clean Water Act (CWA) section 401, Water Quality Certification (certification) for activities related to the State Route 128 Culvert Rehabilitation Project, Phase III (Project). Three certifications were issued covering the first two phases of this project on August 29, 2011, February 22, 2012, and May 29, 2013.

2. **Hydrologic Unit**: The proposed Project would cause impacts to jurisdictional waters tributary to the Navarro River (Basin Plan Hydrologic Planning Area 113.50).

3. **Public Notice:** The Regional Water Board provided public notice of the application pursuant to title 23, California Code of Regulations, section 3858 on February 24, 2015, and posted information describing the Project on the Regional Water Board's website. No comments were received.

4. **Project Description:** The Project would rehabilitate 72 drainage systems along State Route 128 between post-miles 2.8 and 23.3. The purpose of the Project is to maintain public safety and prevent highway damage due to potential drainage system failures. Common drainage system elements that will be employed include culverts, down-drains, headwalls, dikes, drainage inlets and energy dissipation (rip-rap). Common problems with the existing drainage systems include corroded and damaged culverts, undersized culverts, inadequate or missing headwalls or rip-rap, and lack of down-drains. Most of the culverts would be replaced using trench cut-and-cover method.

   Work would be conducted on drainage systems at the following SR 128 Post-Miles:

2.81	3.01	3.08	3.20	3.36	3.46	3.66	3.71
3.89	3.92	4.02	4.05	4.08	4.17	4.45	4.50
4.55	4.78	4.83	5.03	5.08	5.36	5.82	5.92
6.08	6.11	6.48	6.66	6.74	7.07	7.40	7.51
7.76	7.81	7.95	8.08	8.55	8.75	8.87	8.91
8.95	9.34	9.44	9.61	9.73	9.85	9.99	10.08
10.43	10.47	10.58	10.73	11.00	11.07	11.13	11.17
11.54	12.12	14.91	15.19	15.52	15.56	16.11	16.50
16.99	17.02	17.26	17.45	18.97	19.94	22.34	23.30

5. **Construction Duration:** The Project is expected to be completed within approximately 280 working days between spring 2015 and fall 2020. Work would only be performed in State waters between June 15 and October 15.

6. **Permanent Impacts:** Caltrans has determined that the proposed Project would result in approximately 0.05 acres and 2,446 linear feet (0.08 acres) of permanent impacts to wetlands and jurisdictional tributaries of the Navarro River, respectively. Permanent impacts to riparian vegetation have been avoided.

7. **Temporary Impacts:** Caltrans has determined that the proposed Project would result in approximately 0.08 acres and 605 linear feet (0.015 acres) of temporary impacts to wetlands and jurisdictional tributaries of the Navarro River, respectively.

8. **Mitigation for Project Impacts**: Caltrans would mitigate for permanent impacts by providing 0.46 acres of restored wetlands and 0.17 acres of restored waters of the United States at MacKerricher State Park, immediately north of Fort Bragg. Mitigation would be done consistent with the April 2013, Inglenook Fen-Ten Mile Dune Natural Preserve Mitigation and Monitoring Plan, prepared by Caltrans.

9. **Post-Construction Storm Water Treatment:** Post-construction storm water treatment is not required because Project implementation would result in less than 5,000 square feet of added impervious area.

10. **Disturbed Soil Area**: Project implementation would result in greater than one acre of disturbed soil area. Caltrans shall apply for coverage under the National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ) and prepare a Stormwater Pollution Prevention Plan detailing Best Management Practices to control pollution from the Project area during construction. All disturbed areas within the Project area shall be appropriately stabilized and/or replanted with appropriate native vegetation.

11. **Utility Relocations:** Utility relocations affecting jurisdictional waters are not proposed for this Project.

12. **Other Agency Actions:** Caltrans has requested U.S. Army Corps of Engineers authorization to perform the project under Regional General Permit no. 2009-00447N, pursuant to CWA, section 404. Caltrans has also submitted a section 1600 Notification of Lake or Streambed Alteration to the California Department of Fish and Wildlife. Caltrans received a Biological Opinion (AFWO-10B0003-10F0090) from the National Marine Fisheries Service (NMFS) on January 4, 2005, that determined the Project is not likely to adversely affect listed salmonid species. Caltrans reinitiated consultation with NMFS in 2006 after a change in the listing status of Central California Coast coho salmon as well as designation of critical habitat for Northern California steelhead and Central California Coast steelhead. In a January 10, 2007, letter, NMFS maintained that the original Biological Opinion and incidental take statement remained valid.

13. **CEQA Compliance:** On June 14, 2005, Caltrans certified a Negative Declaration (State Clearinghouse No. 2005042089) for the project in order to comply with the California Environmental Quality Act. The Regional Water Board has considered the environmental document.

14. **Total Maximum Daily Load:** The Navarro River watershed is listed on the Clean Water Act Section 303(d) list as impaired for sediment and temperature. In December 2000, the U.S. EPA established sediment Total Maximum Daily Loads (TMDLs) for the Navarro River watershed. Roads are a significant source of sediment in the watershed

(directly, from surface erosion, and indirectly, by triggering landslides). Certification conditions include measures to reduce sediment discharges to surface waters from the Project and also include measures to avoid, minimize, and mitigate impacts in riparian zones. Accordingly, this certification is consistent with, and implements portions of the Navarro River TMDL.

15. **Antidegradation Policy:** The federal antidegradation policy requires that state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Regional Water Board's Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. This certification is consistent with applicable federal and State antidegradation policies, as it does not authorize the discharge of increased concentrations of pollutants or increased volumes of treated wastewater, and does not otherwise authorize degradation of the waters affected by this Project.

16. This discharge is also regulated under State Water Resources Control Board Order No. 2003-0017-DWQ, "General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification," which requires compliance with all conditions of this certification. A weblink to this Order is included at the end of this certification.

Receiving Water:	Navarro River	
Filled and/or Excavated Areas:	Permanent – jurisdictional other waters of the U.S.	2,446 linear feet (0.08 acres)
	Permanent – wetlands	0.05 acres
	Temporary – jurisdictional other waters of the U.S.	605 linear feet (0.015 acres)
	Temporary – wetlands	0.08 acres
Dredge Volume:	none	
Latitude/Longitude:	~39.159242, -123.603145	

Accordingly, based on its independent review of the record, the Regional Water Board certifies that the State Route 128 Culvert Rehabilitation Project, Phase III (WDID No. 1B15008WNME), as described in the application will comply with sections 301, 302, 303, 306 and 307 of the Clean Water Act, and with applicable provisions of state law, provided that Caltrans complies with the following terms and conditions:

All conditions of this certification apply to Caltrans (and all its employees) and all contractors (and their employees), sub-contractors (and their employees), and any other entity or agency that performs activities or work on the project (including the off-site mitigation lands) as related to this Water Quality Certification.

Project-Specific Conditions Requiring Reports

1. The Regional Water Board shall be notified in writing (e-mail is acceptable) at least five working days prior to commencement of ground disturbing activities for each construction season.

2. Caltrans shall implement the Project *Revegetation Plan* dated January 2015. Years 1, 3, and 5 reports shall be submitted to the Regional Water Board not later than January 15 following each respective monitoring event.

3. Caltrans shall implement the April 2013 mitigation and monitoring plan entitled, *Seaside Beach Roadside Repair (EA 47490) Anchor Bay Drainage Repair (EA 44650) and SR 128/253 Culvert Rehabilitation (EA 37812, 37813, 37814, 37816, 37817) and Men 20 Left Turn and Shoulder Widening (EA 29200) Off-Site Wetland Mitigation at California State Parks Inglenook Fen – Ten Mile Dunes Natural Preserve, Mitigation and Monitoring Plan*.

4. Caltrans shall submit, subject to review and concurrence of Regional Water Board staff, a diversion plan no later than 30 days prior to conducting any diversion activities. Information submitted shall include a delineation of the area to be diverted, method of diversion, and a description of all activities that would occur within the diverted area. All diversion activities shall not create erosion, be designed to minimize potential impacts to State waters, and maintain pre-diversion flow conveyance. All diversion structures shall be removed immediately upon completion of Project activities within the diverted work area.

Project-Specific Condition

5. Work within State waters shall occur only between June 15 and October 15. Any deviation from this timeframe restriction shall be subject to prior acceptance by Regional Water Board staff.

Standard Conditions

6. Herbicides and other pesticides shall not be used within the Project limits. If Caltrans has a compelling case as to why pesticides should be used, then a request for pesticide use and a BMP plan may be submitted to the Regional Water Board staff for review and acceptance.

7. All Project activities and BMPs shall be implemented according to the submitted

Standard Conditions

application package and the findings and conditions of this certification. Subsequent changes to the Project that could significantly impact water quality shall first be submitted to Regional Water Board staff for prior review, consideration, and written concurrence. If the Regional Water Board is not notified of an alteration to the Project that results in an impact to water quality, it will be considered a violation of this Order, and Caltrans may be subject to Regional Water Board enforcement actions.

8. All conditions required by this Order shall be included in the Contract Documents prepared by Caltrans for the contractor. In addition, Caltrans shall require compliance with all conditions included in this Order in the bid contract for this Project.

9. Caltrans is prohibited from discharging waste to waters of the State, unless explicitly authorized by this certification. For example, no debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or concrete washings, welding slag, oil or petroleum products, or other organic or earthen material from any construction or associated activity of whatever nature, shall be allowed to enter into State waters.

10. Except for temporary stockpiling of waste generated during demolition operations ("temporary" in this instance means generated and removed during the same working day), waste materials shall not be placed in a manner where the materials may be transported into waters of the State. Waste materials shall not be placed within 100 linear feet of State waters. Exceptions to the 100-foot limit may be granted on a case-by-case basis provided Caltrans first submits a proposal in writing that is found acceptable by Regional Water Board staff.

11. Caltrans is liable and responsible for the proper disposal, reuse, and/or recycling of all Project-generated waste in compliance with applicable State and Federal laws and regulations, and as described in Caltrans 2010 Standard Specifications 13-4.03D, Waste Management. Additionally, when handling, transporting, disposing, reusing, and/or recycling Project-generated waste, Caltrans and their contractors shall:

    i) Provide the Regional Water Board with a copy of the Solid Waste Disposal and Recycling Report prepared for Caltrans by the contractor per Caltrans 2010 Standard Specification 14-10.02A(1), Submittals. These reports shall be provided not later than January 31 for each year work is performed during the previous calendar year. A copy of the final Solid Waste Disposal and Recycling Report shall be submitted to the Regional Water Board within 30 days after being received by Caltrans from the contractor.

    ii) For waste other than solid waste, obtain evidence that waste has been appropriately disposed, reused, and/or recycled. Evidence shall include type and quantity of waste and may include, but not be limited to, property owner agreements, permits, licenses, and environmental clearances. Evidence shall

Standard Conditions

be provided to the Regional Water Board upon request; and

iii) For waste other than solid waste, ensure the Resident Engineer has given written permission for disposal, reuse, and/or recycling, prior to the actual disposal, reuse, and/or recycling.

12. Asphalt-concrete grindings shall not be placed in any location where they may, at any time, be directly exposed to surface waters or seasonally high ground water, except asphalt-concrete grindings may be re-used and incorporated into hot mix asphalt products or encapsulated within the roadway structural section.

13. Caltrans and their contractors shall comply with the activity restrictions detailed in Caltrans 2010 Standard Specifications 13-4.03C(1). In addition, fueling, maintenance, storage and staging of vehicles and equipment shall be prohibited within waters of the State (e.g., gravel bars, seeps, ephemeral streams) and riparian areas.

14. Fueling, maintenance, and/or staging of individual equipment types within waters of the State or riparian areas may be authorized if Caltrans first submits a plan for review by Regional Water Board staff that:

    i) Identifies the specific piece of machinery that may require fueling, maintenance, and/or staging within waters of the State or riparian areas;

    ii) Provides justification for the need to refuel, maintain, or stage within State waters or riparian areas. The justification shall describe why conducting the activity outside of jurisdictional waters is infeasible; and

    iii) Includes a narrative of specific BMPs that shall be employed to prevent discharges to State waters and riparian areas;

15. Caltrans shall not use leaking vehicles or equipment within State waters or riparian areas.

16. Only 100-percent biodegradable erosion and sediment control products that will not entrap or harm wildlife shall be used. Photodegradable synthetic products are not considered biodegradable. If Caltrans finds that erosion control netting or products have entrapped or harmed wildlife, personnel shall remove the netting or product and replace it with wildlife-friendly biodegradable products. This condition does not prohibit the use of plastic sheeting used in water diversion or dewatering activities. Caltrans shall request approval from the Regional Water Board if an exception to this requirement is needed for a specific location.

17. Work in flowing or standing surface waters, unless otherwise proposed in the project description and approved by the Regional Water Board, is prohibited.

Standard Conditions

18. Non-stormwater discharges are prohibited unless the discharge is first approved by the Regional Water Board and in compliance with the Basin Plan. If dewatering of groundwater is necessary, then Caltrans shall use a method of water disposal other than disposal to ground or surface waters, such as land disposal. Groundwater disposed of to land shall not enter State waters. Alternatively, Caltrans may apply for coverage under the Low Threat Discharge Permit or an individual National Pollutant Discharge Elimination System (NPDES) Permit. If Caltrans applies for coverage under either of these permits, then discharge is prohibited until Caltrans has received notification of coverage under the respective permit.

19. Gravel bags used within State waters shall:

    i) Comply with Caltrans 2010 Standard Specifications sections 13-5.02G and 88-1.02F;

    ii) Be immediately removed and replaced if the bags have developed or are developing holes or tears; and

    iii) Be filled only with clean washed gravel.

    Exceptions to these criteria are subject to the review and acceptance of Regional Water Board staff;

20. This Order does not authorize drafting of surface waters.

21. Caltrans shall provide access to the Project construction site upon request by Regional Water Board staff.

22. Initial water pollution control training described in Caltrans 2010 Standard Specifications 13-1.01D(2), Training, shall apply to all Caltrans employees, contractors, and sub-contractors. Initial water pollution control training topics shall include Regional Water Board 401 certification and construction general permit requirements, identification of state waters and riparian areas, and violation avoidance and discharge reporting procedures.

23. Caltrans shall maintain logs of all Caltrans staff, contractors, and sub-contractors trained pursuant to the Caltrans 2010 Standard Specifications 13-1.01D(2). The logs shall include the names of trainees, training dates, and summary of the scope of training. Caltrans shall provide evidence of this documentation upon the request of the Regional Water Board.

24. If an unauthorized discharge to surface waters (including wetlands, rivers or streams) occurs, or any other threat to water quality arises as a result of Project

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implementation, the associated Project activities shall cease immediately until the threat to water quality is otherwise abated. If there is a discharge to State waters, the Regional Water Board shall be notified no more than 24 hours after the discharge occurs.

25. Uncured concrete shall not be exposed to State waters or surface waters that may discharge to State waters. Concrete sealants may be applied to the concrete surface where difficulty in excluding flow for a long period may occur. If concrete sealant is used, water shall be excluded from the site until the sealant is cured. If groundwater comes into contact with fresh concrete, it shall be prevented from flowing towards surface water.

26. Ground and surface water that has come into contact with fresh concrete, and all other wastewater, shall not be discharged to State waters or to a location where it may discharge to State waters; the wastewater shall be collected and re-used or disposed of in a manner approved by the Regional Water Board.

27. All imported fill material shall be clean and free of pollutants. All fill material shall be imported from a source that has the appropriate environmental clearances and permits. The reuse of low-level contaminated solids as fill on-site shall be performed in accordance with all State and Federal policies and established guidelines and must be submitted to the Regional Water Board for review and consideration of acceptance.

28. Caltrans shall provide a copy of this certification and State Water Resources Control Board (SWRCB) Order No. 2003-0017-DWQ (web link referenced below) to the contractor and all subcontractors conducting the work, and require that copies remain in their possession at the work site. Caltrans shall be responsible for work conducted by its contractor and subcontractors.

29. The validity of this certification is conditioned upon total payment of any fee required under title 23, California Code of Regulations, section 3833. The total Application fee is $41,194. The Regional Water Board received $1,701 from Caltrans on January 30, 2015, and $39,493 on March 26, 2015.

30. This certification will be subject to annual billing during the construction phase ("Annual Active Discharge Fee") and during the monitoring phase of the Project ("Annual Post Discharge Monitoring Fee"), per the current fee schedule, which can be found on our website: http://www.swrcb.ca.gov/northcoast/water_issues/programs/water_quality_certification.shtml. These fees will be automatically invoiced to Caltrans.

31. Caltrans shall notify the Regional Water Board upon Project construction completion

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to request termination of the Annual Active Discharge Fee and to receive a "Notice of Completion of Discharges Letter." If the Project is subject to the Annual Post Discharge Monitoring Fee, then Caltrans shall also notify the Regional Water Board at the end of the monitoring period to request termination of the fee and receive a "Notice of Project Complete Letter." Caltrans may be required to submit completion reports at the end of each of these phases. Regional Water Board staff may request site visits at the end of each Project phase to confirm Project status and compliance with this Order.

32. This certification action is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to title 23, California Code of Regulations, section 3855, subdivision (b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

33. In the event of any violation or threatened violation of the conditions of this certification, the violation or threatened violation shall be subject to any remedies, penalties, process or sanctions as provided for under applicable state or federal law. For the purposes of section 401(d) of the Clean Water Act, the applicability of any state law authorizing remedies, penalties, process or sanctions for the violation or threatened violation constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this certification. In response to a suspected violation of any condition of this certification, the State Water Board may require the holder of any federal permit or license subject to this certification to furnish, under penalty of perjury, any technical or monitoring reports the State Water Board deems appropriate, provided that the burden, including costs, of the reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In response to any violation of the conditions of this certification, the Regional Water Board may add to or modify the conditions of this certification as appropriate to ensure compliance.

34. This certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to Water Code section 13330 and title 23, California Code of Regulations, section 3867.

35. This certification is not transferable. In the event of any change in control of ownership of land presently owned or controlled by Caltrans, Caltrans shall notify the successor-in-interest of the existence of this certification by letter and shall forward a copy of the letter to the Regional Water Board. The successor-in-interest must send to the Regional Water Board Executive Officer a written request for transfer of this certification to discharge dredged or fill material under this Order. The request must

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contain the following:

i) Requesting entity's full legal name;

ii) The state of incorporation, if a corporation;

iii) The address and phone number of contact person; and

iv) A description of any changes to the project or confirmation that the successor-in-interest intends to implement the project as described in this Order.

36. Except as may be modified by any preceding conditions, all certification actions are contingent on:

i) The discharge being limited, and all proposed revegetation, avoidance, minimization, and mitigation measures being completed, in strict compliance with Caltrans's project description and CEQA documentation, as approved herein;

ii) Caltrans shall construct the project in accordance with the project described in the application and the findings above; and

iii) Compliance with all applicable water quality requirements and water quality control plans including the requirements of the Water Quality Control Plan for the North Coast Region (Basin Plan), and amendments thereto.

Any change in the design or implementation of the project that would have a significant or material effect on the findings, conclusions, or conditions of this Order must be submitted to the Executive Officer of the Regional Water Board for prior review, consideration, and written concurrence. If the Regional Water Board is not notified of a significant alteration to the project, it will be considered a violation of this Order, and Caltrans may be subject to Regional Water Board enforcement actions.

37. The authorization of this certification for any dredge and fill activities expires five years from the date of this Order. Conditions and monitoring requirements outlined in this Order are not subject to the expiration date outlined above, and remain in full effect and are enforceable.

Conditions 1-4 include requirements for information and reports. Any requirement for a report made as a condition to this certification is a formal requirement pursuant to California Water Code section 13267, and failure or refusal to provide, or falsification of such required report is subject to civil liability as described in California Water Code, Section 13268.

The Regional Water Board may add to or modify the conditions of this Order, as appropriate, to implement any new or revised water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act or section 303 of the Clean Water Act.

Please contact our staff Environmental Scientist, Brendan Thompson at (707) 576-2699, or via e-mail, at Brendan.Thompson@waterboards.ca.gov, if you have any questions.

_____

Matthias St. John
Executive Officer

150327_BJT_dp_CDOT_MEN128_Culverts_401

Web link: State Water Resources Control Board Order No. 2003-0017 -DWQ, General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification can be found at: http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0017.pdf

Original to: Mr. Sebastian Cohen, Caltrans, District 1, 1656 Union Street, Eureka, CA 95501 Sebastian.Cohen@dot.ca.gov

cc: Holly Costa, U.S. Army Corps of Engineers holly.n.costa@usace.army.mil
JoAnn Dunn, California Department of Fish and Wildlife JoAnn.Dunn@wildlife.ca.gov
State Water Resources Control Board stateboard401@waterboards.ca.gov
Environmental Protection Agency, Region 9 R9-WTR8-Mailbox@epa.gov
Hilary Sundeen, Caltrans Hilary.Sundeen@dot.ca.gov
Jennifer Osmondson, Caltrans Jennifer.Olah@dot.ca.gov

California Department of Fish and Wildlife

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
NORTHERN REGION
619 SECOND STREET
EUREKA, CALIFORNIA 95501

RECEIVED
MAR 30 2015
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LAKE OR STREAMBED ALTERATION AGREEMENT
NOTIFICATION NO. 1600-2015-0030-R1
Unnamed Tributaries to the Navarro River

72 Encroachments

Mr. Sebastian Cohen Representing the Department of Transportation
CULVERT REPLACEMENT PROJECT (PHASE III);
STATE ROUTE 128 (PMS 2.81-23.30)
UNNAMED TRIBUTARIES IN THE NAVARRO RIVER WATERSHED, MENDOCINO COUNTY

This Lake or Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Wildlife (CDFW) and Mr. Sebastian Cohen (Permittee) representing the California Department of Transportation (Caltrans).

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) section 1602, Permittee notified CDFW on February 5, 2015 that Permittee intends to complete the project described herein.

WHEREAS, pursuant to FGC section 1602, CDFW has determined that the project could substantially adversely affect existing fish or wildlife resources and has included measures in the Agreement necessary to protect those resources.

WHEREAS, Permittee has reviewed the Agreement and accepts its terms and conditions, including the measures to protect fish and wildlife resources.

NOW THEREFORE, Permittee agrees to complete the project in accordance with the Agreement.

PROJECT LOCATION

The project is located on State Route 128 affecting 72 culvert locations between post miles 2.81 and 23.3, between the Boonville and State Route 1, affecting numerous small, unnamed tributaries in the Navarro River watershed in the County of Mendocino, State of California; Sections 18 and 19, Township 14N, Range 14W; Sections 3 and 11, Township 14N, Range 15W; Sections 20, 29 and 33, Township 15N, Range 15W; Sections 7, 8, 13, 14, 15, 16 and 17, Township 15N, Range 16W; and Sections 11 and 12, Township 15N, Range 17W; Mt. Diablo Base and Meridian, in the Philo, Calif., Cold Spring, Calif., Navarro, Calif. and Elk, Calif., U.S. Geological Survey 7.5-minute quadrangles. Detailed project location information is as follows:

Table 1. U.S. Geological Survey Quad Map, Section, Township, and Range

Project No. (EA)	Project Drainage System (DS) No.	Post Mile (PM)	Longitude (Decimal Degrees)	Latitude (Decimal Degrees)	Township	Range	Section
37814	1	10.58	-123.595096	39.157832	15N	16W	14
37814	2	10.73	-123.593189	39.157233	15N	16W	14
37814	3	11.00	-123.590078	39.156061	15N	16W	14
37814	4	11.13	-123.587764	39.156482	15N	16W	13
37814	5	11.17	-123.587093	39.156580	15N	16W	13
37814	6	11.54	-123.585095	39.160860	15N	16W	13
37814	7	12.12	-123.575877	39.157692	15N	16W	13
37814	8	14.91	-123.540311	39.143575	15N	15W	20
37814	9	15.19	-123.536129	39.141678	15N	15W	20
37814	10	15.52	-123.533602	39.137585	15N	15W	29
37814	11	15.56	-123.533813	39.137015	15N	15W	29
37814	12	16.11	-123.530991	39.129728	15N	15W	29
37814	13	16.50	-123.524395	39.127454	15N	15W	28
37814	14	16.99	-123.517878	39.122954	15N	15W	33
37814	15	17.02	-123.517509	39.122586	15N	15W	33
37814	16	17.26	-123.515979	39.119358	15N	15W	33
37814	17	17.45	-123.514521	39.116889	15N	15W	33
37814	18	18.97	-123.492815	39.102849	14N	15W	3
37814	19	19.94	-123.481092	39.092731	14N	15W	11
37814	20	22.34	-123.452359	39.067573	14N	14W	18
37814	21	23.30	-123.437227	39.061893	14N	14W	19
37817	1	2.81	-123.706531	39.179028	15N	17W	11
37817	2	3.01	-123.702797	39.178728	15N	17W	12
37817	3	3.08	-123.701856	39.179172	15N	17W	12
37817	4	3.2	-123.700097	39.180156	15N	17W	12
37817	5	3.36	-123.697114	39.180349	15N	17W	12
37817	6	3.46	-123.695831	39.179925	15N	17W	12
37817	7	3.66	-123.692919	39.178488	15N	17W	12
37817	8	3.71	-123.692337	39.177936	15N	17W	12
37817	9	3.89	-123.688962	39.177355	15N	17W	12
37817	10	3.92	-123.688356	39.177475	15N	17W	12
37817	11	4.02	-123.686775	39.177926	15N	17W	12
37817	12	4.05	-123.686262	39.178212	15N	17W	12
37817	13	4.08	-123.685717	39.178451	15N	16W	7
37817	14	4.17	-123.684168	39.179126	15N	16W	7
37817	15	4.45	-123.679611	39.177929	15N	16W	7
37817	16	4.5	-123.678859	39.177396	15N	16W	7
37817	17	4.55	-123.678314	39.176782	15N	16W	7
37817	18	4.78	-123.675719	39.174379	15N	16W	7
37817	19	4.83	-123.674697	39.174069	15N	16W	7
37817	20	5.03	-123.671288	39.173228	15N	16W	7
37817	21	5.08	-123.670444	39.172961	15N	16W	7
37817	22	5.36	-123.665637	39.171491	15N	16W	7
37817	23	5.82	-123.659891	39.167786	15N	16W	8
37817	24	5.92	-123.659207	39.166374	15N	16W	17
37817	25	6.08	-123.658224	39.164249	15N	16W	17
37817	26	6.11	-123.657805	39.163847	15N	16W	17
37817	27	6.48	-123.651908	39.161263	15N	16W	17
37817	28	6.66	-123.648916	39.162302	15N	16W	17
37817	29	6.74	-123.647959	39.163143	15N	16W	17
37817	30	7.07	-123.644392	39.166563	15N	16W	17
37817	31	7.4	-123.639626	39.164143	15N	16W	16
37817	32	7.51	-123.638855	39.162655	15N	16W	16
37817	33	7.76	-123.637562	39.159306	15N	16W	16
37817	34	7.81	-123.637425	39.158681	15N	16W	16
37817	35	7.95	-123.636543	39.157081	15N	16W	16
37817	36	8.08	-123.634003	39.157575	15N	16W	16
37817	37	8.55	-123.625984	39.156202	15N	16W	16
37817	38	8.75	-123.623027	39.155395	15N	16W	15
37817	39	8.87	-123.260929	39.154985	15N	16W	15
37817	40	8.91	-123.620239	39.155049	15N	16W	15
37817	41	8.95	-123.619555	39.155362	15N	16W	15
37817	42	9.34	-123.613957	39.153822	15N	16W	15
37817	43	9.44	-123.612149	39.154267	15N	16W	15
37817	44	9.61	-123.609277	39.155469	15N	16W	15
37817	45	9.73	-123.607399	39.156066	15N	16W	15
37817	46	9.85	-123.605548	39.156704	15N	16W	14
37817	47	9.99	-123.604155	39.158301	15N	16W	14
37817	48	10.08	-123.603145	39.159242	15N	16W	14
37817	49	10.43	-123.597736	39.157175	15N	16W	14
37817	50	10.47	-123.597109	39.157314	15N	16W	14
37817	51	11.07	-123.588865	39.156282	15N	16W	14

PROJECT DESCRIPTION

The project involves 72 encroachments that remove, abandon and/or replace upgraded culverts and related highway drainage structures on State Route 128 between Post Miles (PM) 2.81 and 23.30. Related work includes a detailed revegetation plan, erosion control and stabilizing eroding drainage channels at PMs 4.02, 5.08, 7.40 and 10.74. An off-site wetland mitigation plan was previously approved for this project (Phase III) and the other related culvert replacement projects permitted under Phases I and II of the State Route 128/253 Culvert Rehabilitation Project.

PROJECT IMPACTS

Existing fish or wildlife resources the project could substantially adversely affect include: populations of foothill yellow-legged frog (*Rana boylii*), northern red-legged frog (*Rana aurora*), southern torrent salamander (*Rhyacotriton variegatus*), wetland habitat, and downstream populations coho salmon (*Oncorhynchus kisutch)*, steelhead trout (*O. mykiss irideus*), Navarro roach (*Lavinia symmetricus navarroensis*), and other aquatic and riparian species.

The adverse effects the project could have on the fish or wildlife resources identified above include: direct and/or incidental take, impede up- and/or down-stream migration, damage to spawning and/or rearing habitat and potential cumulative impacts.

MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

1. Administrative Measures

Permittee shall meet each administrative requirement described below.

1.1 Documentation at Project Site. Permittee shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials and California Environmental Quality Act (CEQA) documents, readily available at the project site at all times and shall be presented to CDFW personnel, or personnel from another state, federal, or local agency upon request.

1.2 Providing Agreement to Persons at Project Site. Permittee shall provide copies of the Agreement and any extensions and amendments to the Agreement to all persons who will be working on the project at the project site on behalf of Permittee, including but not limited to contractors, subcontractors, inspectors, and monitors.

1.3 Notification of Conflicting Provisions. Permittee shall notify CDFW if Permittee determines or learns that a provision in the Agreement might conflict with a provision imposed on the project by another local, state, or federal agency. In that event, CDFW shall contact Permittee to resolve any conflict.

1.4 Project Site Entry. Permittee agrees that CDFW personnel may enter the project site at any time to verify compliance with the Agreement.

1.5 Permittee shall notify the Department, in writing, at least five (5) days prior to initiation of construction (project) activities and at least five (5) days prior to completion of construction (project) activities. Notification shall be faxed to the Department at (707) 441-2021, Attn: Rick Macedo, Environmental Scientist, or via e-mail

2. Avoidance and Minimization Measures

To avoid or minimize adverse impacts to fish and wildlife resources identified above, Permittee shall implement each measure listed below.

2.1 Except where otherwise stipulated in this Agreement, all work shall be conducted in accordance with the forms, work plans, updated re-vegetation plan, maps and drawings submitted with Notification No. 1600-2015-0030, as modified or amended on March 9, 2015.

2.2 This Agreement pertains to 72 encroachments affecting numerous unnamed tributaries within the Navarro River watershed.

2.3 Permanent culverts at stream crossings shall be sized to pass the estimated 100-year flood flow, including debris and sediment loads, without overtopping or diverting. Culvert sizing factors shall include transportation of bedload, and the abundance and size of woody debris likely to be introduced to the stream upstream of the culvert crossing. The culverts shall be set at the natural streambed elevation to the maximum extent feasible.

2.4 All work within the bed, bank and channel shall be confined to the period June 15 through October 15 of each year. Work may be conducted in or near the stream during the late season work period October 15 through November 1, provided adherence to all conditions in this Agreement and a) – c) below:

a) The Permittee shall complete any unfinished encroachment work, including erosion control measures, within 24 hours of CDFW directing the Permittee to do so.

b) Prior to any work at a site, the Permittee shall stock-pile erosion control materials at the site. All bare mineral soil exposed in conjunction with crossing construction, deconstruction, maintenance or repair or removal shall be treated for erosion immediately upon completion of work on the crossing, and prior to the onset of precipitation capable of generating runoff.

c) When a 7-day National Weather Service forecast of rain includes a minimum of 5 consecutive days with any chance of precipitation, 3 consecutive days with a 30% or greater chance of precipitation, or 2 consecutive days of 50% or greater chance of precipitation, the Permittee shall finish work underway at encroachment and refrain from starting any new work at encroachment prior to the rain event.

2.5 Equipment shall not operate in a live (flowing) stream or wetted channel except as may be necessary to construct and remove in-stream structures to catch and contain water (i.e., cofferdams) to divert stream flow and isolate the work site, or as otherwise specifically provided for in this Agreement.

2.6 Where flowing water is present during operations:

a) Cofferdams shall be installed to divert stream flow and isolate and dewater the work site, and to catch any sediment-laden water and minimize sediment transport downstream. Cofferdams shall be constructed of non-polluting materials including sand bags, rock, and/or plastic tarps. Mineral soil shall not be used in the construction of cofferdams.

b) Flowing water shall be cleanly bypassed and/or prevented from entering the work area through pumping or gravity flow, and cleanly returned to the stream below the work area. Flow diversions shall be done in a manner that shall prevent pollution and/or siltation and provides flows to downstream reaches.

c) The Responsible Party shall remove any turbid water and sediment present in the work area prior to restoring water flow through the project site, and place them in a location where they cannot enter the Waters of the State.

2.7 To prevent the release of materials that may be toxic to fish and other aquatic species, poured concrete shall be isolated from stream flow and allowed to dry/cure for a minimum of 30 days. As an alternative, the Responsible Party shall monitor the pH of water that has come into contact with the poured concrete. If this water has a pH of 9.0 or greater, the water shall be pumped to tanker truck or to a lined off-channel basin and allowed to evaporate or be transported to an appropriate facility for disposal. During the pH monitoring period, all water that has come in contact with poured concrete shall be isolated and not allowed to flow downstream or otherwise come in contact with fish and other aquatic resources. The water shall be retested until pH values become less than 9.0. Once this has been determined, the area no longer needs to be isolated and water may be allowed to flow downstream. Results of pH monitoring shall be made available to DFG upon request.

2.8 All bare mineral soil exposed in conjunction with project related activities shall be treated for erosion prior to the onset of precipitation capable of generating run-off

or the end of the yearly work period, whichever comes first. Treatments shall include using native slash or seeding and mulching of all bare mineral soil exposed in conjunction with encroachment work. Only clean straw (such as rice, barley, wheat, or weed-free straw), and seeding with regional native seed or non-native seed that is known not to persist or spread (e.g., barley (*Hordeum vulgare*) or wheat (*Triticum aestivum*) shall be used. No known invasive grass seed shall be used such as annual or perennial ryegrass (*Lolium multiflorum or L. perenne*, which are now referred to as *Festuca perennis*).

2.9 Only wildlife-friendly 100 percent biodegradable erosion control products that will not entrap or harm wildlife shall be used. Erosion control products shall not contain synthetic (e.g., plastic or nylon) netting. Photodegradable synthetic products are not considered biodegradable.

2.10 The Permittee shall provide site maintenance for the life of the structures including, but not limited to, re-applying erosion control to minimize surface erosion and ensuring drainage structures, streambeds and banks remain sufficiently armored and/or stable.

2.11 Structures and associated materials not designed to withstand high seasonal flows shall be removed to areas above the ordinary high water mark before such flows occur or the end of the yearly work period, whichever comes first.

2.12 Refueling of equipment and vehicles and storing, adding or draining lubricants, coolants or hydraulic fluids shall not take place within or adjacent to any stream. All such fluids and containers shall be disposed of properly. Heavy equipment parked within or adjacent to the stream shall use drip pans or other devices (e.g., absorbent blankets, sheet barriers or other materials) as needed to prevent soil and water contamination.

2.13 All activities performed in the field which involve the use of petroleum or oil based substances shall employ absorbent material designated for spill containment and clean up activity on site for use in case of accidental spill. Clean-up of all spills shall begin immediately. The Permittee shall immediately notify the State Office of Emergency Services at 1-800-852-7550. CDFW shall be notified by the Permittee and consulted regarding clean-up procedures.

2.14 No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete washings, oil or petroleum products, or other organic or earthen material from construction work, or associated activity of whatever nature shall be allowed to enter into, or be placed where it may be washed by rainfall or runoff into Waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area. (Not applicable to material installed permanently or temporarily as part of the permitted project activities).

2.15 Upon CDFW determination that turbidity/siltation levels resulting from project related activities constitute a threat to aquatic life, activities associated with the turbidity/siltation, shall be halted until effective CDFW approved control devices are installed, or abatement procedures are initiated.

2.16 Removal of the above-ground portions of existing trees and shrubs shall occur after August 31 and before February 1 to avoid impacts to nesting birds. If vegetation must be removed during the nesting season (February 1 to August 31) nest surveys shall be conducted prior to vegetation clearing (see Measure 2.17).

2.17 If vegetation is proposed for removal during the nesting season (February 1 to August 31), an avian and nest survey protocol (Bird Survey Protocol) and a nest protection and monitoring plan shall be submitted to CDFW for review and approval. CDFW will be allowed up to 30 days to review and approve the Bird Survey Protocol. The Bird Survey Protocol and nest protection and monitoring plan shall include the following: a) list of bird species expected to nest in the area, b) description of life histories, c) survey protocols that are designed and tailored specifically to detect the various species expected to nest in the area, d) proposed nest buffer and nest protection measures, e) project activity disturbance monitoring, and e) reporting protocols.

2.18 When moving downed logs is necessary for project completion, displaced logs shall be repositioned as close the original location as feasible.

SITE-SPECIFIC CONDITONS:

2.19 At the PM 3.46 project site, potential habitat for southern torrent salamander and other amphibian species exists adjacent to existing culvert inlet. If surface water is present within or adjacent to the project site during construction, a qualified biologist will visit this site immediately prior to initiating work to determine the species of amphibians that may be impacted. If native amphibians are observed, contact Mr. Rick Macedo at (707) 928-4369 or CDFW at (707) 441-2075 and allow CDFW staff up to 10 business days for consultation regarding proposed impacts to native amphibians.

2.20 At the PM 3.92 project site, avoid displacing the downed 24-inch diameter (estimated) conifer tree that currently exists adjacent to the culvert outlet.

2.21 At the PM 4.05 project site, the Permittee shall develop and implement an erosion control plan to address on-going erosion and sediment delivery to the Navarro River resulting from active head-cutting at the excavated channel that exists approximately 60-feet downstream of the culvert outlet. Prior to implementation this plan shall be reviewed and approved by CDFW and the Department of Parks and Recreation (CDPR) (if the site is on CDPR property).

2.22 At the PM 5.08 project site, the Permittee shall develop and implement an erosion control plan to address on-going erosion and sediment delivery to the Navarro River resulting from active head-cutting at the excavated channel that exists approximately 100-feet downstream of the culvert outlet. Prior to implementation, this plan shall be reviewed and approved by CDFW and the CDPR if the site is on CDPR property.

2.23 At the PM 5.36 project site, design and implementation shall abate the existing erosion feature adjacent to the existing culvert outlet. To mitigate for the proposed removal of an unknown number of 4-inch in diameter or larger alder (*Alnus sp.*) and willow (*Salix sp.*) trees, a revegetation project shall be initiated. This project shall replace these trees at a 3:1 ratio using the same species as those removed. Replacement trees shall be planted and monitored following measures outlined in the revegetation plan that was submitted with the Notification.

2.24 At the PM 7.07 project site, potential habitat for southern torrent salamander and other amphibian species exists adjacent to existing culvert inlet. If surface water is present within or adjacent to the project site during construction, a qualified biologist shall visit this site immediately prior to initiating work to determine the species of amphibians that may be impacted. If native amphibians are observed, contact Mr. Rick Macedo at (707) 928-4369 or CDFW at (707) 441-2075 and allow CDFW staff up to 10 business days for consultation regarding proposed impacts to native amphibians.

2.25 At the PM 7.40 project site, the Permittee shall develop and implement an erosion control plan to address on-going erosion and sediment delivery to the North Fork Navarro River resulting from active head-cutting at the excavated channel that exists approximately 40-feet downstream of the culvert outlet. Prior to project implementation this plan shall be reviewed and approved by CDFW and CDPR (if the site is on CDPR property).

2.26 At the PM 8.75 project site, ponded water and dense wetland vegetation exists downstream of the existing culvert outlet. Amphibian habitat is also present. If surface water is present within 100-feet of the culvert outlet during construction, a qualified biologist shall visit this site immediately prior to initiating work to determine the species of amphibians that may be impacted. If native amphibians are observed, contact Mr. Rick Macedo at (707) 928-4369 or CDFW at (707) 441-2075 and allow CDFW staff up to 10 business days for consultation regarding proposed impacts to native amphibians.

2.27 At the PM 9.34 project site, ponded water exists downstream of the existing culvert outlet. Amphibian habitat is also present. If surface water is present within 100-feet of the culvert outlet during construction, a qualified biologist shall visit this site immediately prior to initiating work to determine the species of amphibians that may be impacted. If native amphibians are observed, contact Mr. Rick Macedo at

(707) 928-4369 or CDFW at (707) 441-2075 and allow CDFW staff up to 10 business days for consultation regarding proposed impacts to native amphibians.

2.28 At the PM 9.61 project site, one approximate 4-inch-diameter California bay tree will be removed as a result of the project. This project shall replace this tree at a 3:1 ratio using the same species. Replacement trees shall be planted and monitored following measures outlined in the revegetation plan that was submitted with the Notification

2.29 At the PM 10.73 project site, the Permittee shall develop and implement an erosion control plan to address on-going erosion and sediment delivery resulting from active head-cutting at the excavated channel that exists downstream of the culvert outlet. This plan shall be reviewed and approved by CDFW and CDPR (if the site is on CDPR property). The erosion point is located where the channel steeply cascades into the North Fork Navarro River channel.

2.30 At the PM 12.12 project site, protect the estimated 5-inch-diameter bigleaf maple tree (*Acer macrophyllum*) that currently exists adjacent to the culvert outlet.

2.31 At the PM 15.19 project site, maintain ponded, wetland habitat adjacent to the culvert outlet. If surface water is present within or adjacent to the project site during project construction, the Permittee shall adhere to conditions "a" through "b" below (note, condition "c" shall be completed regardless of water presence or absence):

a) a qualified biologist shall visit this site immediately prior to initiating work to determine the species of amphibians(s) that may be impacted. If native amphibians are observed, contact Mr. Rick Macedo at (707) 928-4369 or CDFW at (707) 441-2075 and allow CDFW staff up to 10 business days for consultation regarding proposed impacts to native amphibians;

b) to prevent permanent dewatering or notable reduced water elevations, the invert elevation of the replacement culvert shall be the same or higher as the existing culvert elevation; and

c) to mitigate for wetland impacts, removed cattails (*Typha sp.*) shall be excavated so that the rhizomes are intact. Removed cattails shall be retained and kept moist, a minimum 6 by 4-foot flat area shall shall be created adjacent to the new culvert outlet, and displaced cattails shall be planted in the created flat area.

2.32 At the PM 16.99 project site, maintain ponded, wetland habitat adjacent to the culvert outlet. If surface water is present within or adjacent to the project site during construction, the Permittee shall adhere to conditions "a" through "b" below (note, condition "c" shall be completed regardless of water presence or absence):

a) a qualified biologist shall visit this site immediately prior to initiating work to determine the species of amphibians(s) that may be impacted. If native amphibians are observed, contact Mr. Rick Macedo at (707) 928-4369 or CDFW at (707) 441-2075 and allow CDFW staff up to 10 business days for consultation regarding proposed impacts to native amphibians;

b) to prevent permanent dewatering or notable reduced water elevations, the invert elevation of the replacement culvert shall be the same or higher as the existing culvert elevation; and

c) to mitigate for wetland impacts, removed cattails (*Typha sp.*) shall be excavated so that the rhizomes are intact. Removed cattails shall be retained and kept moist, a minimum 6 by 4-foot flat area shall shall be created adjacent to the new culvert outlet, and displaced cattails shall be planted in the created flat area.

2.33 At the PM 18.97 project site, water from the existing culvert discharges into a channel leading to a second culvert that conveys water under a County Road. Significant erosion exists downstream of the County Road culvert outlet. To abate this erosion feature, the Permittee shall construct a rock energy dissipater beginning at the County Road culvert outlet and extending approximately 20feet down the receiving channel.

2.34 At the PM 19.94 project site, proposed "concrete backfill" work shall adhere to Measure 2.7 in the Agreement.

2.35 At the PM 22.34 project site, this site maintains ponded habitat adjacent to the culvert outlet. One multi-stemmed toyon (*Heteromeles arbutifolia*) is proposed for removal. To address project impacts at this site, the Permittee shall adhere to the following conditions:

a) If surface water is present within or adjacent to the project site during construction, a qualified biologist shall visit this site immediately prior to initiating work to determine the presence and species of amphibians(s) that may be impacted. If native amphibians are observed, contact Mr. Rick Macedo at (707) 928-4369 or CDFW at (707) 441-2075 and allow CDFW staff up to 10 business days for consultation regarding proposed impacts to native amphibians; and

b) to mitigate for the proposed removal of one multi-stemed toyon (*Heteromeles arbutifolia*), a minimum of three toyon shrubs shall be planted within or adjacent to the project site. Replacement trees shall be planted and monitored following measures outlined in the revegetation plan that was submitted with the Notification.

2.36 At the PM 23.30 project site, the proposed relocation of the existing downed California bay (*Umbellularia californica*) shall adhere to Measure 2.18 in this Agreement.

3. Reporting Measures

Permittee shall meet each reporting requirement described below.

3.1 As required in Measure 2.17, a Bird Survey Protocol and a nest protection and monitoring plan shall be submitted to CDFW for review and approval.

3.2 As required in Measures 2.21, 2.22, 2.25 and 2.29, an erosion control plan to address on-going erosion and sediment delivery shall be reviewed and approved by CDFW and CDPR (if the site is on CDPR property).

CONTACT INFORMATION

Written communication that Permittee or CDFW submits to the other shall be delivered to the address below unless Permittee or CDFW specifies otherwise:

To Permittee:

Mr. Sebastian Cohen
California Department of Transportation
1656 Union Street
Eureka, CA 95501
E-Mail: sebastian.cohen@dot.ca.gov
Phone: (707) 441-3979/mobile (707) 496-4096

To CDFW:

Department of Fish and Wildlife
Region 1
619 Second Street, Eureka, California 95501
Attn: Lake and Streambed Alteration Program
Notification #1600-2015-0030-R1
Fax: 707-441-2021

LIABILITY

Permittee shall be solely liable for any violations of the Agreement, whether committed by Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents or contractors and subcontractors, to complete the project or any activity related to it that the Agreement authorizes.

This Agreement does not constitute CDFW's endorsement of, or require Permittee to proceed with the project. The decision to proceed with the project is Permittee's alone.

SUSPENSION AND REVOCATION

CDFW may suspend or revoke in its entirety the Agreement if it determines that Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, is not in compliance with the Agreement.

Before CDFW suspends or revokes the Agreement, it shall provide Permittee written notice by certified or registered mail that it intends to suspend or revoke. The notice shall state the reason(s) for the proposed suspension or revocation, provide Permittee an opportunity to correct any deficiency before CDFW suspends or revokes the Agreement, and include instructions to Permittee, if necessary, including but not limited to a directive to immediately cease the specific activity or activities that caused CDFW to issue the notice.

ENFORCEMENT

Nothing in the Agreement precludes CDFW from pursuing an enforcement action against Permittee instead of, or in addition to, suspending or revoking the Agreement.

Nothing in the Agreement limits or otherwise affects CDFW's enforcement authority or that of its enforcement personnel.

OTHER LEGAL OBLIGATIONS

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from obtaining any other permits or authorizations that might be required under other federal, state, or local laws or regulations before beginning the project or an activity related to it.

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with other applicable statutes in the FGC including, but not limited to, FGC §§ 2050 et seq. (threatened and endangered species), 3503 (bird nests and eggs), 3503.5 (birds of prey), 5650 (water pollution), 5652 (refuse disposal into water), 5901 (fish passage), 5937 (sufficient water for fish), and 5948 (obstruction of stream).

Nothing in the Agreement authorizes Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, to trespass.

AMENDMENT

CDFW may amend the Agreement at any time during its term if CDFW determines the amendment is necessary to protect an existing fish or wildlife resource.

Permittee may amend the Agreement at any time during its term, provided the amendment is mutually agreed to in writing by CDFW and Permittee. To request an amendment, Permittee shall submit to CDFW a completed CDFW "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the corresponding amendment fee identified in CDFW's current fee schedule (see Cal. Code Regs., title 14, § 699.5).

TRANSFER AND ASSIGNMENT

This Agreement may not be transferred or assigned to another entity, and any purported transfer or assignment of the Agreement to another entity shall not be valid or effective, unless the transfer or assignment is requested by Permittee in writing, as specified below, and thereafter CDFW approves the transfer or assignment in writing.

The transfer or assignment of the Agreement to another entity shall constitute a minor amendment, and therefore to request a transfer or assignment, Permittee shall submit to CDFW a completed CDFW "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in CDFW's current fee schedule (see Cal. Code Regs., title 14, § 699.5).

EXTENSIONS

In accordance with FGC § 1605(b), Permittee may request one extension of the Agreement, provided the request is made prior to the expiration of the Agreement's term. To request an extension, Permittee shall submit to CDFW a completed CDFW "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in CDFW's current fee schedule (see Cal. Code Regs., title 14, § 699.5). CDFW shall process the extension request in accordance with FGC 1605(b) through (e).

If Permittee fails to submit a request to extend the Agreement prior to its expiration, Permittee must submit a new notification and notification fee before beginning or continuing the project the Agreement covers (FGC § 1605, subd. (f)).

EFFECTIVE DATE

The Agreement becomes effective on the date of CDFW's signature, which shall be: 1) after Permittee's signature; 2) after CDFW complies with all applicable requirements under the California Environmental Quality Act (CEQA); and 3) after payment of the applicable FGC § 711.4 filing fee listed at http://www.wildlife.ca.gov/habcon/ceqa/ceqa_changes.html.

TERM

This Agreement shall expire **five years** after the date the Agreement is fully executed, unless it is terminated or extended before then. All provisions in the Agreement shall remain in force throughout its term. Permittee shall remain responsible for implementing any provisions specified herein to protect fish and wildlife resources after the Agreement expires or is terminated, as FGC section 1605(a)(2) requires.

EXHIBITS

None.

AUTHORITY

If the person signing the Agreement (signatory) is doing so as a representative of Permittee, the signatory hereby acknowledges that he or she is doing so on Permittee's behalf and represents and warrants that he or she has the authority to legally bind Permittee to the provisions herein.

AUTHORIZATION

This Agreement authorizes only the project described herein. If Permittee begins or completes a project different from the project the Agreement authorizes, Permittee may be subject to civil or criminal prosecution for failing to notify CDFW in accordance with FGC section 1602.

CONCURRENCE

The undersigned accepts and agrees to comply with all provisions contained herein.

FOR DEPT. OF TRANSPORTATION

Sebastian Cohen — Date: 3/30/15

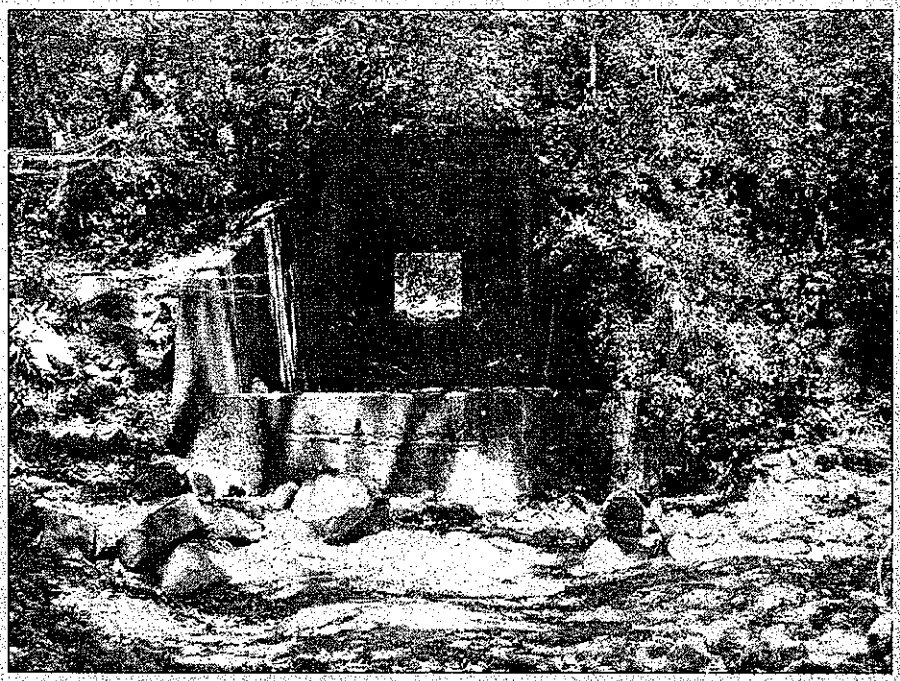
FOR DEPARTMENT OF FISH AND WILDLIFE

for Gordon Leppig — Date: 4.2.2015
Senior Environmental Scientist (Supervisor)

Prepared by: Rick Macedo
Senior Environmental Scientist (Specialist)
3-16-15 and revised on 3-30-15
Reviewed by J. Dunn on 3-18-15

National Marine Fisheries Services

Men 128/253 Culvert Rehabilitation Project



Biological Assessment for
National Marine Fisheries Service Consultation

Men 128/253 Culvert Rehabilitation Project
Mendocino County, California
01-Men-128- KP 0.29 to 81.41 (PM 0.18 to 50.59) and
01-Men-253-KP 1.59 to 27.6 (PM 0.99 to 17.15)
EA Number 378100

January 2004

DEPARTMENT OF TRANSPORTATION
UNITED STATES OF AMERICA

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Biological Assessment for
National Marine Fisheries Service Consultation

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January 2004

U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration, and
STATE OF CALIFORNIA
Department of Transportation

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1.0 SUMMARY OF FINDINGS, CONCLUSIONS AND DETERMINATIONS

The California Department of Transportation, in conjunction with the Federal Highway Administration, proposes to rehabilitate or replace deteriorated culverts and appurtenant structures at 274 locations on Routes 128 and 253 in Mendocino County. This Biological Assessment has been prepared to address potential effects to federally listed and proposed species under jurisdiction of the National Atmospheric and Oceanic Administration, National Marine Fisheries Service that may occur as a result of this project.

The BA includes an evaluation of all federally listed and proposed anadromous salmonid species known from the region that could occur in the project vicinity and be affected by the project. Based on this evaluation, it was determined that four federally listed species may be affected by the proposed project: California coastal chinook salmon, central California coast coho salmon, central California coast steelhead and northern California steelhead. The BA provides a detailed accounting of the potential project effects on these species and proposed *Avoidance and Minimization Measures*. These measures primarily address work windows, protection of adjacent habitat, and minimizing water quality effects.

The BA concludes that the project *is Not Likely To Adversely Affect* these listed species during repair or replacement of 43 culverts that do not convey streams supporting or potentially supporting one or more of the listed species, and 1 culvert (PM 20.15) that does convey a stream supporting or potentially supporting one or more of the listed species. In addition, the BA concludes that repair, replacement or retrofitting of 5 culverts (PM's 21.8, 27.54, 36.63, 39.88, and 49.66) that convey streams supporting or potentially supporting one or more of the listed species is *Likely To Adversely Affect* one or more of these species. The BA also concludes that the project *is Not Likely To Adversely Modify* designated Critical Habitat and will result in *Minimal Adverse Effects* to Essential Fish Habitat.

2.0 INTRODUCTION

The California Department of Transportation (Caltrans), in conjunction with the Federal Highway Administration, proposes to rehabilitate or replace deteriorated culverts and install standard drainage inlet and outlet structures at 274 locations on Routes 128 and 253 in Mendocino County. Work on these culverts is needed because the 30 to 45-year old pipes are deteriorating (rusty, perforated, bent, separated at the joints, etc.) and have reached the end of their maximum useful life. If the culverts are not replaced, further deterioration will take place under the roadway. The deterioration will eventually lead to the pipes collapsing under the weight of the roadway and the roadway itself will begin to deteriorate, possibly resulting in unsafe conditions and increasing the costs of repair. Substantial environmental damage could also result if the roadway fill and/or road surface materials erode into a stream.

This Biological Assessment (BA) has been prepared to evaluate potential impacts to federally listed anadromous fish species that may be affected by the proposed activity. The BA will be used to facilitate consultation with the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) pursuant to Section 7 of the federal Endangered Species Act (FESA).

2.1 PROJECT OVERVIEW

The proposed work on Route 128 is located between Post Miles 0.18 to 50.59 and involves rehabilitation or replacement at 216 locations. The proposed work on Route 253 includes 58 locations between Post Miles 0.99 and 17.15. Figures 1 and 2 (map pocket) provide location and vicinity maps of the proposed project.

Because the culverts convey water beneath the existing highways, most of the required work will occur close to the roadways and within Caltrans right-of-way. Work may extend away from the road and outside of right-of-way where deemed necessary (depending upon final design determinations). Some drainage work will be done at inlets and outlets, and minor vegetation removal may be performed to improve water flow. Minor grading may also be performed at various locations when deemed necessary to prevent water buildup at inlets and/or outlets.

In order to evaluate baseline resources and potential impacts to those resources, Caltrans established approximate limits of work at each culvert location based on the type of rehabilitation/replacement proposed and general site characteristics. At most sites, work will be confined to an area within 15 meters (50 feet) of either side of the road, and within 15 meters on either side of the culvert, for a maximum total impact area (excluding the road surface) of under 0.08 ha (0.2 acre). At many sites, the impact area will be substantially less than this; however, at some sites, the work area will be larger due to access requirements or other physical constraints.

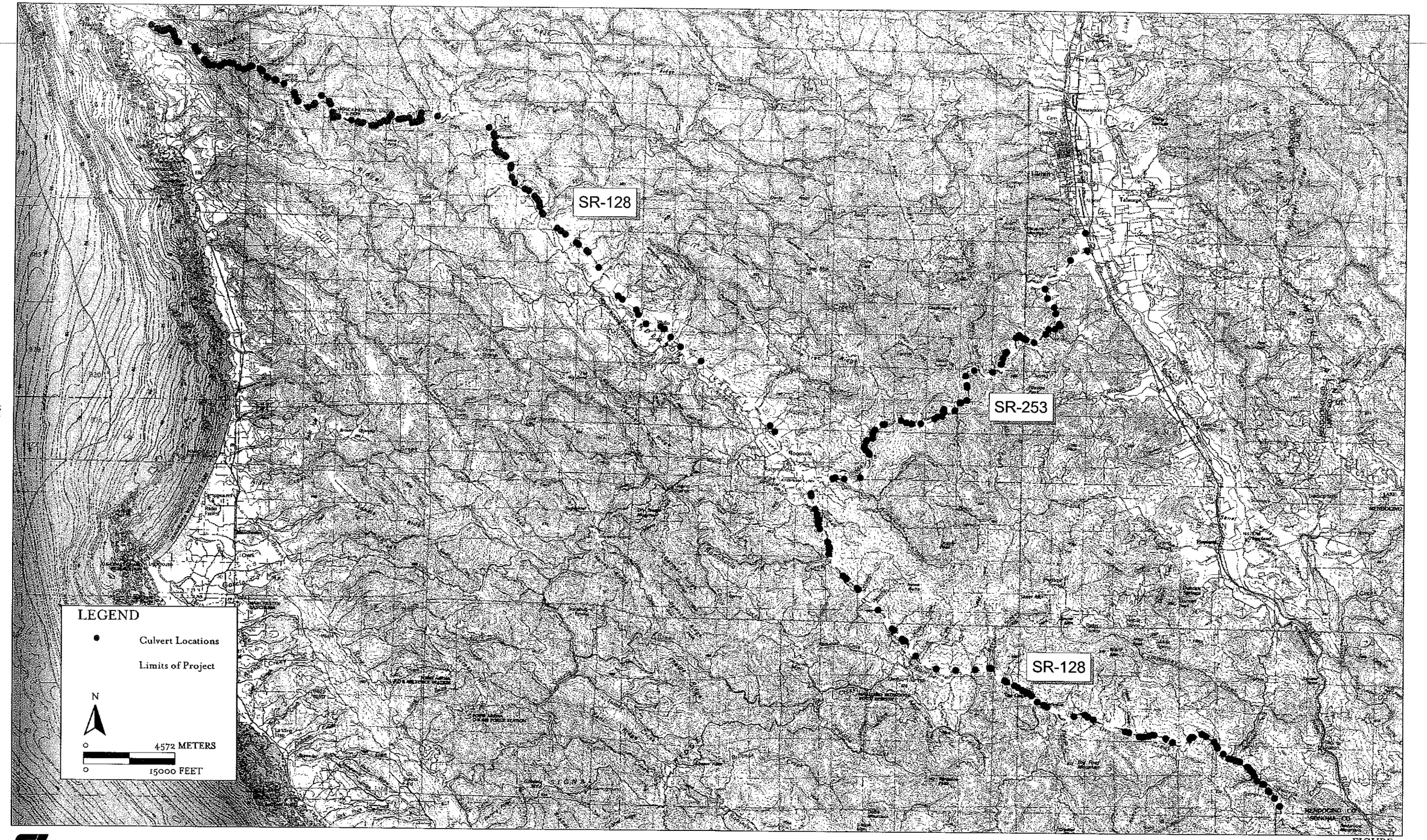

FIGURE 1

Men 128/253 Culvert Rehabilitation Project
01-MEN-128-KP 0.29-81.41 (PM 0.18-50.59)
01-MEN-253-KP 1.59-27.60 (PM 0.99-17.15)
EA 378100
Project Vicinity

SOURCE: BASEMAP - USGS 30X60' SERIES QUADS - UKIAH & POINT ARENA; MAPPING/GIS - LSA ASSOCIATES, INC.

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2.2 DETAILED DESCRIPTION OF PROPOSED WORK

For purposes of evaluating project effects to listed anadromous salmonids, the 274 repair sites were separated into those sites that could potentially affect listed salmonids and those that would not. It was determined that repairs at 49 of the 274 sites could affect listed salmonids. These 49 sites were further separated into those sites that conveyed streams that support or potentially support anadromous salmonids (i.e., a fish passage site), and those that do not (i.e., non-fish passage site). It was determined that only 6 of the 49 sites, all of which occur along SR 128, were fish passage sites.

2.2.1 Non-Fish Passage Sites

To minimize erosion and associated water quality impacts, culvert rehabilitation/replacement will be conducted outside of the rainy season, which generally extends from October through April. If water is present at any of the culvert locations, the contractor will dewater the work area. Although contractors will have discretion in the specific method to be employed (subject to Caltrans approval), dewatering is commonly done by capturing the flow upstream of the culvert and pumping the water into a roadside ditch where it can flow to an adjacent culvert. Other options that may be employed include utilizing an existing, to-be-abandoned culvert, or installing a small diameter pipe in a shallow trench across the roadway. Regardless of the method, any dewatering will be performed in compliance with Caltrans Best Management Practices.

Rubber tire backhoes are the most common equipment employed for this type of work, and movement of the equipment off the shoulder should only be required for deep installations. Rubber tire equipment is preferred in order to avoid unnecessary damage to pavement and the added cost of moving equipment between culvert locations. Crawler mounted excavators may also be used when the depth or reach of excavation is greater than 4.5 m (15 ft).

Standard construction techniques will be employed to rehabilitate the culverts. The most commonly employed technique will be to completely replace the culvert and associated structural elements (headwall and/or endwall). Traffic will be routed to one lane to provide a safe work area on a paved surface. One-half of the culvert will be replaced at a time. The asphalt-concrete road surface will be sawcut, followed by excavation of backfill and removal of the existing culvert. The new culvert segment will be placed at the planned grade and backfilled with native soils or concrete slurry; when slurry backfill is used, earth plugs will be used to contain the slurry within the trench. Traffic will then be switched to the opposite lane and the remaining segment completed. The excavation will normally be paved after the new culvert is in place to allow the restoration of two-way traffic, but multiple replacements may be completed and paved all at once to improve paving efficiency. In this case, protection of the backfill is typically accomplished by placing steel plates over the area until the paving occurs.

Based on typical traffic conditions in the project area, local contractors should be able to install both halves of a 600 mm (2-ft)-diameter culvert, including backfill, in a single, one-day shift. In order to avoid delivery of partial truckloads of AC paving material, contractors will typically pave once per week, usually covering three complete crossings. Depending on the situation, inlet or outlet work may be performed with a different crew at a later date.

At some sites, a new drainage inlet (metal or concrete) will be installed. Inlets will be set into place and either backfilled or grouted after connection with inlet and outlet pipes is complete. Rock slope

protection (RSP) will be necessary at some culvert outlets to stabilize the outlet area and minimize erosion; RSP is currently proposed at about 50 of the 274 locations.

When the depth of the culvert below the road surface is too great for excavation, or the work would result in unacceptable traffic delays, jacking techniques will be utilized. This technique is currently being considered at 4 of the 274 sites. For smaller culverts, a micro-bore is used that has a small cutting head, 600-1,200 mm (2-4 ft) in diameter. The material cut by the micro-bore is typically removed by an auger attached to the cutting head or by a conveyor belt in the new culvert. For larger jobs (greater than 1.8 m/6 ft diameter) low profile tractors are driven into the "tunnel" and the material is "mucked" out. High pressure jacking of the new reinforced concrete culvert pipe is used to keep the end of the new culvert close to the point of excavation. Jacking operations will require a larger work area for access and staging (up to 1,880 sq. meters, about 0.5 acre), and the period of construction may extend over several days.

At some locations, it may be possible to install a new liner within an existing culvert rather than remove the culvert. This approach is typically limited to small diameter pipe (usually 600-900 mm/2 to 3 ft diameter). To accomplish the installation, a high-density plastic or metal liner is pushed into the existing pipe using a jack or hydraulic equipment. The liner is fabricated with holes to allow pumping of grout into the space between the liner and original pipe. Liners are currently proposed at nine locations.

Paving of the invert is proposed at approximately ten locations. Paving prolongs the life of culverts that may be failing on the bottom but are otherwise in good condition. Grout is pumped from a transit mix truck via hose to pave the bottom of culvert. The grout is quick drying and isolated from any streamflow.

At some locations, it may be more efficient, or less impacting, to abandon the existing culvert and install a new culvert at a different location. Large culverts (over 600 mm/2 ft) that are abandoned will be filled with sand and/or grout and plugged. Smaller culverts will be plugged with grout at the inlet only.

In steep terrain, outlet pipes often extend down slopes. Suspension systems are generally used to support the segment of pipe installed on the exposed slope. Due to "reach" constraints (4.5 to 6 m/15 to 20 ft for typical backhoes), a temporary work pad may need to be constructed part way down the slope at some sites to allow equipment to reach the outlet of the culvert. RSP may be required at these locations to minimize erosion.

A disposal agreement is usually prepared when any excess material is generated on a project. Through this agreement, the contractor assumes ownership of and responsibility for disposal of the excess material, with the requirement that Caltrans approve the disposal method and site. It is expected that this material will be hauled to aggregate pits, but occasionally private parties obtain the needed grading permits to allow disposal on private property.

Over the years, erosion gullies have formed at the outlets of many of the culverts. As part of the culvert rehabilitation/replacement project, outlet areas will be stabilized as necessary to minimize future erosion; and erosion gullies will be repaired and/or filled, as necessary.

2.2.2 Fish Passage Sites

The following are general measures that will apply to the 6 fish passage sites along SR 128. The individual descriptions of the work proposed at the fish passage sites follow below. Preliminary design plans and hydraulic calculations for the fish passage sites are contained in Appendix A.

- Instream work and work on the banks of perennial anadromous fish-bearing streams will be conducted between June 15 and October 15.

- Riparian areas outside the designated work areas will be designated as Environmentally Sensitive Areas (ESA's) and clearly indicated as such on project construction plans. Project specifications will include a requirement that ESA's are clearly delineated with brightly colored fencing, rope or equivalent prior to beginning construction.

- Dewatering, if necessary, will consist of using sandbags or equivalent method to construct a temporary cofferdam upstream of the work area at the inlet, and downstream of the work area at the outlet. Following construction of the cofferdams, a gravity siphon hose system will be installed to transport upstream flows through the work area to the channel downstream of the work area. If necessary, a pump will be used to convey flows through the hose.

- Water for dust abatement (if necessary) will be acquired from an off-site source. No drafting will be permitted.

- Measures consistent with the current Caltrans' Construction Site Best Management Practices (BMPs) Manual (including the Storm Water Pollution Prevention Plan [SWPPP] and Water Pollution Control Program [WPCP] Manuals (http://www.dot.ca.gov/hq/construc/Construction_Site_BMPs.pdf]) will be implemented to minimize effects to anadromous fish habitat (e.g., siltation, etc.) during construction.

- Graded or otherwise bare areas resulting from construction activities will be revegetated using native species. At least six months prior to the start of project construction, Caltrans will prepare detailed construction drawings and specifications for implementation of the revegetation effort. The guidelines in Appendix B have been prepared to outline the revegetation strategy to be implemented by Caltrans for temporary impacts to riparian vegetation during construction.

Description of Fish Passage Sites

MEN 128 - PM 20.15 Unnamed Creek. Proposed work at this site is limited to invert paving and minor improvements to the existing concrete apron at the outlet to prevent further erosion of the adjacent banks and channel. A temporary access road will not be necessary.

MEN 128 - PM 21.80 Clow Creek. Proposed work at this site consists of replacing the existing 1.5 m (5 ft) diameter corrugated steel pipe (CSP) with 3.0 m (10 ft) diameter welded steel pipe (WSP). The new pipe will be jacked under SR 128 from the outlet side. The existing culvert will be removed once the new culvert is installed. Three inch minus cobble will be imported to place in the culvert bottom. A 20 m (65 ft) square area will be required to stage equipment in the outlet channel, and a temporary access road will be constructed down the road embankment west of the existing culvert.

MEN 128 - PM 27.54 Graveyard Creek. Proposed work at this site consists of retrofitting the existing 2.1 m (6.5 ft) diameter CSP. Retrofits will consist of removal of 9.5 m (31.1 ft) of the culvert at the inlet and construction of a new concrete headwall. The section of the channel where the culvert is removed will be regraded to natural contours. Two concrete fish weirs will be constructed in the outlet channel and a new concrete headwall will be constructed. In addition, a roughened channel bottom will be installed in the existing CSP. Temporary access roads will be required at both the inlet and outlet. At the inlet, an access road will be constructed down the road embankment east of the existing culvert. At the outlet, an access road will be constructed down the road embankment west of the existing culvert.

MEN 128 - PM 36.63 Lost Creek. Proposed work at this site consists of retrofitting the existing 2.4 m (7.9 ft) square reinforced concrete box (RCB). Retrofits will include invert paving and installation of five concrete weirs on the bottom of the RCB. In addition, a concrete fishway consisting of six weirs will be constructed in the outlet channel starting at the edge of the existing concrete apron. A temporary access road will be required at the outlet to construct the fishway. The access road will be constructed on the west side of the channel from an existing gravel road that connects to SR 128.

MEN 128 - PM 39.88 John Hiatt Creek. Proposed work at this site consists of retrofitting the existing 2.1 m (6.5 ft) diameter CSP. Retrofits will include installation of a roughened channel bottom in the existing CSP and construction of three concrete weirs in the outlet channel. Approximately 32 m^2 (345 ft^2) of quarter ton RSP and light RSP will be placed on the banks at the outlet. A temporary access road will be required at the outlet to construct the weirs. The access road will be constructed on the SR 128 embankment west of the existing culvert.

MEN 128 - PM 49.66 Edwards Creek. Proposed work at this site consists of replacing the existing 1.2 m (4 ft) and 1.5 m (5 ft) diameter CSP's with a 4.3 m (14 ft) by 2 m (6.5 ft) double RCB. Three inch minus cobble will be imported to place in the culvert bottom. New concrete headwall and endwalls will be constructed and approximately 24 m^2 (260 ft^2) of light RSP will be placed on the banks at the inlet. A temporary access road is will not be required as the site is accessible from the highway.

3.0 ENVIRONMENTAL SETTING

This section provides an overview of the physical and biological setting of the project and serves as a baseline for determining potential sensitive species occurrence in the project area.

3.1 GEOGRAPHIC AREA

The project area is located in southwestern Mendocino County. SR 128 begins at SR 1, at the mouth of the Navarro River south of Albion. The highway extends in a southeasterly direction, paralleling the Navarro River and North Fork Navarro River for the first 13 km (8 miles). At the community of Navarro (KP 23.16/PM 14.39), the highway turns toward the south and follows a south-southeasterly route through the Anderson Valley and the towns of Philo and Boonville. Past Boonville (approx. KP 47/ PM 29), the highway climbs out of the Anderson Valley, passes through the community of Yorkville, and crosses the Sonoma County line just north of Cloverdale. The total length of SR 128 within Mendocino County is 81.4 km (50.9 miles).

SR 253 begins at SR 128 in the Anderson Valley, just south of Boonville. The highway extends in a northeasterly direction, climbing over Pine Ridge, which separates the Anderson and Russian River Valleys, and terminates at US 101 on the south end of Ukiah. The total length of SR 253 is about 28 km (17.5 miles).

3.2 TOPOGRAPHY

The general topography in the project vicinity is characterized by steep and very steep northwest-trending ridges dissected by perennial streams and rivers. The topography within the project limits, along SR 128 and SR 253, is characterized by gently sloping, low elevation river valleys with moderately steep intervening ridges. Elevations range from less than 15 m (50 feet) MSL at the west end of SR 128 to over 600 m (1,980 feet) MSL where SR 253 crosses Pine Ridge between the Anderson and Russian River Valleys. The majority of the project area is below 150 M (500 feet) in elevation.

3.3 SOILS

Numerous soil types are represented along the 109 km (67 mi) of the project. The predominant soil types mapped by the Soil Conservation Service (USDA, Soil Conservation Service, 1991; 2003 http://www.ca.nrcs.usda.gov/mlra02/wmendo.html) are described in Table A below, where they are generally presented in order of geographic distribution from west to east (coastal to interior).

Table A: Predominant Soil Types in the Project Area

Map Unit	Texture	Soil Depth	Drainage Class/ Permeability	Dominant Vegetation	Location in Project Area
Dystrocepts	Loam	Shallow to moderately deep	Well drained/ Extremely variable	Brush and grass, Douglas fir, redwood	Along SR 128 from western end of the project area east to about PM 2
Bigriver loamy sand	Loamy sand	Very deep	Well drained/ Moderately rapid	Redwood forest	Along SR 128 and the Navarro River to about PM 13, west of Navarro
Ornbaun-Zeni Complex	Loam and gravelly loam	Moderately deep to deep	Well drained/ Moderate	Mixed broadleaf / coniferous forest including redwood, Douglas fir, tanoak, and madrone	Steeply sloping area along SR 128 to about PM 17
Bearwallow-Wolfey Complex	Loam and sandy loam	Shallow to moderately deep	Well drained/ Moderate to moderately slow	Primarily annual grasses and forbs	Along SR 128 from around PM 17 to PM 18.5; scattered locations along west end of SR 253
Pinole- Boontling	Loam	Very deep	Somewhat poorly to well drained/ Moderately slow	Mostly in grape and orchard production	Along SR 128 through Anderson Valley, from about PM 18.5 to PM 30
Hopland, Hopland-Squawrock, Hopland-Witherell-Squawrock, Hopland-Wohly	Loam, gravelly loam	Shallow to moderately deep	Well drained to excessively drained/ Moderately slow to moderate	Mixed broadleaf including black oak, madrone, live oak, with some Douglas fir, and annual grassland	Along most of western end SR 253 in short segments from about PM 2 to PM 8.5
Yorktree-Hopland-Woodlin	Loam to gravelly, sandy loam	Moderately deep to deep	Well drained/ Moderate to slow	Oaks and grassland	Eastern portion of SR 253 from about PM 11 to PM 14
Yorkeville-Squawrock-Witherell	Loam , clay loam, gravelly loam	Shallow to very deep	Moderately well to somewhat excessive drained/ very slow to moderate	Primarily annual grasses and forbs	Along SR 128 south of Anderson Valley to about PM 39; along west end of SR 253 to about PM 2 and other short segments
Feliz Loam-Feliz Clay Loam	Loam and clay loam	Very deep	Well drained/ Moderate	Grasses with scattered oaks and cottonwoods	Along SR 128 in Dry Creek area, east of Yorkville to about PM 46; along east end of 253 from about PM 15 to PM 17
Yorkville-Yorktree-Squawrock	Loam and cobbly loam	Moderately deep to very deep	Well drained and moderately drained	Oaks and grassland	Southern end of SR 128, southeast of Yorkville to about PM 48 and small portions of SR 253
Bearwallow-Hellman-Witherell	Loam to sandy loam	Shallow to very deep	Well to somewhat excessively drained/ moderate to slow	Grassland with scattered oaks	Along southernmost end of SR 128 to about PM 51

3.4 CLIMATE AND HYDROLOGY

Climate in the project area is mild with cool rainy winters and warm dry summers. Inland areas are significantly warmer during summer than coastal areas. Average annual minimum and maximum temperatures in Pt. Arena on the coast range from 44.9 to 61.8 F, while average annual minimum and maximum temperatures in Ukiah range from 43.6 to 73.9 F. The average annual July maximum temperatures for these same locations are 65.5 F and 93.1 F, respectively. Average annual precipitation ranges from 37.09 inches at Ukiah to 40.88 inches at Pt. Arena. Although the "rainy season" is generally October through May, most of the rainfall occurs between the beginning of November and end of March.

The majority of the project area falls within the Navarro River watershed. The watershed begins southwest of the community of Yorkville, at the southern end of Mendocino County, and generally follows SR 128 northwest through Anderson Valley. Rancheria Creek is the primary tributary in the southern portion of the watershed. Rancheria Creek meanders toward the north, joining with Anderson Creek near Philo to form the Navarro River. The main stem of the Navarro River continues northward, joining the North Fork Navarro River about nine river miles inland from the coast. The North Fork Navarro River, which is divided into north and south branches, drains the area to the east of the community of Navarro. Other main tributaries in the watershed include Mill Creek and Indian Creek. The Navarro River continues northward, emptying into the Pacific Ocean just south of the community of Albion.

A sand sill forms at the mouth of the Navarro River during mid summer (August) in most years, diminishing tidal exchange until the mouth closes off completely, typically in September (Steve Cannata, CDFG, pers. comm.) This results in the formation of a brackish lagoon that extends upstream for several miles. The breaching of the lagoon mouth occurs after the first or second significant rainfall, usually in November (Steve Cannata, CDFG, pers. comm).

The southernmost and easternmost portions of the project area fall within the Russian River watershed. Robinson Creek, which is crossed by SR 253 just southwest of Ukiah, Dry Creek, which parallels SR 128 south of Yorkville, and Edwards Creek, which flows under SR 128 just north of Cloverdale, are the primary Russian River tributaries within the project area. The Russian River flows south past Healdsburg, then turns west, and empties into the ocean at Jenner.

3.5 BASIC PLANT COMMUNITIES

A number of plant communities characterize the project area. The primary community types are described below and are generally presented in order of geographic distribution from west to east (coastal to interior). Community descriptions are generally according to Holland (1986).

Because the project area includes road shoulders and other disturbed area along highways, much of the understory is dominated by nonnative (primarily), ruderal species. The composition of this weedy understory is generally consistent throughout the project area, regardless of the overstory community type. These ruderal species are often the dominant plants in the vicinity of culvert inlets and outlets. Common elements of this weedy understory include, horsetail (*Equisetum* sp.), rattlesnake grass (*Briza* sp.), velvet grass (*Holcus lanatus*), wild oat (*Avena* sp.), brome grasses (*Bromus* sp.), annual fescue (*Vulpia myuros*), star thistle (*Centaurea solstitialis*), hedgehog dogtail (*Cynosaurus echinatus*), bur chervil (*Anthriscus caucalis*), plantain (*Plantago* sp.), sweet pea (*Lathrus latifolius*), clover (*Trifolium* spp.), vetch (*Vicia* sp.), Queen Anne's lace (*Daucus carota*), and others.

In wetter areas, Himalaya blackberry (*Rubus discolor*), reed canary grass (*Phalaris arundinaceae*), annual rabbitsfoot grass (*Polypogon monspeliensis*), nutsedge (*Cyperus* sp.), pennyroyal (*Mentha pulegium*), birdsfoot trefoil (*Lotus coriniculatus*), dallis grass (*Paspalum dilatatum*), sweetclover (*Melilotus* sp.), and bull thistle (*Cirsium vulgare*, dock (*Rumex* sp.) are common.

3.5.1 Northern Coastal Scrub

This low, shrubby community occurs on windy, exposed sites with shallow soils in the westernmost portion of the project area. Coyote brush (*Baccharis pilularis*) is the dominant species. Other common species found in this community type include California blackberry (*Rubus ursinus*), poison oak (*Toxicodendron diversiloba*), wild cucumber (*Marah macrocarpus*), California figwort (*Scrophularia californica*), honeysuckle (*Lonicera* sp.), and horsetail.

3.5.2 California Bay Forest

California bay forest occurs near the coast on exposed slopes and is dominated by shrubby, wind-pruned California bay (*Umbellularia californica*). In the project area, this community occurs along SR 128, interspersed with bluff scrub, inland to about PM 2. Other species include red elderberry (*Sambucus racemosa*), red alder (*Alnus rubra*), Douglas fir (*Pseudotsuga menziesii*), willow (*Salix* spp.), coyote brush, poison oak, and various species of *Rubus*.

3.5.3 Alluvial Redwood Forest/Upland Redwood Forest

These redwood-dominated forest types occur on deep, well drained soils of canyon bottoms and on shallower soils of steep slopes. In the project area, alluvial redwood forest occurs along SR 128 and the Navarro River, with upland redwood forest on the adjacent slopes. Both forest types are interspersed with mixed evergreen forest. The redwood-dominated forests occur from about PM 2 inland to about PM 13, near the community of Navarro. Common species in addition to coast redwood (*Sequoia sempervirens*) include Douglas fir and California bay, with occasional Sitka spruce (*Picea sitchensis*), tanoak (*Lithocarpus densiflorus*), red alder California huckleberry (*Vaccinium ovatum*), California nutmeg (*Torreya californica*), salal (*Gaultheria shallon*), various *Rubus* species, redwood sorrel (*Oxalis oregana*), sedges (*Carex* spp.), and western sword fern (*Polystichum munitum*).

3.5.4 Mixed Evergreen Forest

Mixed evergreen forest occurs on moist, well-drained soils, typically on slopes. In the project area, mixed evergreen forest is interspersed with redwood forest along the Navarro River, becoming more predominant at the inland limit of the forest, and extending throughout the project area on more mesic sites. In the western end of the Anderson Valley, this community type is interspersed with vineyards. Dominant species in the project area include California bay, big-leaf maple (*Acer macrophyllum*), madrone (*Arbutus menziesii*), tanoak, elderberry, chinquapin (*Chrysolepis* spp.), Douglas fir, redwood, Oregon oak (*Quercus garryana*), canyon live oak (*Q. chrysolepis*), and black oak (*Q. kelloggii*).

3.5.5 Mixed North Slope Cismontane Woodland

This broadleaf-dominated woodland, which occurs on somewhat drier, inland sites than mixed evergreen forest, is the most abundant plant community in the project area. Mixed woodland ranges from dense woodland to open savanna, with an understory primarily consisting of nonnative grassland. Common species include interior live oak, Oregon oak, valley oak (*Quercus lobata*), black oak, California bay, buckeye, toyon (*Heteromeles arbutifolia*), scotch broom (*Cytisus scoparius*), coyote brush, and poison oak.

3.5.6 Upland Douglas Fir Forest

This coniferous forest is strongly dominated by Douglas fir. Distribution in the project area is limited to the eastern portion of the SR 128 corridor, primarily on north-facing slopes above Rancheria Creek.

3.5.7 Red Alder Riparian Forest

Red alder riparian forest occurs along streams and at seeps on hillsides near the coast. The dominant species is red alder, generally mixed with willow, and with an understory including various *Rubus* species, elk clover (*Aralia californica*), stinging nettle (*Urtica dioica*), and others.

3.5.8 North Coast Riparian Scrub

This riparian community occurs along perennial and intermittent streams. Willow species typically dominate with red alder, big-leaf maple, California bay, Oregon ash (*Fraxinus latifolia*), and other trees, and with an understory typically including Himalaya blackberry and other nonnative species, as described above.

3.5.9 Vernal Marsh

Permanent freshwater marsh is uncommon in the project area, but seasonal marsh does occur along some streams, roadside ditches and at seeps. Common species include rushes (*Juncus* spp.) monkey flower (*Mimulus guttatus*), and many of the nonnative mesic species described above.

3.5.10 Pasture/Nonnative Grassland

This herbaceous community is common and widespread in the project area, especially in Anderson Valley and along SR 253, and is commonly interspersed with mixed woodland. Dominant species include wild oats, brome grasses, fescue, storksbill (*Erodium* spp.), ryegrass (*Lolium multiflorum*), California poppy (*Eschscholzia californica*), goldfields (*Lasthenia* spp.), lupine (*Lupinus* spp.), tarweed (*Hemizonia* spp.), and others.

3.5.11 Vineyard/Orchard

Natural communities have been converted to vineyards and orchards within Anderson valley and other portions of the project area. These areas are generally interspersed with mixed woodland and nonnative grassland. Except for weedy species, vineyards and orchards generally lack any native vegetation.

4.0 SPECIES CONSIDERED IN THIS DOCUMENT

The species addressed in this BA are limited to those federally listed fish or wildlife species under the jurisdiction of NMFS pursuant to their authority under FESA of 1973, as amended. Federally listed fish or wildlife species under the jurisdiction of the U.S. Fish and Wildlife Service are addressed in a separate document. The majority of taxa under NMFS's jurisdiction consist of marine and pelagic fish and wildlife species such as tuna, sea turtles, marine mammals, etc., but NMFS also has jurisdiction over anadromous salmonid species. This document also addresses potential effects to Critical Habitat as designated pursuant to Section 4 of the FESA, and Essential Fish Habitat (EFH), as defined under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA).

The proposed project is located completely within the inland area of Mendocino County (i.e., will not affect coastal waters). Consequently, the species considered in this BA include only anadromous salmonids (i.e., salmon and steelhead); federally listed marine and pelagic species potentially occurring in the coastal waters are not addressed. NMFS identifies Pacific anadromous salmonids as separate populations, or Evolutionarily Significant Units (ESU), of the species as a whole. In order to be considered an ESU, a population (or group of populations) must be substantially reproductively isolated from other populations, and contribute substantially to the ecological or genetic diversity of the species (Myers, et al, 1998).

Based on review of pertinent literature, coordination with NMFS and California Department of Fish and Game (CDFG) personnel, and past experience in the region, it has been determined that one ESU of chinook salmon, one ESU of coho salmon, and two ESU's of steelhead could potentially occur in the project area. Table B, below, lists these four ESU's, the general boundaries of each ESU, and the listing status for each ESU under the FESA.

In addition, a population of coho salmon designated by CDFG as a Candidate Recover Species also occurs in the project area. This population, termed northern California coho salmon, includes the northern portion of the Central California coast coho salmon ESU (from San Francisco Bay to Punta Gorda), and the southern (California) portion of the southern Oregon/northern California ESU (Punta Gorda, California to Cape Blaco, OR). Northern California coho salmon have been proposed for *Endangered* status in the southern portion of their range (where they overlap with the Central California coast ESU), and proposed for *Threatened* status in the northern portion (where they overlap with the southern Oregon/northern California ESU). Official listing pursuant to the California Endangered Species Act is currently deferred.

Since this BA is a federal document and northern California coho salmon have no federal status, they are not included in Table B. However, due to the overlapping ranges between northern California coho salmon and the central California coast ESU, project effects to these populations will be identical. Therefore, for the purpose of this document, the evaluation of project effects to northern California coho salmon will be covered under the evaluation of project effects to the central California coast coho salmon ESU, and it is hereby noted that these effects are assumed to be

identical. This approach is appropriate due to the overlap in range of these two populations and the location of the project in the overlapping area.

Table B: Salmon and Steelhead ESU's Occurring in the Project Area

Common Name ***Latin Name***	**ESU Boundaries**	**Listing Status**
California coastal chinook salmon *Oncorhynchus tshawytscha*	Redwood Ck., Humboldt Co. to Russion R., Sonoma Co.	*Threatened*
Central California coast coho salmon *Oncorhynchus kisutch*	Punta Gorda, Humboldt Co. to San Lorenzo R., Santa Cruz Co.	*Threatened*
Central California Coast steelhead *Oncorhynchus mykiss*	Russian R., Sonoma Co. to Soquel Ck., Santa Cruz Co. (ex. San Francisco and San Pablo Bays)	*Threatened*
Northern California steelhead *Oncorhynchus mykiss*	Redwood Ck., Humboldt Co. to Gualala R., Mendocino Co.	*Threatened*

5.0 STUDY METHODS

Due to the large number of sites included in the proposed project, a two-step approach was used to evaluate impacts of the proposed project to listed salmonids.

The initial step in the process was to conduct a cursory field investigation of the entire project area, during which each site was briefly evaluated for presence of suitable habitat and potential effects to salmonids. The goal of the first visit was to identify all sites where the proposed work could potentially affect listed salmonids or their habitat; it was also determined if a given culvert conveyed a fish-bearing stream and if the proposed work at the culvert could potentially affect fish passage. During this initial field work, very little was known about the actual work required for each site, and only minimal background review of the potential species affected was conducted prior to this first visit. As a result, during this first pass, a very liberal approach was taken in determining whether listed salmonids could be affected by the proposed work for a given site (i.e., a site was included if there was any chance at all that the proposed work could effect salmonids or their habitat). Initial site investigations resulted in a list of 87 sites that included work that could potentially affect listed salmonids or their habitat. Of those 87 sites, 29 were identified as having potential fish passage issues.

The second step of the process included focussed literature review and agency coordination, including early coordination and field meetings with CDFG and NMFS (see Table C for a summary of meetings). The preliminary list of potential "fish passage" sites was also forwarded to local CDFG fisheries biologist Scott Harris for review and comment. Mr. Harris conducted a preliminary inspection at each site and provided comment on whether a given stream was fish-bearing. Mr. Harris determined that of the 29 sites in the preliminary list, 16 conveyed fish-bearing streams and one site required a survey to determine its fish bearing status.

Table C: Summary of Agency Coordination Meetings

Meeting Date	Attendees	Purpose
December 12, 2002	Peter Lewendal, Caltrans Jeff Bray, LSA Fred Botti, CDFG	Early Coordination
January 7, 2003	Peter Lewendal, Caltrans Jeff Bray, LSA Jeff Jahn, NMFS Jon Mann, NMFS Dick Butler, NMFS	Early Coordination
April 15, 2003	Peter Lewendal, Caltrans Jeff Bray, LSA Jeff Jahn, NMFS Jon Mann, NMFS Dick Butler, NMFS Fred Botti, CDFG	Progress, Early Coordination

May 12, 2003	Peter Lewendal, Caltrans Sebastian Cohen, Caltrans Jeff Jahn, NMFS Jon Mann, NMFS Fred Botti, CDFG Doug Albin, CDFG	Field Visit Review to Fish Passage Sites

Literature review focussed on determining which, if any, species occurred in a given waterbody that could be affected by the work proposed at one or more sites. Because of the linear nature of the project, it was important to locate any migration barriers and/or determine the upstream extent of anadromy for a given waterbody in order to determine whether listed salmonids even occurred at a given site.

Following agency coordination and literature review, follow-up field investigations were conducted to 1) make an accurate assessment of the potential effects to listed salmonids/habitat from the proposed work at each site, 2) assess potential effects to listed salmonids/habitat on a site-by-site basis, and 3) field-check locations of migration barriers and/or other features documented in the literature that could affect the analysis. The follow-up investigation resulted in the list of "fish sites" being reduced to 49, and the "fish passage" sites being reduced to 6. Table D provides a complete list of the sites, including the postmile and kilometer post, existing conditions, and proposed repair. As shown in the Table D, all 6 fish passage sites are located on SR 128.

Habitat evaluation for the fish passage sites was completed by conducting field surveys within the stream corridors to the limit of legal access (91.5 m/300 ft). Additionally, reaches of the stream beyond the legal access limit were reviewed using black and white digital orthorectified aerial photographs and USGS 7.5' topographic quadrangles, at scales of 1:12,000 and 1:24,000 respectively.

The potential for effects to Critical Habitat for central California coast (CCC) coho salmon and EFH for both CCC coho salmon and California coastal (CC) chinook was also evaluated during the follow-up investigations. Potential effects to Critical Habitat and EFH were evaluated at all sites within current ESU boundaries, regardless if the subject species was known to occur at a given site. For example, sites within the ESU boundaries for CCC coho salmon, but above the current range for this species, were evaluated for potential effects to Critical Habitat. The exception was those sites along waterways above impassable migration barriers (e.g., Warm Springs Dam) which, by definition, represent the upstream extent of Critical Habitat. In addition, although Critical Habitat has been vacated for both steelhead ESU's and CC chinook, an evaluation of Critical Habitat for these ESU's was made in anticipation of future reinstatement of Critical Habitat.

The proposed work at a given site was determined to potentially affect Critical Habitat and/or EFH if it 1) will result in direct effects to the live stream or banks, 2) will result in removal of riparian vegetation and/or removal of non-riparian shade habitat, or 3) will result in direct effects to the active floodplain or remove associated riparian vegetation.

Prior to these investigations, Caltrans engineering and environmental staff generated typical repair concepts and established work limits for each site, taking into consideration existing resources, staging areas, etc. These limits of work were used to determine the effects for each site.

Table D: Summary of Fish Sites

Location							
Route	PM	KP	Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Fish Passage Site
128	0.18	0.29	600	600	CMP	Replace culvert and install H W	
128	0.40	0.64	300	600	CMP	Replace culvert and install H W	
128	0.43	0.69	300	600	CMP	Replace culvert and install H W	
128	0.50	0.80	300	600	CMP	Replace culvert and install H W	
128	0.59	0.95	300	600	CMP	Replace culvert and install H W	
128	0.66	1.06	600	600	CMP	Replace culvert and install H W, w / RSP	
128	0.71	1.14	300	600	CMP	Replace culvert and install DI and protection wall	
128	0.73	1.17	300	600	CMP	Replace culvert and install DI and protection wall	
128	0.79	1.27	300	600	CMP	Replace culvert and install OMP DI with two windows	
128	0.82	1.32	300	600	CMP	Replace culvert and install HW	
128	0.96	1.54	300	600	CMP	Replace culvert and install HW	
128	1.02	1.64	300	600	CMP	Replace culvert and install HW	
128	1.10	1.77	450	600	CMP	Replace culvert and install HW	
128	1.15	1.85	750	600	CMP	Replace culvert and install HW	
128	1.29	2.08	300	750	ACP	Replace culvert and install HW	
128	1.34	2.16	300	750	CMP	Replace culvert and install HW	
128	1.38	2.22	300	750	CMP	Replace culvert and install HW	
128	3.08	4.96	300	750	CMP	Replace culvert and install OMP DI Short the Outlet 2 m w/RSP	
128	3.20	5.15	300	750	CMP	Replace culvert and install HW	
128	3.46	5.57	600	900	CMP	Replace culvert and install HW, move HW 1.5 m closer to the road & 50 m^3	
128	4.02	6.47	450	600	CMP	Replace culvert and install HW & EW	
128	4.05	6.52	300	600	CMP	Replace culvert and install OMP DI , extend pipe at Outlet 1.5 m	

Location							
Route	PM	KP	Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Fish Passage Site
128	4.08	6.57	300	600	CMP	Replace culvert and install HW & EW	
128	4.17	6.71	300	600	CMP	Replacement with a 600mm high density polyethylene (HDPE) plastic pipe. The HDPE should be smooth interior wall type. The Outlet should have Rock Energy Dissipater (RED). A new modified Inlet that duplicates the bank stabilization effects of the existing DI should be placed.	
128	4.83	7.77	300	600	CMP	Replace culvert and install DI & EW, extend pipe at outlet 2 m	
128	5.36	8.63	450	1000	CMP	Replace culvert and install DI	
128	6.08	9.78	300	750	CMP	Replace culvert and install DI, extend pipe1.0 m Inlet& 1.5 m outlet.	
128	6.11	9.83	300	600	CMP	Replace culvert and install DI & EW, extend pipe at outlet 1 m	
128	7.40	11.9	300	600	CMP	Replace culvert and install OMP DI	
128	7.51	12.09	600	750	CMP	Replace culvert and install HW & EW, extend pipe at outlet 2 m	
128	9.99	16.08	450	600	CMP	Replace culvert and install HW & EW, extend pipe 1 m at inlet & 2 m at outlet	
128	10.08	16.22	600	600	CMP	Replace culvert and install HW	
128	10.43	16.79	300	600	CMP	Replace culvert and install HW, extend pipe 1 m at inlet	
128	10.47	16.85	300	600	CMP	Replace culvert and install HW & EW	
128	10.73	17.27	450	600	CMP	Replace culvert and install HW & EW, extend pipe 1 m at inlet	
128	11.33	18.23		600		Replace culvert and install HW, raise culvert w / DD	
128	11.40	18.34	450	600	CMP	Replace culvert and install DI & EW	
128	11.54	18.57	450	1100	CMP	Replace culvert and install HW	
128	20.15	32.43	1.2 x 1.5	2130	RCB	Pave invert and repair concrete apron.	X
128	21.80	35.08	900	3000	WSP	Jack new oversized culvert in same location as existing. New culvert will be embedded 40 to 50 percent of diameter.	X
128	27.54	44.32	1800	1800	WSP	Remove 9.5 m of culvert at the inlet side and replace headwall. Construct roughened channel within culvert with embedded rock. Construct new headwall at outlet and concrete fish weir in outlet channel.	X

Location							
Route	PM	KP	Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Fish Passage Site
128	27.78	44.71	1800	1800	CMP	Place a new headwall and pave invert.	
128	36.63	58.95	2600 x 2500	2600x 2500	RCB	Install concrete weirs within the existing culvert and construct concrete fishway at outlet.	X
128	39.88	64.18	2250	2250	CMP	Install concrete weirs within the existing culvert and construct concrete wier at outlet. Install RSP bank protection at outlet.	X
128	49.66	79.92	2x 1200	4300x 2000	RCB	Install new 4.3 m by 2 m double box culvert, embedded approx. 50 percent. Construct new headwalls at inlet and outlet. RSP at outlet.	X
128	49.72	80.01	300	1000	CMP	Replace culvert and install HW	
123	13.73	22.10	450	750	CMP	Replace culvert and install OMP DI with one side window and DD 20-25 m w / 200 m3 RSP	
253	13.96	22.47	450	600	CMP	Replace culvert and install DI, w / DD and RSP	
253	14.31	23.03	600	750	CMP	Replace culvert extend pipe 3 m, w / RSP	
Count		49					6

6.0 SPECIES ACCOUNTS

6.1 CALIFORNIA COASTAL CHINOOK SALMON

The CC chinook salmon was listed as a federally *Threatened* species by NMFS on September 16, 1999. The CC chinook ESU includes all naturally spawned populations from rivers and streams south of the Klamath River to the Russian River.

CC chinook salmon generally spend two to four years in saltwater before returning to spawn (Myers et al, 1998). This ESU consists of both fall-run and spring-run salmon; little data is available on run timing. Chinook salmon, and salmonids in general, require clean, cold, well-oxygenated streams for spawning. Spawning streams must have a substrate of gravel or small cobble to provide safe incubation sites for the eggs.

6.1.1 Critical Habitat/EFH

Critical Habitat for this ESU was initially designated in February 2000 (Federal Register 2000), but was subsequently vacated pursuant to a April 30, 2002, court order by the U.S. District Court for the District of Columbia. A revised Critical Habitat designation is currently under development.

EFH includes waters (e.g., wetlands, estuarine, and riverine habitats) and substrate (including associated biological communities) necessary to fish for spawning, breeding, feeding, or growth to maturity.

6.2 CENTRAL CALIFORNIA COAST COHO SALMON

The CCC coho salmon was listed as a federally *Threatened* species by NMFS on October 31, 1996. The CCC coho ESU includes all naturally spawned populations from Punta Gorda in northern California to the San Lorenzo River in central California, including tributaries to San Francisco Bay (excluding the Sacramento-San Joaquin River Basin).

CCC coho salmon generally spend approximately 18 months in freshwater and 18 months in saltwater before returning to spawn (Meyers et al 1998). Migration generally occurs in December and January, with spawning beginning soon after migration. Coho salmon, and salmonids in general, require clean, cold, well-oxygenated streams for spawning. Spawning streams must have a substrate of gravel or small cobble to provide safe incubation sites for the eggs.

6.2.1 Critical Habitat/EFH

Critical Habitat for this ESU, as designated by NMFS on May 5, 1999, (Federal Register 1999), includes all reaches and estuarine areas accessible to steelhead within the range of the ESU (as described above). Also included in Critical Habitat are adjacent riparian zones. Generally, existing dams or longstanding natural migration barriers (e.g., impassable waterfalls) define the upstream limit of Critical Habitat.

EFH includes waters (e.g., wetlands, estuarine and riverine habitats) and substrate (including associated biological communities) necessary to fish for spawning, breeding, feeding, or growth to maturity.

6.3 CENTRAL CALIFORNIA COAST STEELHEAD

The Central California Coast (CCC) steelhead was listed as a federally *Threatened* species by NMFS on August 18, 1997. The CCC steelhead ESU includes all naturally spawned populations from the Russian River to Aptos Creek, including drainages of the San Francisco and San Pablo Bays eastward to the Napa River (excluding the Sacramento-San Joaquin River Basin).

CCC steelhead generally spend two years in freshwater and one to two years in saltwater before returning to spawn (Busby et al 1996). Migration generally occurs from July through May, with peaks in September and February. Spawning begins in late December and can extend into April. Steelhead, and salmonids in general, require clean, cold, well-oxygenated streams for spawning. Spawning streams must have a substrate of gravel or small cobble to provide safe incubation sites for the eggs.

6.3.1 Critical Habitat

Critical Habitat for this ESU was initially designated in February 2000 (Federal Register 2000), but was subsequently vacated pursuant to a April 30, 2002, court order by the U.S. District Court for the District of Columbia. A revised Critical Habitat designation is currently under development

6.4 NORTHERN CALIFORNIA STEELHEAD

Northern California (NC) steelhead was listed as a federally *Threatened* species by NMFS on June 7, 2000. The NC steelhead ESU includes all naturally spawned populations from Redwood Creek south to the Gualala River, inclusive.

NC steelhead generally spend two years in freshwater and one to two years in saltwater before returning to spawn (Busby et al 1996). Migration generally occurs from July through May, with peaks in September and February. Spawning begins in late December and can extend into April. Steelhead, and salmonids in general, require clean, cold, well-oxygenated streams for spawning. Spawning streams must have a substrate of gravel or small cobble to provide safe incubation sites for the eggs.

6.4.1 Critical Habitat

Critical Habitat for this ESU is currently under development.

7.0 RESULTS: IMPACTS AND AVOIDANCE AND MIINIMIZATION MEASURES

7.1 OCCURRENCE IN THE PROJECT AREA

In general, SR 128 and SR 253 parallel several streams within the project area. For SR 128 (west to east), these include the Navarro River, North Fork Navarro River, Anderson Creek, Rancheria Creek, Beebe Creek, John Hiatt Creek, Dry Creek, and Edwards Creek. For SR 253 (east to west), these include Soda Creek, an unnamed tributary to Robinson Creek, and Robinson Creek. Potential effects from the project are generally limited to these adjacent streams and the anadromous fish species present. Therefore, the primary focus of this section is identifying which species occur in the subject streams and evaluating potential project effects to these species.

7.1.1 California Coastal Chinook Salmon

Russian River Watershed. CC chinook salmon occur in the Russian River upstream of Ukiah and, consequently, could potentially occur in the eastern portion of the project area. Per e-mail correspondence with Mr. Scott Harris, CDFG fisheries biologist, CC chinook are not expected to occur in the (upstream) section of Edwards Creek that flows through the project area along SR 128, at approximately PM 50.0 (Harris, CDFG pers. comm.). However, CC chinook could occur in Robinson Creek along SR 253, and potentially in an unnamed tributary to Robinson Creek along SR 253 near approximately PM 14.0.

Warm Springs Dam, located south of the project area, represents the upstream limit of anadromy on Dry Creek, a tributary to the Russian River (CDFG 2002). As a result, CC chinook are assumed absent from the reach of Dry Creek within the project area along SR 128 from approximately PM 40.0 to 47.0, as it is upstream of the dam.

Navarro River Watershed. This ESU is not known from the Navarro River and is assumed absent from this watershed.

7.1.2 Central California Coast Coho Salmon

Russian River Watershed. CCC coho salmon are known from the lower Russian River, generally below the Dry Creek confluence (Harris, CDFG pers. comm.). Brown and Moyle (1991) surveyed historical CCC coho tributaries in the upper Russian River watershed (near Ukiah) in 2001 with negative results. The main stem Russian River and its tributaries were not included in this survey; the subject reach is not considered CCC coho juvenile rearing habitat due to low flow and high temperatures (Harris, CDFG pers. comm.). Consequently, considering the migration barrier represented by Warm Springs Dam, CCC coho are considered absent from the portions of the Russian River watershed in the project area.

Navarro River Watershed. CCC coho are known throughout the Navarro River watershed. Within the project area, CCC coho occur in the main stem Navarro River up to the confluence with Anderson Creek, based on 2001 surveys by Brown and Moyle (1991). These same surveys assumed CCC coho presence in the North Fork Navarro River. Surveys were negative for CCC coho in Rancheria Creek and Indian Creek, and Anderson Creek was not surveyed. Per e-mail correspondence with Mr. Scott Harris, CDFG fisheries biologist, CCC coho have not been observed in Anderson Creek in many years (Harris, pers. comm.). In addition, as documented by Jones (2001), surveys of Con Creek and Soda Creek (tributaries to Anderson Creek) in 1994 reported only steelhead present. Based on this data, it is assumed that within the project area CCC coho are present in the main stem Navarro River up to the confluence with Anderson Creek, and absent from Rancheria Creek and Anderson Creek, and their tributaries.

7.1.3 Central California Coast Steelhead

Russian River Watershed. CCC steelhead have been observed in Edwards Creek (Dept. of Transportation 2001) within the project area along SR 128 at PM 49.66, and in Robinson Creek (LSA Associates, Inc. 2000) at the Robinson Creek Road crossing. An unnamed, perennial tributary to Robinson Creek that flows along SR 253 within the project area confluences approximately one mile downstream of Robinson Creek Road; CCC steelhead are assumed present in this tributary.

Due to the migration barrier represented by Warm Springs Dam, CCC steelhead are assumed absent from the reach of Dry Creek within the project area along SR 128 from approximately PM 40.0 to 47.0 as it is upstream of the dam.

Navarro River Watershed. The Navarro River is not within the range of the CCC steelhead ESU.

7.1.4 Northern California Steelhead

Russian River Watershed. The Russian River is not within the range of the NC steelhead ESU.

Navarro River Watershed. NC steelhead are known throughout the Navarro River watershed within the project area. Jones (2001) reports NC steelhead in the main stem Navarro River, North Fork Navarro River, Indian Creek, Rancheria Creek, Anderson Creek and Soda Creek during 1994 surveys. Jones also noted a 20-foot high falls on Soda Creek at approximately PM 3.0, which presented a migration barrier and the upstream limit of anadromy for NC steelhead. This falls was field-checked during the follow-up field investigations for this project and its presence confirmed. Jones (2001) also reports NC steelhead in two tributaries to Rancheria Creek, Beasely Creek in 1994 (approximately PM 34.0), and Yale Creek in 1962 (approximately PM 38.0). Although the 1962 report for Yale Creek is old and no records were located for NC steelhead above Yale Creek, field investigations did not reveal migrations barriers or unsuitable conditions that would otherwise prevent NC steelhead from migrating to Yale Creek. The only barrier identified was a culvert crossing on John Hiatt Creek (tributary to Rancheria Creek via Beebe Creek) at PM 39.37 (Harris, CDFG pers. comm.). Consequently, it is assumed that NC steelhead occur in the main stem Navarro River, North Fork Navarro River, Anderson Creek, Soda Creek up to the falls at approximately PM 3.0, and Rancheria Creek (to at least the confluence with Yale Creek at approximately PM 38.0), Beebe Creek and John Hiatt Creek to PM 39.37.

This section evaluates the potential effects of culvert replacement at the 49 non-fish passage sites to CC chinook, CCC coho, CCC steelhead, and NC steelhead, and Critical Habitat/EFH, based on the distribution information presented in Section 7.1 and in Table E.

7.2.1 Avoidance and Minimization Measures

1) No work will be conducted in the live channel of perennial anadromous fish-bearing streams (e.g., the Navarro River).
2) Work in non-fish bearing streams (i.e., intermittent or ephemeral streams) will be conducted when the channel is dry. In the event of sudden thunderstorms or other unusual rain event, temporary dewatering (using sandbags or bladders) may be used to avoid siltation of the channel.
3) Work on the bank of fish-bearing streams (e.g., the Navarro River) will be conducted between June 15 and October 15.
4) Riparian areas outside the designated work areas will be designated as ESA's and clearly indicated as such on project construction plans. Project specifications will include a requirement that ESA's are clearly delineated with brightly colored fencing, rope or equivalent prior to beginning construction.
5) Measures consistent with the current Caltrans' Construction Site BMPs Manual (including the SWPPP and WPCP Manuals [http://www.dot.ca.gov/hq/construc/Construction_Site_BMPs.pdf]) will be implemented to minimize effects to anadromous fish habitat (e.g., siltation, etc.) during construction.
6) For those sites located in the redwood forest (i.e., along the Navarro River and North Fork Navarro River), impacts are primarily limited to minor grading of mostly unvegetated understory areas that are covered by a thick layer of duff. At these sites, the duff within the proposed work area will be collected and stockpiled prior to the start of work, and then re-spread on the graded/bare areas following construction. Provided sufficient duff is available to cover all graded/bare areas, no compensatory measures is proposed at these sites.
7) With the exception of item 6 above, graded or otherwise bare areas resulting from construction activities will be revegetated using native species. At least six months prior to the start of project construction, Caltrans will prepare detailed construction drawings and specifications for implementation of the revegetation effort. The guidelines in Appendix B have been prepared to outline the revegetation strategy to be implemented by Caltrans for temporary impacts to riparian vegetation during construction.

7.2.2 Project Impacts

Culvert replacement at the 49 non-fish passage sites in the project will result in direct permanent effects to CC chinook, CCC coho, CCC steelhead, and NC steelhead through loss of Critical Habitat/EFH[1] for CC chinook, CCC coho, CCC steelhead, and NC steelhead, totalling 0.004 ha (0.01 ac) as shown in Table D. Permanent habitat loss will occur during placement of RSP, totalling 0.002 ha (0.005 ac) for CCC coho, and NC steelhead and totalling 0.002 ha (0.005 ac) for CC chinook and CCC steelhead. With implementation of the measures in Section 7.2.1, culvert replacement at these sites will not result in indirect effects to CC chinook, CCC coho, CCC steelhead, or NC steelhead.

[1] "Critical Habitat" refers to "habitat" in general, with the understanding that "Critical Habitat" is officially only designated for CCC coho, but will likely be reinstated at some time in the future for CC chinook, CCC steelhead, and NC steelhead; it is also noted that EFH refers only CC chinook and CCC coho.

Direct temporary effects to these species from culvert replacement at the 49 non-fish passage sites will occur through temporary removal of Critical Habitat/EFH. As shown in Table E, the 49 non-fish passage sites will remove approximately 0.13 ha (0.31 ac) of Critical Habitat/EFH. Habitat impacts will occur during removal of the existing culverts and installation of the new culverts, grading for temporary access, and minor grading to facilitate drainage.

The majority of temporary effects (0.1 ha/0.24 ac) will occur to riparian habitat along the Navarro River and North Fork Navarro River near the west end of SR 128. Work at these sites will affect Critical Habitat/EFH for CCC coho and NC steelhead. However, many sites at the west end of the project occur in upland redwood forest (near the banks of the rivers), and the proposed work at these sits will not affect riparian vegetation. These sites are in close proximity to the Navarro River or North Fork Navarro River and require minor grading of existing, upland ditches that outlet onto the banks. Although the work at these sites will result in removal of understory redwood vegetation totalling approximately 0.02 ha (0.06 ac), the actual impacts to the banks of these rivers are too small to calculate. However, the effects could not be discounted as the Navarro River and North Fork Navarro River rivers are identified as Critical Habitat/EFH.

The remaining non-fish passage sites are along SR 253, and occur in north slope cismontane woodland. Culvert replacement at these sites will affect Critical Habitat/EFH for CC chinook and CCC steelhead. NC steelhead will not be affected as the sites along SR 253 that may affect Soda Creek are located upstream of the falls at approximately PM 3.0. The work at these sites will affect only upland vegetation totalling 0.03 ha (0.07 ac); however, due to their location upslope (i.e., on extremely steep slopes) from anadromous fish bearing streams, and the increased potential for siltation, or where the existing culvert conveys an ephemeral tributary and outlets in close proximity to a fish bearing stream, they were included as potential effects to Critical Habitat/EFH.

Since no work will be conducted within or over the live channel of any fish bearing streams and no pile driving will occur, temporary noise impacts to listed salmonids are not expected.

7.2.3 Compensatory Measures

Due to the minimal amount of permanent habitat loss at the non-fish passage sites due placement of RSP, approximately 0.004 ha (0.01 ac), and with implementation of the *Avoidance and Minimization Measures* in Section 7.2.1, no compensatory measures are proposed.

7.2.4 Cumulative Effects

Non-federal activities in the region that affect anadromous fish include local agency (e.g., Mendocino County) road projects, timber harvesting, and vineyard development and operation. These activities affect fish either directly (e.g., stream encroachment during construction) or indirectly (e.g., habitat removal and degradation, increased siltation and urban runoff, etc.). Culvert replacement at the 49 non-fish passage sites will result in minimal direct permanent and temporary effects through removal of Critical Habitat/EFH. All Critical Habitat/EFH temporarily removed during construction will be revegetated using native species. Consequently, the culvert replacement at the 49 non-fish passage sites in the project will not result in substantial cumulative effects to CC chinook, CCC coho, CCC steelhead, or NC steelhead.

7.2.5 Conclusions and Determinations

Culvert replacement at the 49 non-fish passage sites will result in permanent direct effects to CC chinook, CCC coho, CCC steelhead, and/or NC steelhead through permanent loss of Critical Habitat totalling 0.004 ha (0.01 ac). Culvert replacement at these sites will also result in direct temporary effects to these species through temporary loss of Critical Habitat totalling 0.13 ha (0.31 ac). With implementation of the *Avoidance and Minimization Measures* described Section 7.2.1, the minimal permanent and temporary loss of habitat is *Not Likely To Adversely Affect* CC chinook, CCC coho, CCC steelhead, or NC steelhead. In addition, the minimal permanent and temporary loss of habitat is *Not Likely To Adversely Modify* Critical Habitat for CCC coho[2], and will result in only *a Minimal Adverse Affect* to EFH for CC chinook and CCC coho. Informal consultation with NMFS is required under Section 7 of the ESA. Consultation with NMFS is also required pursuant to the MSFCMA.

[2] In the event Critical Habitat is designated for CC chinook, CCC steelhead or NC steelhead in the future, this *not likely to adversely modify* finding would also apply to the Critical Habitat for these species.

Table E: Summary of Impacts to Fish Sites (Note: Fish Passage Sites are Shaded)

Location											
Route	PM	KP	Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Temporary Effects	Permanent Effects	Species Affected	Critical Habitat/EFH	Take
128	0.18	0.29	600	600	CMP	Replace culvert and install H W	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.40	0.64	300	600	CMP	Replace culvert and install H W	19 m^2/250 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.43	0.69	300	600	CMP	Replace culvert and install H W	23 m^2/250 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.50	0.80	300	600	CMP	Replace culvert and install H W	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.59	0.95	300	600	CMP	Replace culvert and install H W	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.66	1.06	600	600	CMP	Replace culvert and install H W, w / RSP	9 m^2/200 ft^2 Riparian	5 m^2/50 ft^2 Riparian	CCC coho/ NC steelhead	CCC coho	N
128	0.71	1.14	300	600	CMP	Replace culvert and install DI and protection wall	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.73	1.17	300	600	CMP	Replace culvert and install DI and protection wall	9 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.79	1.27	300	600	CMP	Replace culvert and install OMP DI with two windows	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.82	1.32	300	600	CMP	Replace culvert and install HW	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	0.96	1.54	300	600	CMP	Replace culvert and install HW	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N

Location											
Route	PM	KP	Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Temporary Effects	Permanent Effects	Species Affected	Critical Habitat/EFH	Take
128	1.02	1.64	300	600	CMP	Replace culvert and install HW	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	1.10	1.77	450	600	CMP	Replace culvert and install HW	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	1.15	1.85	750	600	CMP	Replace culvert and install HW	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	1.29	2.08	300	750	ACP	Replace culvert and install HW	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	1.34	2.16	300	750	CMP	Replace culvert and install HW	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	1.38	2.22	300	750	CMP	Replace culvert and install HW	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	3.08	4.96	300	750	CMP	Replace culvert and install OMP DI Short the Outlet 2 m w/RSP	37 m^2/400 ft^2 Riparian	5 m^2/50 ft^2 Riparian	CCC coho/ NC steelhead	CCC coho	N
128	3.20	5.15	300	750	CMP	Replace culvert and install HW	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	3.46	5.57	600	900	CMP	Replace culvert and install HW, move HW 1.5 m closer to the road & 50 m3	37 m^2/400 ft^2 Riparian	5 m^2/50 ft^2 Riparian	CCC coho/ NC steelhead	CCC coho	N
128	4.02	6.47	450	600	CMP	Replace culvert and install HW & EW	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	4.05	6.52	300	600	CMP	Replace culvert and install OMP DI , extend pipe at Outlet 1.5 m	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	4.08	6.57	300	600	CMP	Replace culvert and install HW & EW	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N

Location			Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Temporary Effects	Permanent Effects	Species Affected	Critical Habitat/EFH	Take
Route	PM	KP									
128	4.17	6.71	300	600	CMP	Replacement with a 600mm high density polyethylene (HDPE) plastic pipe. The HDPE should be smooth interior wall type. The Outlet should have Rock Energy Dissipater (RED). A new modified Inlet that duplicates the bank stabilization effects of the existing DI should be placed. Recommended by Sebastian	37 m^2/400 ft^2 Riparian	5 m^2/50 ft^2 Riparian	CCC coho/ NC steelhead	CCC coho	N
128	4.83	7.77	300	600	CMP	Replace culvert and install DI & EW, extend pipe at outlet 2 m	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	5.36	8.63	450	1000	CMP	Replace culvert and install DI	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	6.08	9.78	300	750	CMP	Replace culvert and install DI, extend pipe1.0 m Inlet& 1.5 m outlet.	37 m^2/400 ft^2 redwood understory		CCC coho/ NC steelhead	CCC coho	N
128	6.11	9.83	300	600	CMP	Replace culvert and install DI & EW, extend pipe at outlet 1 m	37 m^2/400 ft^2 redwood understory		CCC coho/ NC steelhead	CCC coho	N
128	7.40	11.9	300	600	CMP	Replace culvert and install OMP DI	56 m^2/600 ft^2 redwood understory		CCC coho/ NC steelhead	CCC coho	N
128	7.51	12.09	600	750	CMP	Replace culvert and install HW & EW, extend pipe at outlet 2 m	37 m^2/400 ft^2 redwood understory		CCC coho/ NC steelhead	CCC coho	N
128	9.99	16.08	450	600	CMP	Replace culvert and install HW & EW, extend pipe 1 m at inlet & 2 m at outlet	9 m^2/100 ft^2 redwood understory		CCC coho/ NC steelhead	CCC coho	N

Location			Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Temporary Effects	Permanent Effects	Species Affected	Critical Habitat/EFH	Take
Route	PM	KP									
128	10.08	16.22	600	600	CMP	Replace culvert and install HW	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	10.43	16.79	300	600	CMP	Replace culvert and install HW, extend pipe 1 m at inlet	37 m^2/400 ft^2 redwood understory		CCC coho/ NC steelhead	CCC coho	N
128	10.47	16.85	300	600	CMP	Replace culvert and install HW & EW	28 m^2/300 ft^2 redwood understory		CCC coho/ NC steelhead	CCC coho	N
128	10.73	17.27	450	600	CMP	Replace culvert and install HW & EW, extend pipe 1 m at inlet	19 m^2/200 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	11.33	18.23		600		Replace culvert and install HW, raise culvert w / DD	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	11.40	18.34	450	600	CMP	Replace culvert and install DI & EW	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	11.54	18.57	450	1100	CMP	Replace culvert and install HW	56 m^2/600 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	20.15	32.43	1200x1 1500	1200x 1500	RCB	Pave invert and repair concrete apron at outlet.	6 m/20 ft Dewatering (within culvert/apron)		CCC coho/ NC steelhead	CCC coho	N
128	21.80	35.08	900	1830	WSP	Jack new oversized culvert in same location as existing. New culvert will be embedded 40 to 50 percent of diameter.	520 m^2/5600 ft^2 Riparian 18 m/60 ft Dewatering		CCC coho/ NC steelhead	CCC coho	Y

Location											
Route	PM	KP	Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Temporary Effects	Permanent Effects	Species Affected	Critical Habitat/EFH	Take
128	27.54	44.32	1800	600	WSP	Remove 9.5 m of culvert at the inlet side and replace headwall. Construct roughened channel within culvert with embedded rock. Construct new headwall at outlet and concrete fish weir in outlet channel.	170 m^2/1850 ft^2 Riparian 30 m/100 ft Dewatering	40 m^2/430 ft^2 Channel (for weir)	CCC coho/ NC steelhead	CCC coho	N
128	27.78	44.71	1800	1475	CMP	Place a new headwall and pave invert.	37 m^2/400 ft^2 Riparian		CCC coho/ NC steelhead	CCC coho	N
128	36.63	58.95	2600 x 2500	750	RCB	Install concrete weirs within the existing culvert and construct concrete fishway at outlet.	40 m^2/40 ft^2 Channel 30 m/100 ft Dewatering	90 m^2/970 ft^2 Channel (for fishway)	CCC coho/ NC steelhead	No	Y
128	39.88	64.18	2250	1270	CMP	Install concrete weirs within the existing culvert and construct concrete weir at outlet. Install RSP bank protection at outlet.	20 m/65 ft Dewatering	32 m^2/350 ft^2 Riparian 24 m^2/260 ft^2 Channel (for weir)	CCC coho/ NC steelhead	No	Y
128	49.66	79.92	2 x 1200	1400	CMP	Install new 4.3 m by 2 m double box culvert, embedded approx. 50 percent. Construct new headwalls at inlet and outlet. RSP at outlet.	110 m^2/1190 ft^2 Riparian 20 m/65 ft Dewatering	24 m^2/260 ft^2 Riparian	CCC steelhead	No	Y
128	49.72	80.01	300	1000	CMP	Replace culvert and install HW	19 m^2/200 ft^2 Riparian		CCC steelhead	No	Y
253	13.73	22.10	450	750	CMP	Replace culvert and install OMP DI with one side window and DD 20-25 m w / 200 m3 RSP	186 m^2/2000 ft^2 Cismontane woodland	9 m^2/100 ft^2 Cismontane woodland	CCC steelhead/ CC chinook	No	N

Location			Existing Diameter	Design Diameter	Existing Material	Proposed Repair	Temporary Effects	Permanent Effects	Species Affected	Critical Habitat/EFH	Take
Route	PM	KP									
253	13.96	22.47	450	600	CMP	Replace culvert and install DI, w / DD and RSP	56 m^2/600 ft^2 Cismontane woodland	9 m^2/100 ft^2 Cismontane woodland	CCC steelhead/ CC chinook	No	N
253	14.31	23.03	600	750	CMP	Replace culvert extend pipe 3 m, w / RSP	37 m^2/400 ft^2 Cismontane woodland	9 m^2/100 ft^2 Cismontane woodland	CCC steelhead/ CC chinook	No	N

7.3 FISH PASSAGE SITES

This section evaluates the potential effects of culvert replacement or retrofitting, or other repairs, at the 6 fish passage sites to CCC coho, CCC steelhead, and NC steelhead, and Critical Habitat/EFH, based on the distribution information presented in Section 7.1 and in Table E. CC chinook does not occur in the vicinity of any of the 6 fish passage sites and, as a result, is not included in the evaluation.

7.3.1 Evaluation of Upstream and Downstream Habitat

With the exception of PM 49.66 where CCC steelhead have been observed, listed salmonids have not been observed at any of the fish passage sites; existing or future presence is assumed based on connectivity (irrespective of known migration barriers) to streams known to support listed salmonids. Therefore, replacement or retrofitting of the four culverts to improve fish passage is being undertaken with the assumption that listed salmonids will be able to access the subject reaches in the future, either through removal of known migration barriers (e.g., Graveyard Creek at Anderson Valley Way), other habitat improvements, etc.

In general, anadromous fish habitat in the vicinity of the six fish passage sites is mediocre. Various conditions exist that have resulted in degradation of the stream habitat in the vicinity of each site. The following is an analysis of the habitat at each site. Due to limitations during site surveys (i.e., access limited to 91.5 m / 300 ft from the highway), evaluation of instream habitat is generally limited to the reaches of each drainage immediately adjacent to the inlet and outlet. Additional evaluation of habitat conditions (e.g., canopy cover, adjacent land uses, etc.) are included for reaches of each drainage to the extent necessary to adequately evaluate the habitat. The additional evaluation was performed by reviewing black and white digital orthorectified aerial photographs and USGS 7.5' topographic quadrangles, at scales of 1:12,000 and 1:24,000 respectively.

MEN 128 - PM 20.15 Unnamed Creek. This creek is a perennial tributary to the Navarro River that dries to very low flows during the late summer and fall. The site is located at the lower end of the drainage, approximately 0.8 km (0.5 mi) upstream of the confluence with the Navarro River. Upstream of SR 128, the creek has been channelized for approximately 0.16 km (0.1 mi); this reach and the entire section of the creek through the valley floor supports a narrow riparian corridor. Downstream of SR 128 to the confluence, the creek generally supports a moderately well developed riparian corridor. The creek is bordered by extensive orchards and vineyards both upstream and downstream of 128, land uses which contribute to erosion, chemical toxicity, and atypical hydrology to the creek. In addition, development occurs along the lower reaches of the creek and several road crossings are present which may present migration barriers. Once beyond the valley floor, the upstream reaches of the creek appear to support more extensive riparian corridors and potential spawning habitat, until the gradient becomes too steep (i.e., a sustained 8 percent grade).

MEN 128 - PM 21.80 Clow Creek. Clow Creek is a perennial tributary to the Navarro River that dries to very low flows during the late summer and fall. The site is located at the lower end of the Clow Creek watershed, approximately 0.16 km (0.1 mi) upstream of the confluence with the Navarro River. Clow Creek generally supports a well developed riparian corridor from the confluence to the upper reaches until the gradient becomes too steep. The upper reaches may provide suitable spawning habitat. Some development occurs near the creek but it is limited to the vicinity of SR 128.

Agricultural land uses also occur near the lower section of the creek and several road crossings are present upstream of SR 128.

MEN 128 - PM 27.54 Graveyard Creek. Graveyard Creek is a perennial tributary to the Navarro River that dries to very low flows during the late summer and fall. This site is located at the lower end of the Graveyard Creek watershed, approximately 0.16 km (0.1 mi) upstream of the confluence with the Navarro River. Graveyard creek supports a moderately well developed riparian corridor along the lower reaches, but the corridor becomes sparse in the upper reaches. Still, spawning habitat is potentially present in the upper reaches of the creek below the section where the gradient becomes too steep. The creek is surrounded by substantial development along the lower reach between SR 128 and the confluence with the Navarro River. In addition, the creek crosses beneath Anderson Valley Way just before the confluence; this crossing appears to be a complete barrier to fish passage.

MEN 128 - PM 36.63 Lost Creek. Lost Creek is an intermittent tributary to Rancheria Creek. Lost Creek confluences with Rancheria Creek approximately 61 m (200 ft) downstream of the SR 128 crossing. Only a short section of Lost Creek is accessible to anadromous salmonids before the gradient becomes too steep. Lost Creek supports a sparse riparian corridor in the vicinity of SR 128 but the channel is mostly open in the upstream section to the point where the gradient becomes too steep. With the exception of a driveway along the west bank upstream of SR 128, no development occurs along the lower section of the creek.

MEN 128 - PM 39.88 John Hiatt Creek. John Hiatt Creek is a perennial tributary to Beebe Creek. John Hiatt Creek confluences with Beebe Creek at approximately PM 39.22. The confluence is located below a known (complete) barrier to fish passage at PM 39.37 (Harris, CDFG pers. comm.), where SR 128 crosses John Hiatt Creek. Upstream, a private road at approximately PM 40.02 presents another barrier to fish passage; the private road appears to be only a partial barrier, likely preventing juvenile passage. The site is located in a fairly steep canyon at the upper extent of the watershed. The subject section of channel supports a well developed riparian corridor and is suitable spawning habitat. Land uses adjacent to the creek are primarily rural residential and open space downstream of SR 128, and vineyards upstream (past approximately PM 40.50). SR 128 also runs along the length of the John Hiatt Creek to the confluence with Beebe Creek, and the crossing at PM 39.37 (i.e., downstream of the site) presents a complete migration barrier (Harris, CDFG pers. comm.).

MEN 128 - PM 49.66 Edwards Creek. Edwards Creek is a perennial tributary to the Russian River. The site is located in the upper extent of the watershed, approximately 6 km (3.75 mi) upstream of the confluence with the Russian River. The creek flows alongside SR 128 immediately upstream of the site for approximately 4.8 km (0.3 mi). The upstream section flows through a fairly steep canyon, supports a well developed riparian corridor and is suitable spawning habitat. The downstream section flows through grassland and oak woodland habitats and has a narrow riparian corridor. Land uses in the vicinity are primarily open space and some grazing. Several low water crossings occur upstream of SR 128.

Evaluation Summary

Since all the fish passage sites were fairly similar in terms of habitat value for anadromous salmonids, the cost of retrofitting each culvert for fish passage was evaluated and weighed against the potential benefits of the retrofit. Table F summarizes the cost of retrofitting each culvert for fish passage as well as the cost for repairing the culvert to improve hydraulic efficiency. As shown in Table F, costs for retrofitting the culverts range from $40,000 to $135,000, with PM 39.88 being the least expensive and PM 20.15 being the most expensive, 150 percent more than the next highest (PM 21.80 at $90,000). Due to the substantial difference in cost to retrofit PM 20.15, it was agreed by all parties at the May 12, 2003, meeting that retrofitting PM 20.15 to only improve hydraulic efficiency would be acceptable provided the other five culverts were retrofitted for fish passage.

Table F: Summary of Cost Analysis for Fish Passage Sites

PM	KP	Name	Type of repair	Retrofit cost including fish passage work	Repair cost for hydraulic purposes only
20.15	32.42	Unnamed Creek	None	$135,000	$11,500
21.80	35.08	Clow Creek	Replacement	$90,000	0
27.54	44.31	Graveyard Creek	Retrofit	$80,000	$55,000
36.63	58.94	Lost Creek	Retrofit	$60,000	$15,000
39.88	64.17	Beebe Creek	Retrofit	$40,000	$4,000
49.66	79.92	Edwards Creek	Replacement	$75,000	$67,000
Total				$480,000	$152,500

7.3.2 Avoidance and Minimization Measures

1) In-stream work and work on the banks of perennial anadromous fish-bearing streams will be conducted between June 15 and October 15.
2) Dewatering, if necessary, will consist of using sandbags or equivalent method to construct a temporary cofferdam upstream of the work area at the inlet, and downstream of the work area at the outlet. Following construction of the cofferdams, a gravity siphon hose system will be installed to transport upstream flows through the work area to the channel downstream of the work area. If necessary, a pump will be used to convey flows through the hose.
3) Riparian areas outside the designated work areas will be designated as ESA's and clearly indicated as such on project construction plans. Project specifications will include a requirement that ESA's are clearly delineated with brightly colored fencing, rope or equivalent prior to beginning construction.
4) Water for dust abatement (if necessary) will be acquired from an off-site source. No drafting will be permitted.
5) Measures consistent with the current Caltrans' Construction Site BMPs Manual (including the SWPPP and WPCP Manuals [http://www.dot.ca.gov/hq/construc/Construction_Site_BMPs.pdf]) will be implemented to minimize effects to anadromous fish habitat (e.g., siltation, etc.) during construction.
6) Graded or otherwise bare areas resulting from construction activities will be revegetated using native species. The guidelines in Appendix B have been prepared to outline the revegetation strategy to be implemented by Caltrans for temporary impacts to riparian vegetation during construction.

7.3.3 Project Impacts

Culvert replacement at 5 fish passage sites (PM's 21.8, 27.54, 36.63, 39.88, and 49.66) will result in direct permanent effects to CCC coho, CCC steelhead, and NC steelhead through permanent loss or alteration of Critical Habitat/EFH totalling 0.02 ha (0.05 ac), as shown in Table G. Permanent loss of Critical Habitat/EFH will occur during placement of RSP, totaling (0.004 ha/0.01 ac). Placement of RSP will result in the loss of riparian habitat adjacent to the channel. Direct permanent effects to Critical Habitat/EFH will also occur during construction of fish weirs and fishways, totalling 0.016 ha/0.04 ac. These effects will occur in the channel at the outlets to the several of the culverts (see Table E and Appendix A). Although construction of the fish weirs and fishways will result in permanent effects to Critical Habitat/EFH, these effects are considered beneficial as they will improve the quality of the channel habitat by making the substrate at the outlet more conducive to fish passage. Direct effects to CCC coho, CCC steelhead, and NC steelhead could also occur if these species are present in the construction area when construction begins. Direct effects to CCC coho, CCC steelhead, and NC steelhead, if any, will be limited to harassment if fish are present during site dewatering.

Direct temporary effects at the 5 sites will occur during temporary removal/disturbance of Critical Habitat/EFH as a result of construction activities (e.g., staging areas, access roads, etc.). As shown in Table G, the 5 sites will temporarily remove or disturb approximately 0.08 ha (0.21ac) of Critical Habitat/EFH for CCC coho, CCC steelhead, and NC steelhead. Approximately 0.076 ha (0.18 ac) of riparian habitat and 0.004 ha (0.01 ac) of channel habitat will be temporarily affected. Temporary impacts may also include dewatering the work area in order to complete the work. A maximum of approximately 124 m (410 ft) of stream channel (not including the length of the existing culvert) could be temporarily dewatered during construction.

Repairs at PM 20.15 will be limited to the existing culvert outlet, and will result in direct temporary effects during dewatering a section of the culvert and outlet apron. However, since the outlet is a complete barrier to fish passage during low flow conditions (i.e., during the work window), fish will not be present in the culvert or the outlet apron during the repairs.

With implementation of the measures in Section 7.3.2, culvert replacement, retrofitting, or other proposed repairs at these sites will not result in indirect effects to CCC coho, CCC steelhead, or NC steelhead.

The total impacts from the fish passage sites are summarized in Table G.

Table G: Summary of Fish Passage Site Habitat Impacts

Effects	Riparian	Channel	Total
Direct			
Permanent	56 m^2 / 600 ft^2 (0.004 ha / 0.01 ac)	154 m^2 / 1,660 ft^2 (0.016 ha / 0.04 ac)	**210 m^2 / 2260 ft^2 (0.02 ha / 0.05 ac)**
Temporary	819 m^2 / 8,610 ft^2 (0.076 ha / 0.18 ac)	40 m^2 / 430 ft^2 (0.004 ha / 0.01 ac)	**859 m^2 / 9040 ft^2 (0.08 ha / 0.21 ac)**
Indirect	-----	-----	----
Total	**875 m^2 / 9,210 ft^2 (0.08 ha / 0.21 ac)**	**194 m^2 / 2,090 ft^2 (0.02 ha / 0.05 ac)**	**1,069 m^2 / 11,300 ft^2 (0.10 ha / 0.26 ac)**

Although the proposed work at the 6 fish passage sites will result in permanent and temporary effects to CCC coho, CCC steelhead, and NC steelhead, and Critical Habitat/EFH, overall, the project will result in a net benefit for these species and Critical Habitat/EFH. The net benefit is due to replacement or retrofitting of 5 of the 6 fish passage culverts, which will improve fish passage conditions at these sites. The proposed replacement or retrofit will result in decreased velocity, increased water depth, and increased flow area for all life stages of anadromous potentially occurring at these sites (refer to hydraulic analyses in Appendix A).

7.3.4 Compensatory Measures

The proposed work at the 6 fish passage site will result in a net benefit to CCC coho, CCC steelhead, and NC steelhead as fish passage conditions will be improved at 5 of the 6 sites, as described in Section 7.3.3. In addition, direct effects due to permanent loss of Critical Habitat/EFH from placement of RSP will be minimal (0.004 ha / 0.01 ac), and temporary effects to Critical Habitat/EFH from construction activities will be avoided and/or minimized per the measures in Section 7.3.2. Consequently, no compensatory measures are proposed.

7.3.5 Cumulative Effects

Non-federal activities in the region that affect anadromous fish include local agency (e.g., Mendocino County) road projects, timber harvesting, and orchard and vineyard development and operation. These activities affect fish either directly (e.g., stream encroachment during construction) or indirectly (e.g., habitat removal and degradation, increased siltation and urban runoff, etc.). Although the construction activities at the 6 fish passage sites will result in minimal direct permanent and temporary effects through removal or disturbance of Critical Habitat/EFH, the project will result in net beneficial effects to CCC coho, CCC steelhead, and NC steelhead due to improved fish passage conditions through the culverts (except PM 20.15). Consequently, the proposed work at the 6 fish passage sites will not result in substantial cumulative effects to CCC coho, CCC steelhead, or NC steelhead.

7.3.6 Conclusions and Determinations

Culvert replacement, retrofit, or other repairs at five fish passage sites (PM's 21.8, 27.54, 36.63, 39.88, and 49.66) will result permanent direct effects to CCC coho, CCC steelhead, and NC steelhead through permanent loss of Critical Habitat/EFH totalling 0.016 ha (0.040 ac). The proposed work at these sites will also result in direct temporary effects to these species through temporary loss of Critical Habitat/EFH (0.08 ha / 0.21 ac) and possibly dewatering of 124 m (410 ft) of stream channel. Since work will be required within the stream channel when CCC coho, CCC steelhead, and NC steelhead could potentially be present, the work at the five fish passage sites is *Likely To Adversely Affect* CCC coho, CCC steelhead, or NC steelhead. Work at one fish passage site (PM 20.15) is *Not Likely To Adversely Affect* these listed species. Since the overall project will result in a net benefit as fish passage conditions at five of the six sites will be improved, the minimal permanent and temporary loss of habitat is *Not Likely To Adversely Modify* Critical Habitat for CCC coho[3], and will result in only *a Minimal Adverse Affect* to EFH for CCC coho. Formal consultation with NMFS is

[3] In the event Critical Habitat is designated for CC chinook, CCC steelhead, or NC steelhead in the future, this *not likely to adversely modify* finding would also apply to the Critical Habitat for these species.

8.0 REFERENCES

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California Dept. of Transportation. 2001. Personal observation by Susan Taylor. Eureka, CA.

APPENDIX A – PRELIMINARY DESIGN PLANS, HYDRAULIC ANALYSES, AND PHOTOS

SR 128 / PM 21.80 Clow Creek

Clow Creek
Men-128-PM 21.80

Existing: 1500 mm (5ft) x 44.3m (145.3 ft) SSPP @ 4.2% slope
Bankfull Width = Appx 8 ft, Active Channel = Appx 5ft
2.7% DS Channel Grade

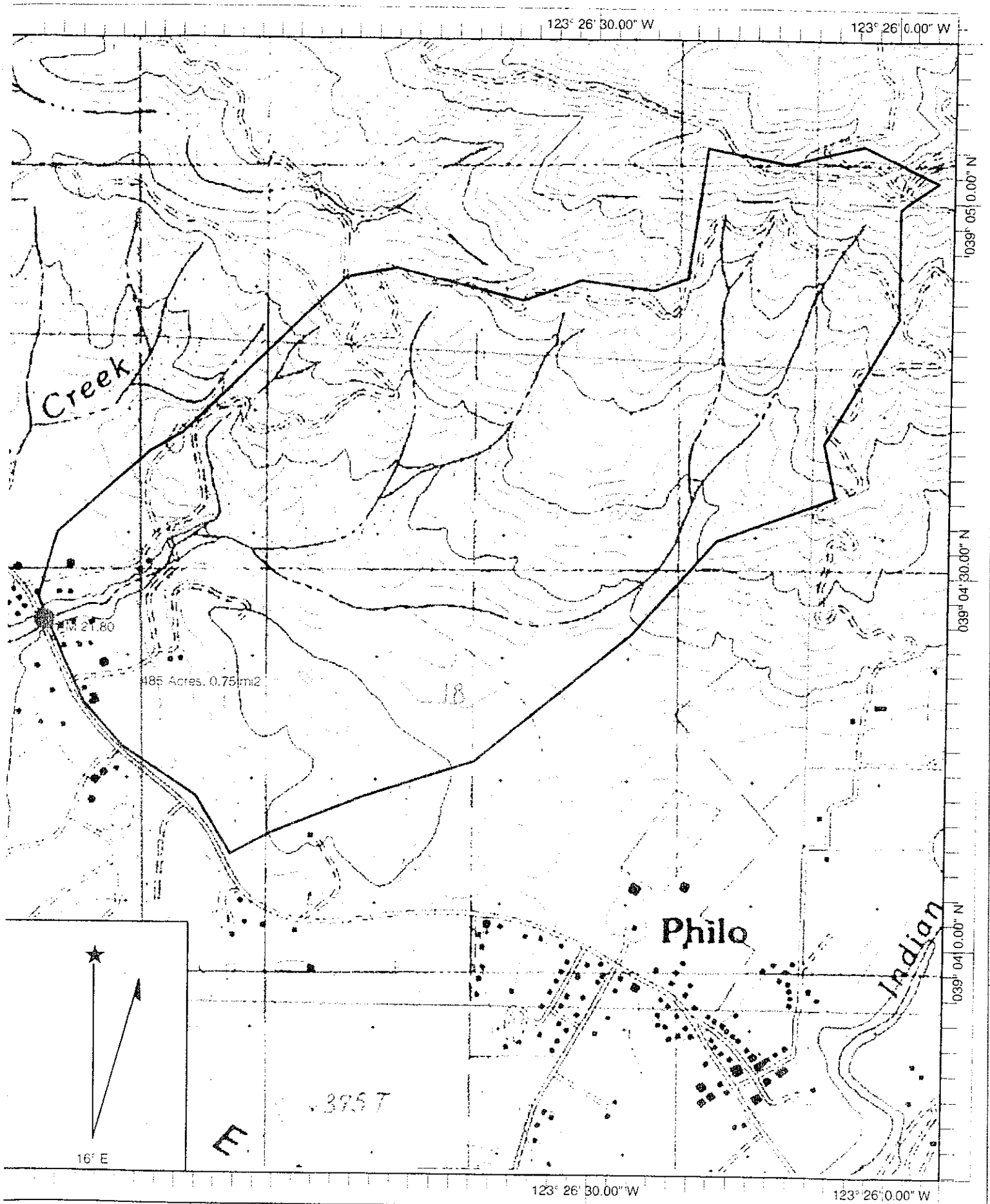
Proposed: 3000mm (10ft) x 44.0m (144.3 ft) Embedded WSP @ 2% Grade (Jack & Bore Method)
Import 3" Minus Cobble, Gradation Commensurate With Upstream and Downstream Stream Gradation

	*Existing Conditions			
Adult Anadromous	**Velocities (fps)**	**Depths (ft)**	**Flow Area (ft^2)**	**EDF**
Lower Q50% (cfs) 3.00	7.41	0.27	0.41	19.18
Upper Q1% (cfs) 16.95	12.18	0.62	1.4	31.73
Resident Trout				
Lower Q90% (cfs) 2.00	6.55	0.22	0.3	17.47
Upper Q5% (cfs) 5.74	9.02	0.36	0.63	23.88
Juvenile Salmonids				
Lower Q95% (cfs) 1.00	5.3	0.16	0.19	13.79
Upper Q10% (cfs) 2.92	7.35	0.26	0.39	19.66

****Proposed Conditions**
Embedded 3.0m (10 ft) Diameter Steel Culvert

			Outlet Vel (fps)	Outlet Depths (ft)	Control Type	HW/D
Q10=	185.0	cfs	15.24	2.97	Inlet	1.53
Q100=	322.4	cfs	16.75	4.74	Inlet	3.5

NOTES:
* Velocities and depths determined using Culvert Master software program (FHWA Equations) (diam=5.0ft, n=0.024)
** Velocities and depths not necessary for Stream Simulation designs
Fish Design Flow Rates determined from Exceedence Flow Curves derived from local gauge stations
Q10 and Q100 flow rates detrmined from Regional Method, based on Q annual of 50 in/yr

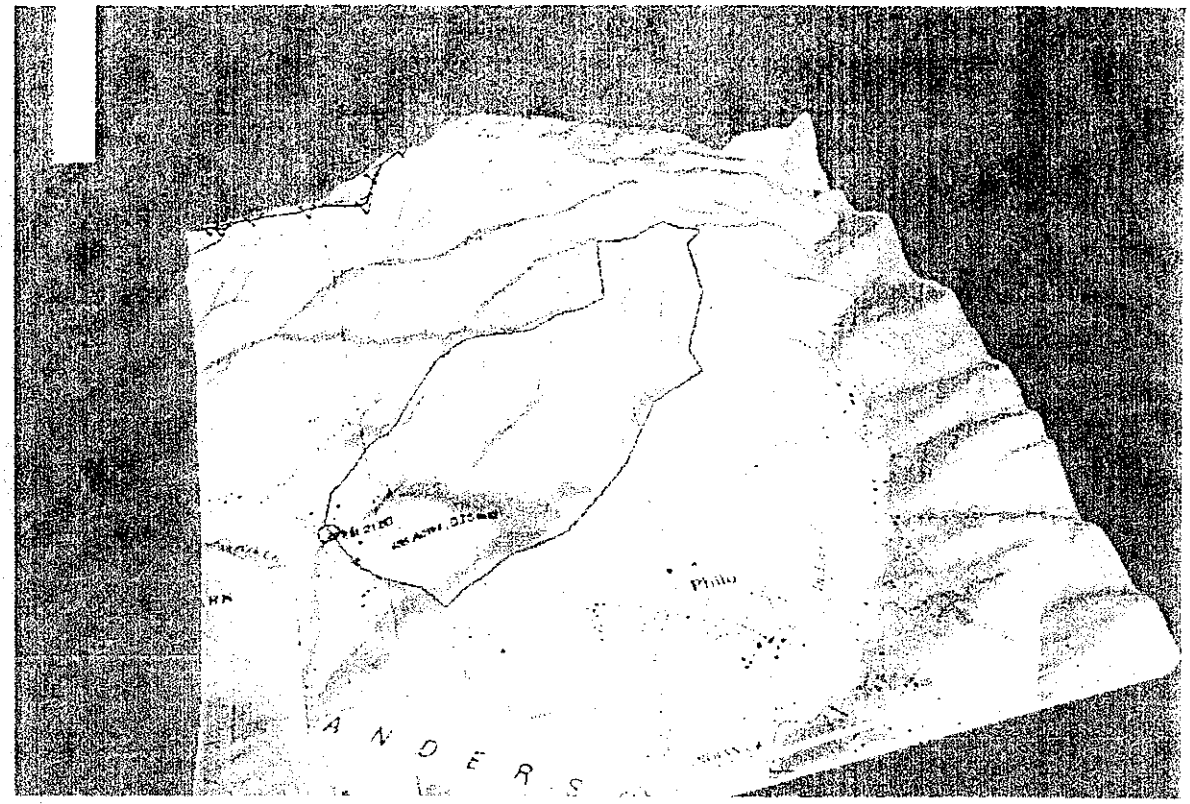


Name: PHILO
Date: 4/8/2003
Scale: 1 inch equals 1000 feet

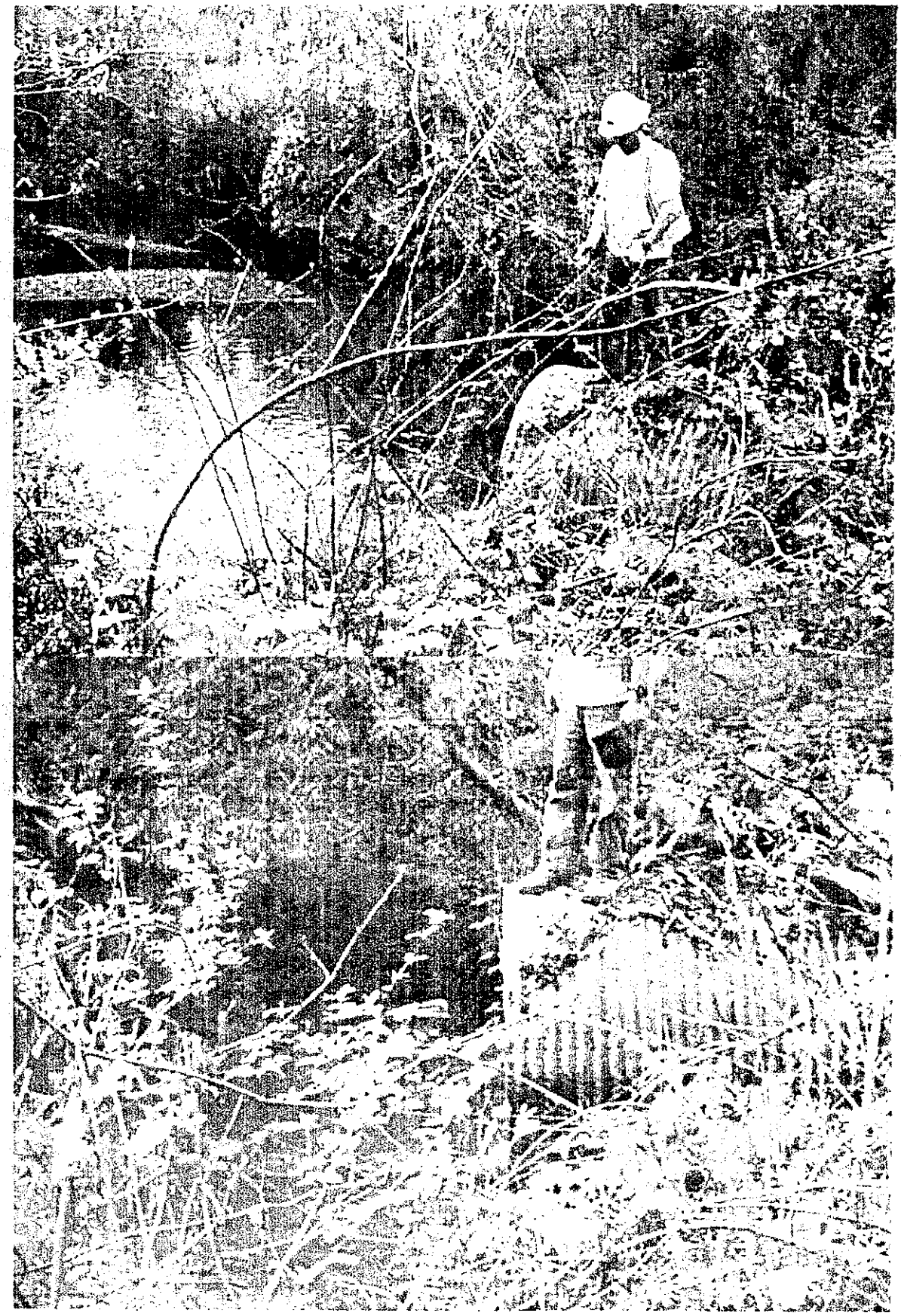
Location: 039° 04' 27.4" N 123° 26' 42.0" W
Caption: small layers, dark

Copyright (C) 1997 Maptech, Inc.

60" SSPP Culvert @ Men-128-PM 21.80
Drainage Area = 485 acres, 0.75 mi2
01-378100



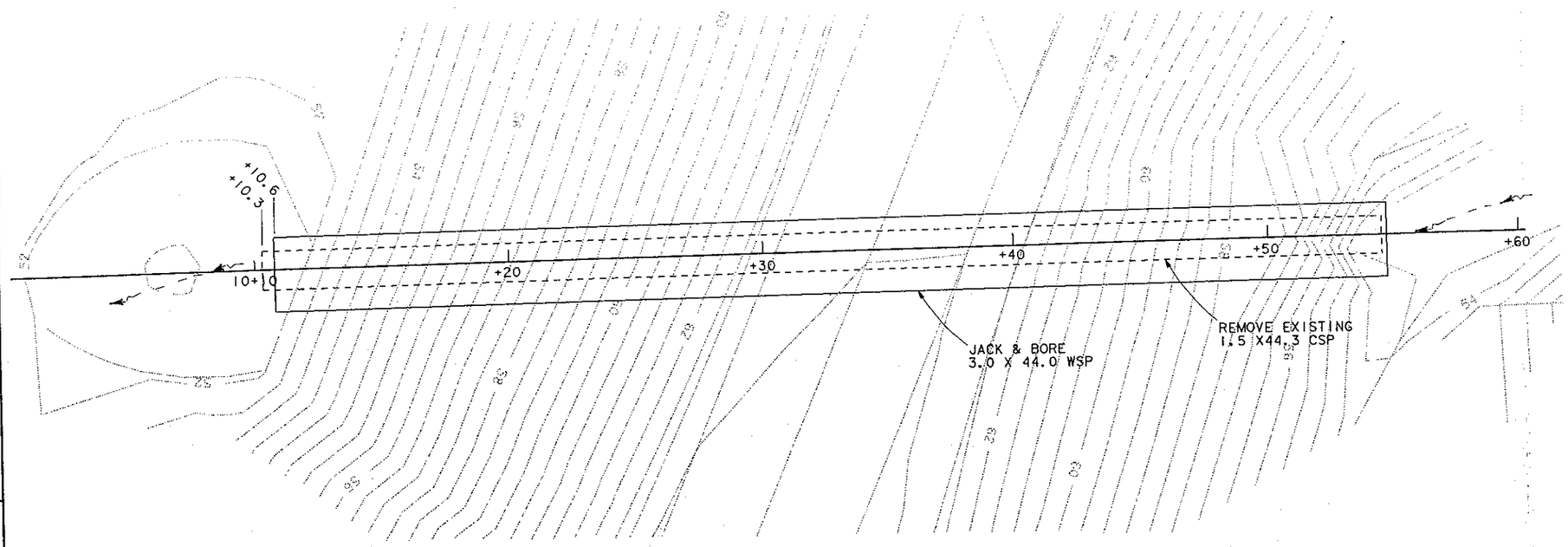
Men-128-PM 21.80, Clow Creek
1500mm CSP
2% Slope
Projecting inlet and outlet

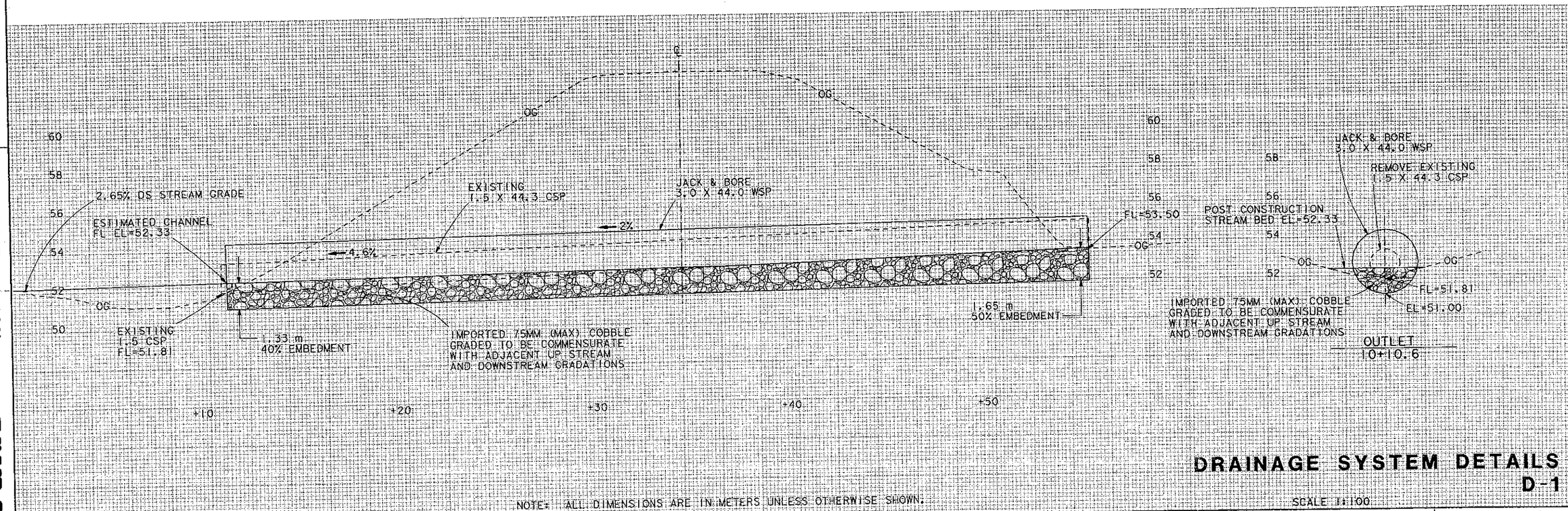


DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
01	Men	128	21.80	1	1

FOR DESIGN STUDY ONLY

Caltrans Metric





DRAINAGE SYSTEM DETAILS
D-1

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

SCALE 1:100

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS

PROJECT ENGINEER: Sebastian Cohen

CALCULATED/DESIGNED BY | CHECKED BY | DATE | REVISED BY | DATE REVISED

DATE PLOTTED => 17-SEP-2003

LAST REVISION 00-00-00

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => tldonh
DGN FILE => 128_2180_001.dgn

CU 03230

EA 378101

SR 128 / PM 27.54 Graveyard Creek

Graveyard Creek

Men-128-PM 27.54

Existing: 2100 mm (7ft) x 72.2m (236.88 ft) SSPP @ 2.8% slope
Active Channel Width=4.3ft
2.1% DS Channel Grade

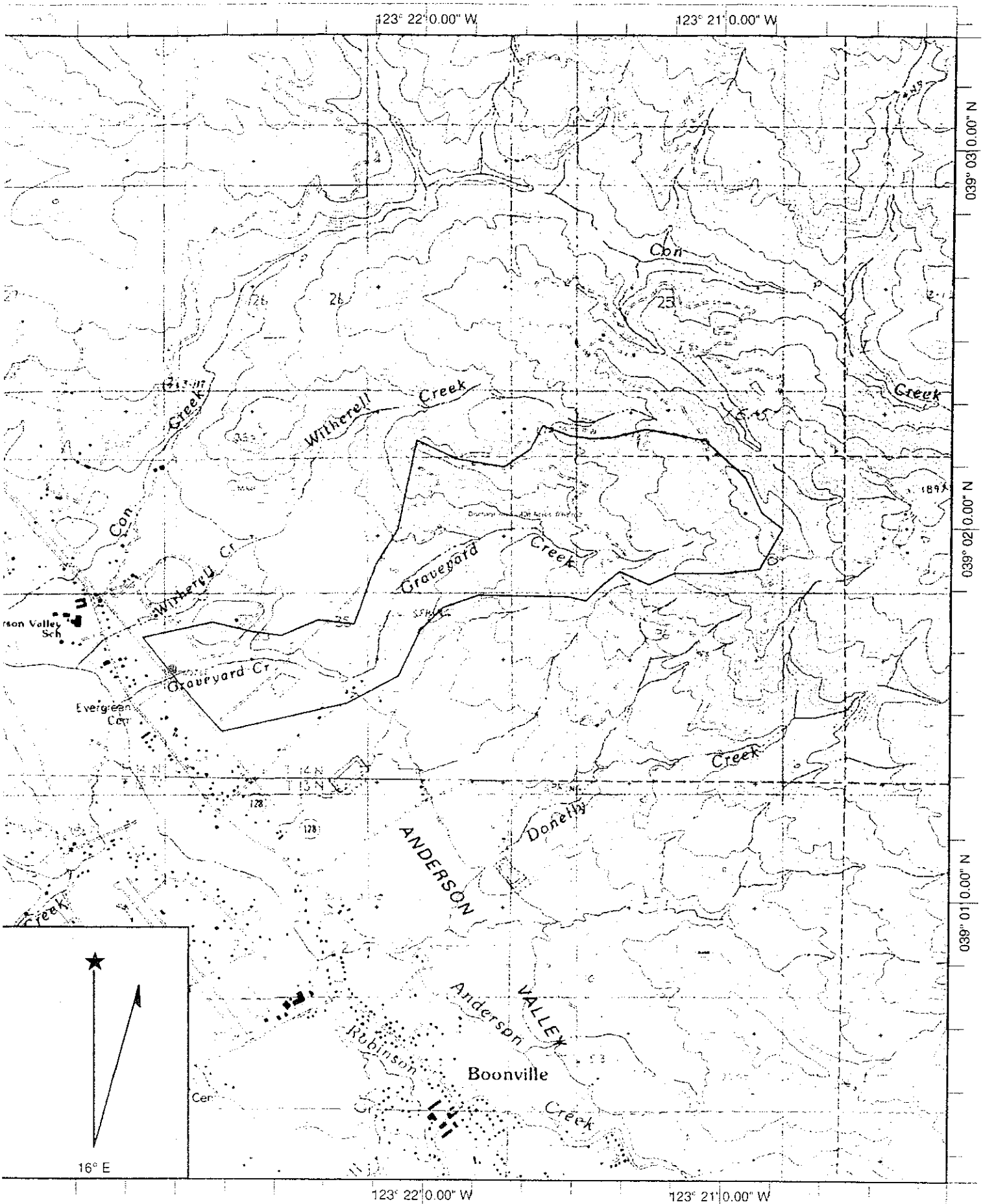
Proposed: Remove 9.6m of SSPP from Inlet, Place Roughened Channel Inside 62.7m of Existing SSPF
Place Headwall & Endwall, Re-Grade Inlet Channel and Re-Vegetate, Place Two Concrete Weirs @ Outlet

	*Existing Conditions				**Proposed Conditions			
Adult Anadromous	**Velocities (fps)**	**Depths (ft)**	**Flow Area (ft^2)**	**EDF**	**Velocities (fps)**	**Depths (ft)**	**Flow Area (ft^2)**	**EDF**
Lower Q50% (cfs) 3.00	3.96	0.36	0.75	6.99	3.06	0.43	0.90	5.82
Upper Q1% (cfs/cfs) 15.31	6.48	0.78	2.35	11.38	4.66	0.98	3.00	8.92
Resident Trout								
Lower Q90% (cfs) 2.00	3.5	0.3	0.57	6.13	3.18	0.47	1.03	3.39
Upper Q5% (cfs) 5.18	4.67	0.47	1.11	8.15	3.52	0.57	1.36	6.65
Juvenile Salmonids								
Lower Q95% (cfs) 1.00	2.83	0.22	0.36	4.85	2.32	0.25	0.40	4.37
Upper Q10% (cfs) 2.64	3.81	0.34	0.69	6.68	2.96	0.40	0.81	5.69

			Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D	Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D
Q10=	169.1	cfs	13.06	2.59	Inlet	0.84	9.2	3.38	Outlet	0.92
Q100=	295.1	cfs	15.12	3.54	Inlet	1.18	11.23	4.52	Outlet	1.70

NOTES:

* Velocities and depths determined using Culvert Master software program (FHWA Equations) (diam=7.0ft, n=0.024)
** Velocities and depths determined using Culvert Master software program (FHWA Equations) (diam=6.0ft, n=0.060)
Fish Design Flow Rates determined from Exceedence flow curves derived from local gauge stations
Q10 and Q100 flow rates detrmined from Regional Method, based on Q annual of 50 in/yr

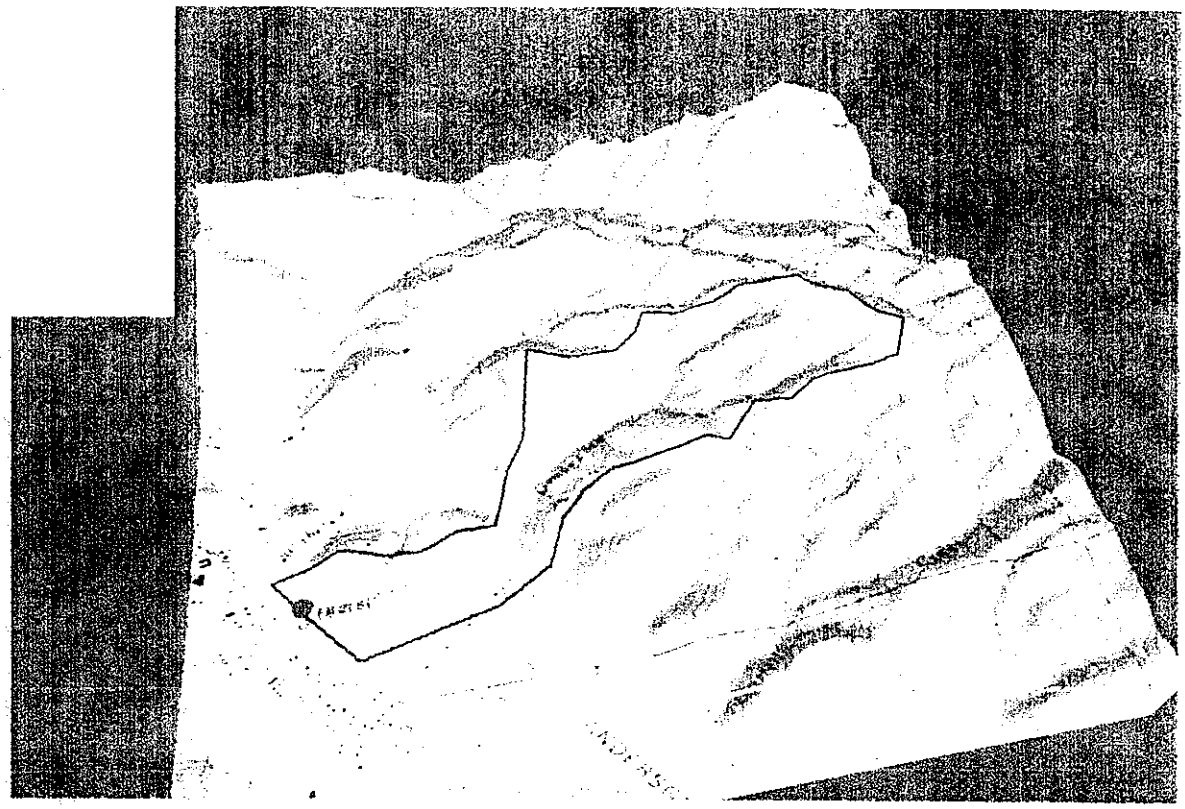


Name: BOONVILLE
Date: 4/8/2003
Scale: 1 inch equals 2000 feet

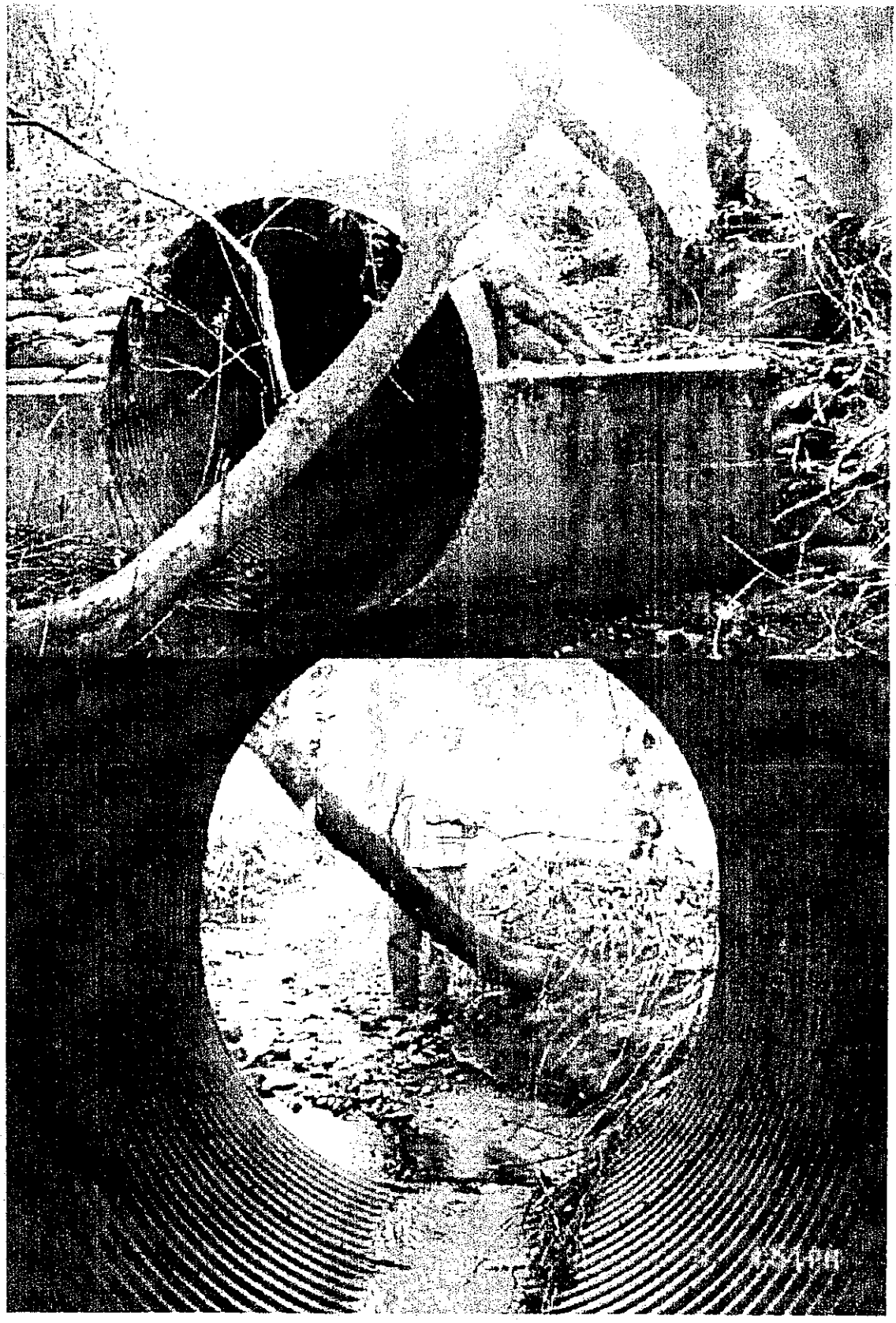
Location: 039° 01' 46.8" N 123° 21' 49.7" W
Caption: Drainage Area = 438 acres. 0.68 mi2

Men-128-PM 27.54

PM 27.54 Graveyard Creek. 2.1m (84") x 71.7m SSPP
Drainage Area = 438 acres, 0.68 mi2
01-378100



Men-128-PM 27.54
72.2m x 2.1m SSPP
2.8% Slope
SFES @ Outlet, Headwall @ Inlet



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
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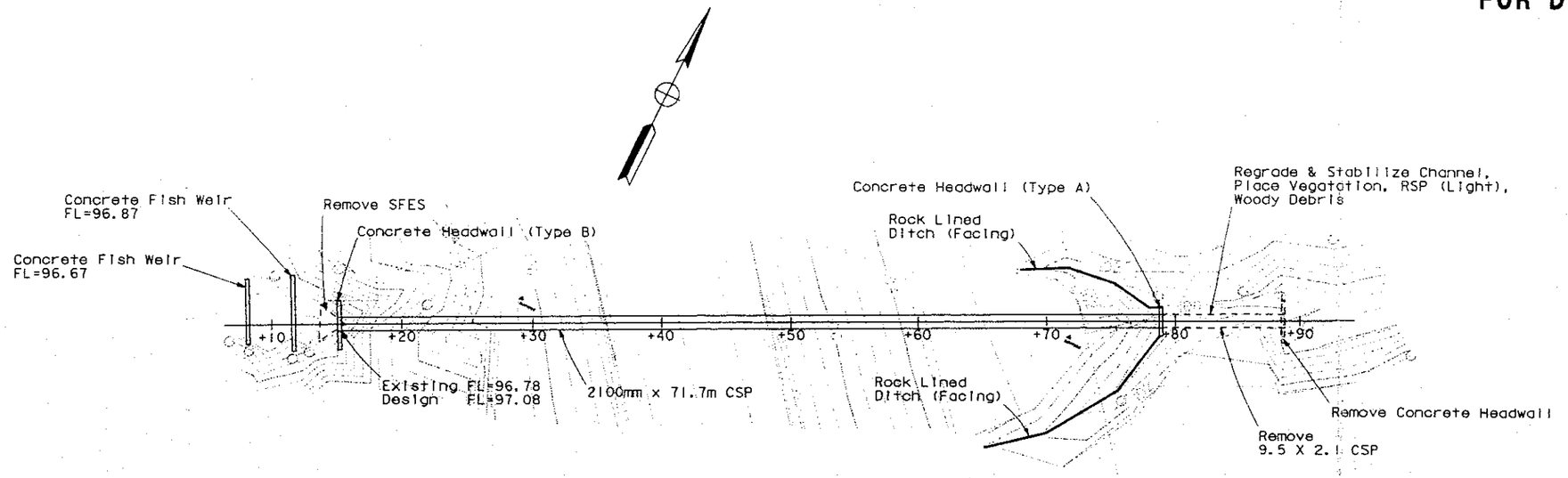
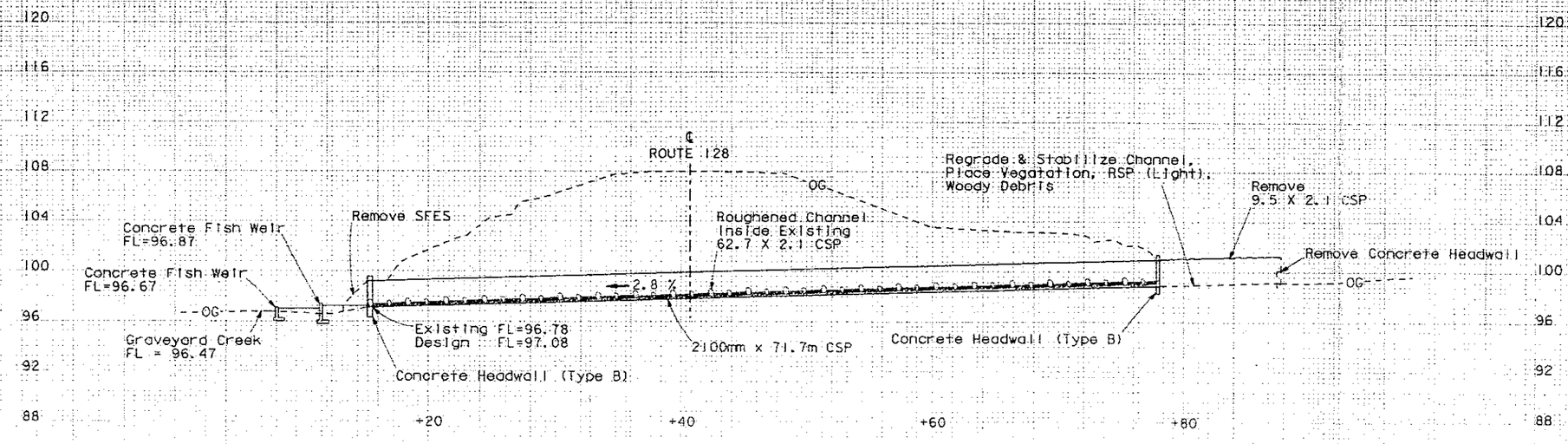
FOR DESIGN STUDY ONLY

Caltrans Metric





NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

DRAINAGE SYSTEM DETAILS

D-1

SCALE 1:200

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => rldonh
DGN FILE => 128.4432.001.dgn

CU 03230

EA 378101

DATE PLOTTED => 17-SEP-2003

LAST REVISION 00 00 00

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

HYDRAULICS

PROJECT ENGINEER Sebastian Cohen

CALCULATED/DESIGNED BY

CHECKED BY

DATE

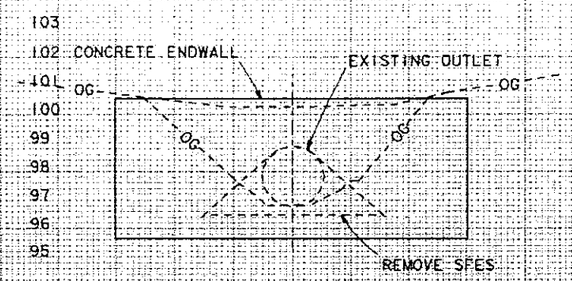
REVISED BY

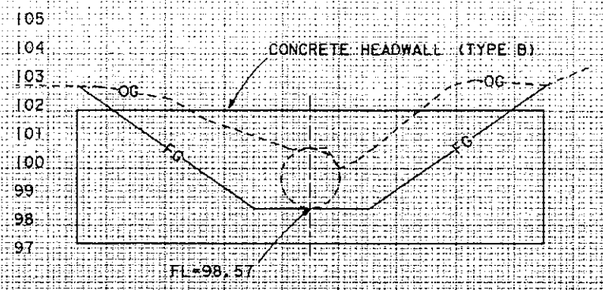
DATE REVISED

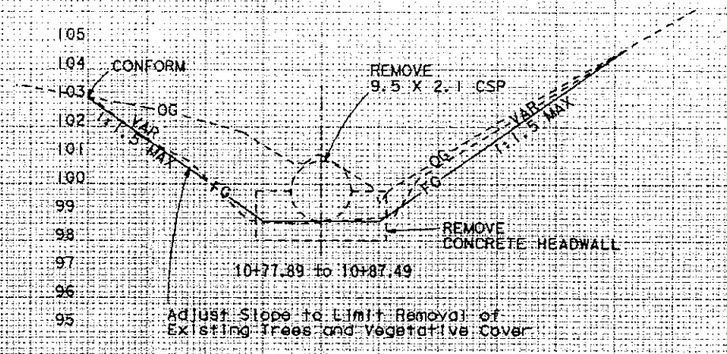
DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Men	128	44.32	2	4

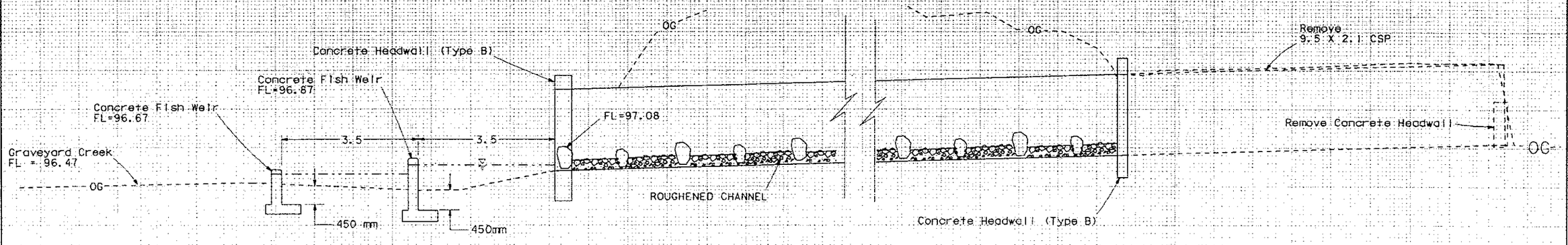
FOR DESIGN STUDY ONLY

Caltrans Metric









HEADWALL AND CHANNEL DETAILS D-2

NO SCALE

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => rtgorm
DGN FILE => 128_4432_002.dgn

CU 03230 EA 378101

PROJECT ENGINEER Sebastian Cohen

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION Caltrans HYDRAULICS

CALCULATED/ DESIGNED BY | CHECKED BY

DATE REVISED | REVISED BY | DATE

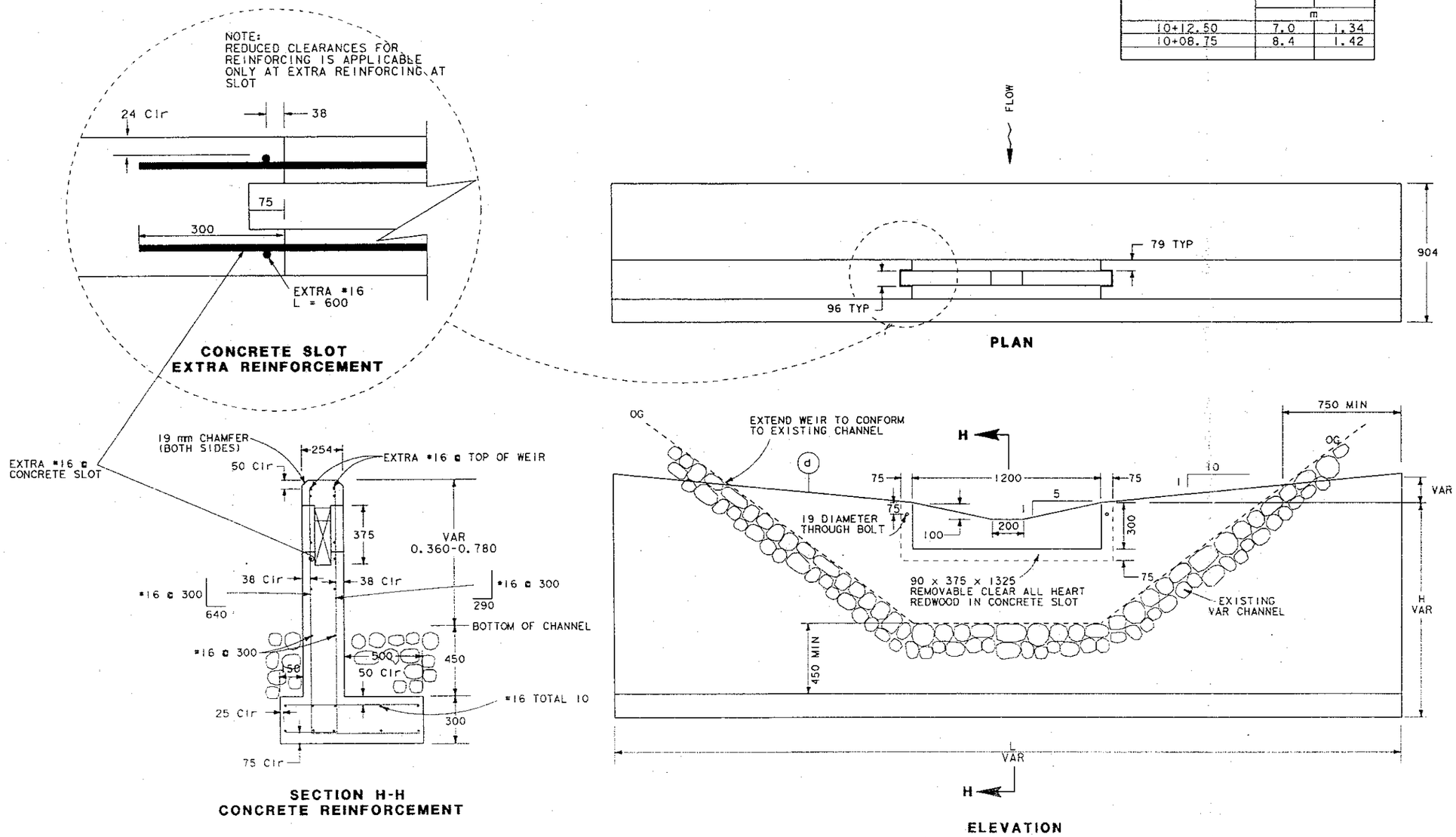
LAST REVISION 10-0- DATE PLOTTED = 14-SEP-2001

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
01	Men	128	44.32	3	4

FOR DESIGN STUDY ONLY

Caltrans Metric

CONCRETE WEIR		
WEIR STATION	H	L
	m	
10+12.50	7.0	1.34
10+08.75	8.4	1.42



NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

FISH WEIR DETAILS
D-3

NO SCALE

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS
PROJECT ENGINEER
Sebastian Cohen
CALCULATED/DESIGNED BY
CHECKED BY
DATE
REVISED BY
DATE REVISED

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => t:\cohn
DGN FILE => 128_4432.003.dgn

CU 03230

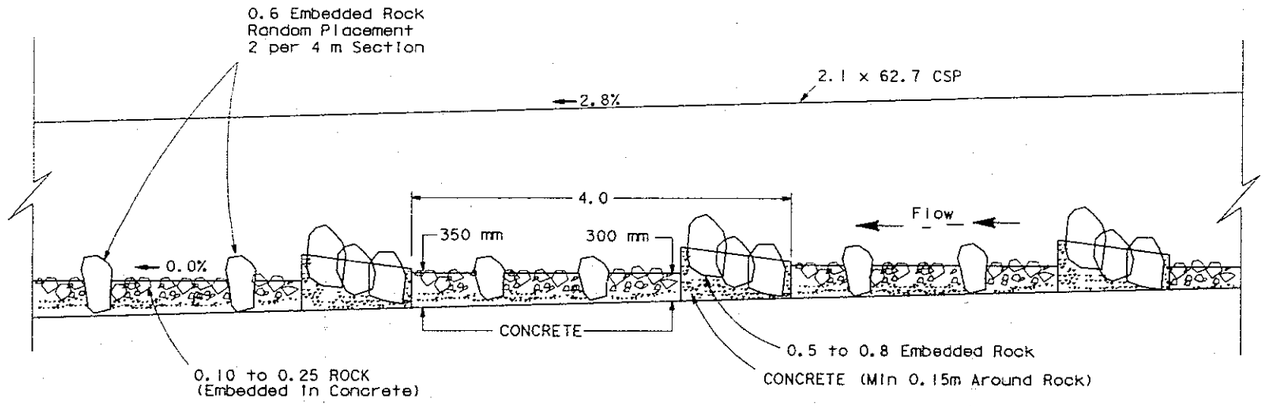
EA 378101

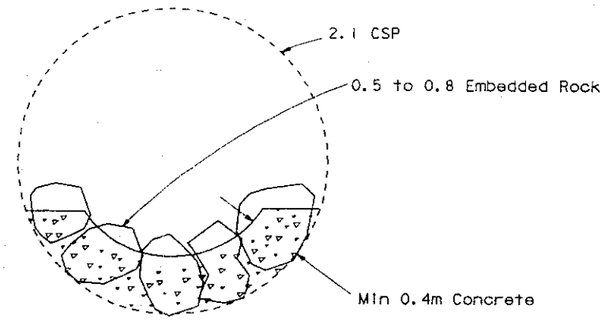
LAST REVISION 00-00-00
DATE PLOTTED => 17 SEP 2003

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Men	128	44.32	4	4

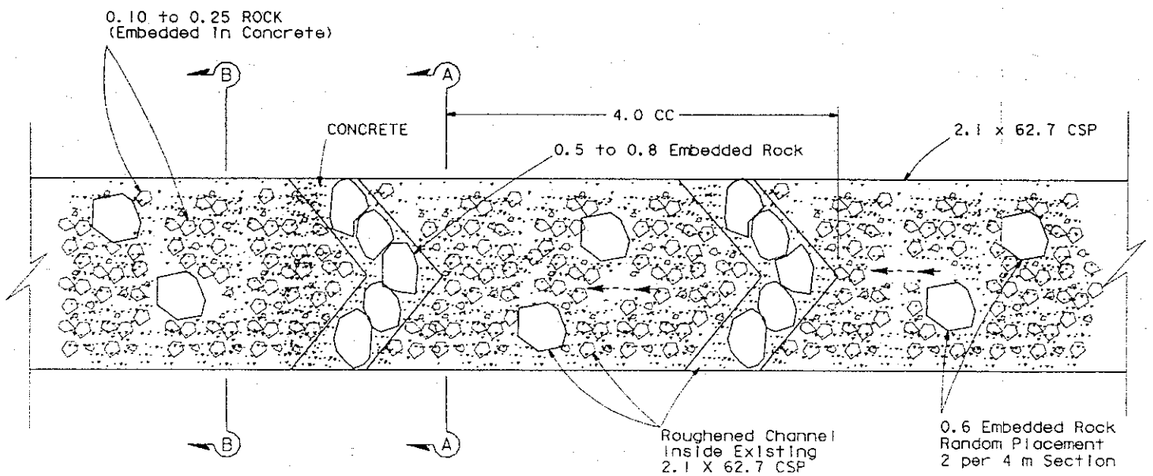
FOR DESIGN STUDY ONLY

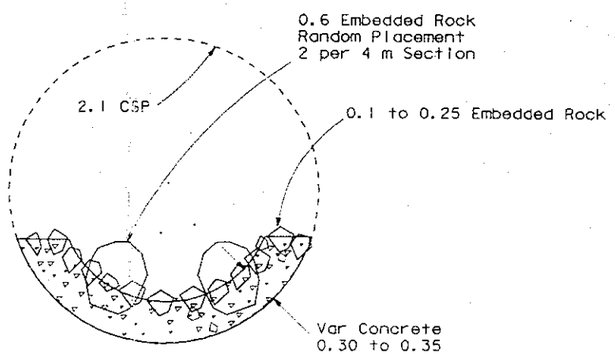
Caltrans Metric





Section A-A





Section B-B

ROUGHENED CHANNEL DETAILS
D-4

NO SCALE

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => sbaldwin
DGN FILE => 128_44R_004.dgn

CU 03230

EA 378101

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS

PROJECT ENGINEER
Sebastian Cohen

DATE	REVISED BY	DATE REVISED

CALCULATED/DESIGNED BY

CHECKED BY

LAST REVISED 30-0-0 PLOTTED => 30/09/2003 - 2:00 PM

SR 128 / PM 36.63 Lost Creek

Lost Creek

Men-128-PM 36.63

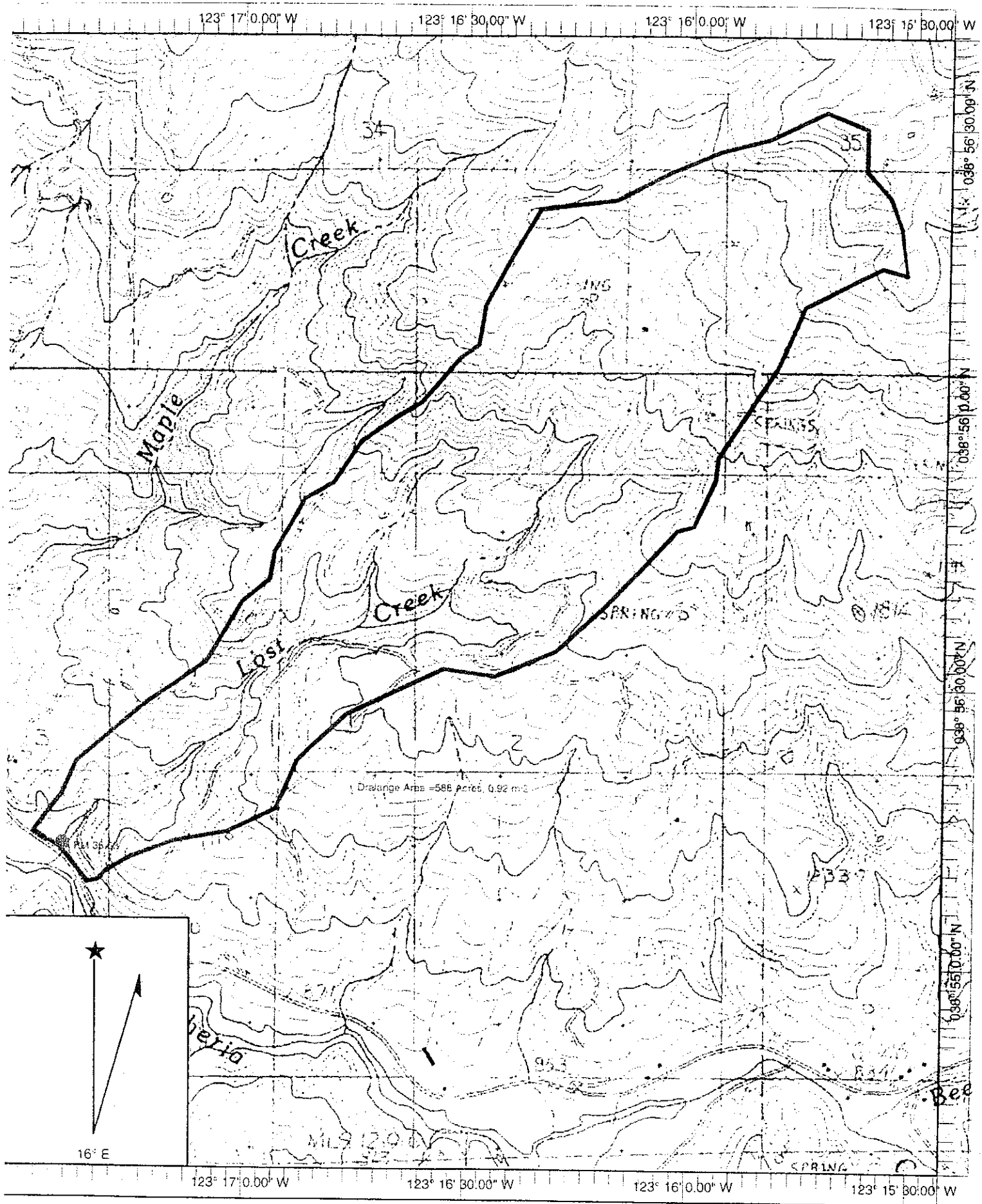
Existing: 2400 mm x 2400mm x 24.6 m (80.65 ft) @ 4.1% slope
Active Channel Width = 12.0ft
4.3% US Channel Grade, 4.0% DS Channel Grade

Proposed: Concrete weirs drill & bonded inside RCB, Pool & Weir style Jump Pools at Outlet

	*Existing Conditions				**Proposed Conditions (in RCB @ weir)					***Proposed Conditions (in Fishway @ Weir)			
Adult Anadromous	Velocities (fps)	Depths (ft)	Flow Area (ft^2)	EDF (culvert)	Velocities (fps)	Depths (ft)	Flow Area (ft^2)	EDF(culvert)	EDF(pool)	Velocities (fps)	Depths (ft)	Flow Area (ft^2)	EDF (pool)
Lower Q50% (cfs) 3.00	4.4	0.09	0.72	10.56	1.61	0.23	1.87	5.85	0.71	1.30	0.15	2.30	0.38
Upper Q1% (cfs/cfs) 20.55	9.32	0.28	2.24	23.24	3.05	0.84	6.73	12.57	4.89	2.48	0.55	8.3	2.6
Resident Trout													
Lower Q90% (cfs) 2.00	3.75	0.07	0.56	9.05	1.40	0.18	1.42	5.20	0.48	1.14	0.12	1.76	0.25
Upper Q5% (cfs) 6.96	6.12	0.14	1.12	15.74	2.13	0.41	3.27	7.49	1.66	1.73	0.27	4.03	0.88
Juvenile Salmonids													
Lower Q95% (cfs) 1.00	2.65	0.04	0.32	7.92	1.11	0.11	0.90	3.90	0.24	0.90	0.07	1.11	0.13
Upper Q10% (cfs) 3.55	4.7	0.09	0.72	12.49	1.70	0.26	3.27	6.15	0.84	1.38	0.17	2.57	0.45

			Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D	Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D
Q10=	193	cfs	17.34	1.39	Inlet	0.17	6.44	3.75	Outlet	0.47
Q100=	381	cfs	19.83	2.4	Inlet	0.3	8.08	5.89	Outlet	0.74

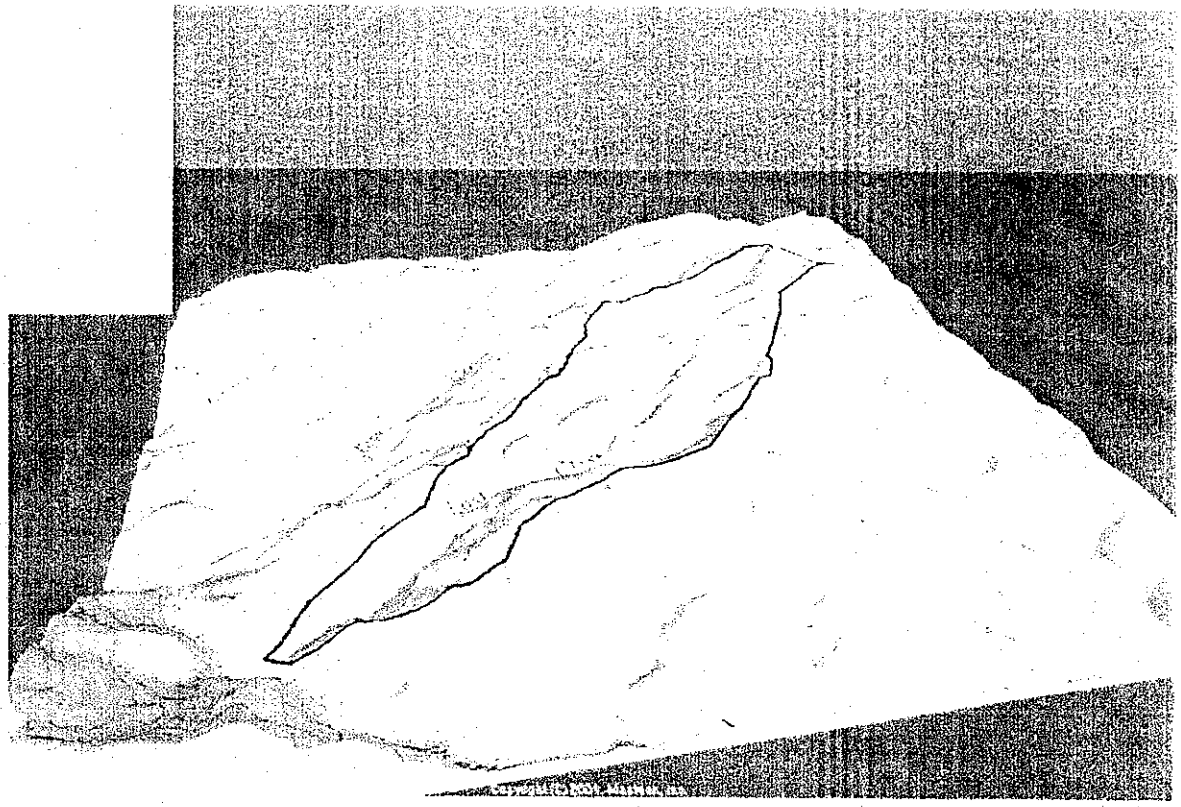
NOTES:
* Velocities and depths determined using Culvert Master software program (FHWA Equations) (diam=8.0ft x 8.0ft RCB, n=0.012)
** Velocities and depths at weir, EDF (pool) assumes pool & wier hydraulics, EDF (culvert) assumes culvert hydraulics (roughened channel)
*** Velocities and depths at wier, assumes pool & weir hydraulics
Fish Design Flow Rates determined from Exceedence Flow Curves derived from local gauge stations
Q10 and Q100 flow rates detrmined from Regional Method, based on Q annual of 50 in/yr



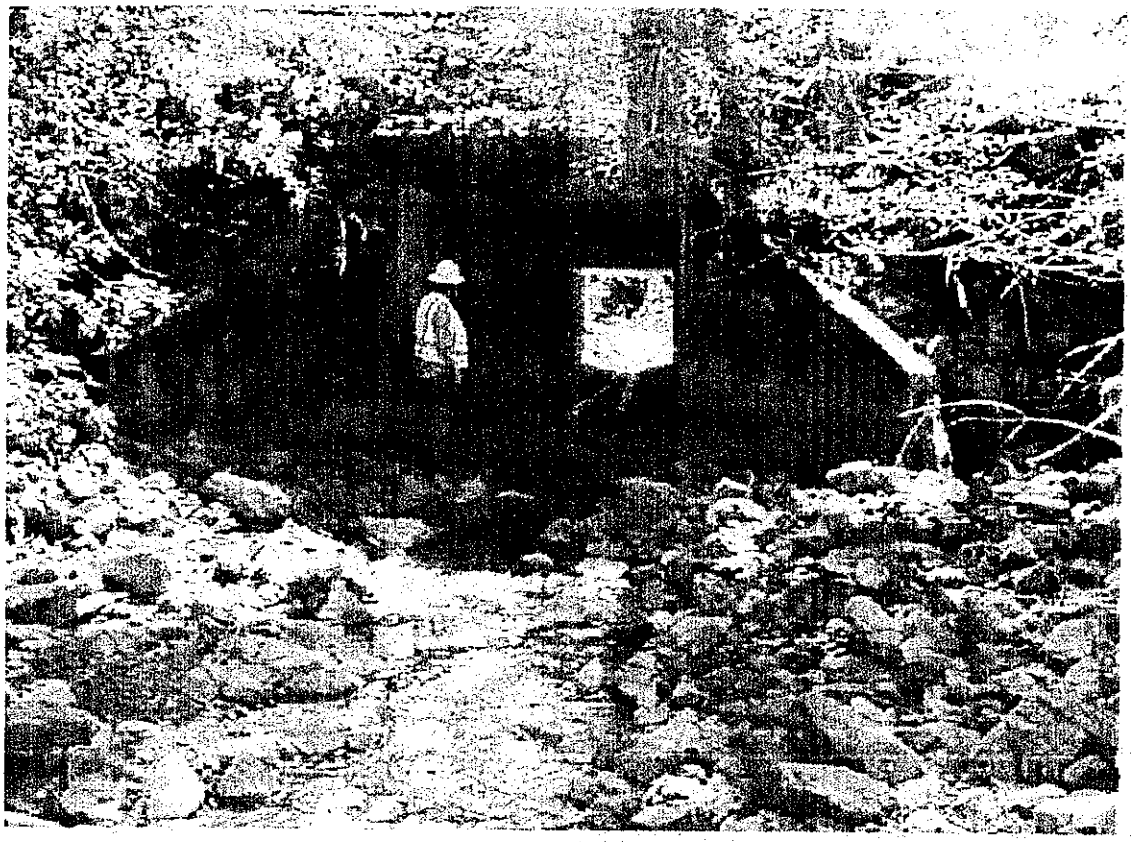
Name: ORNBAUN VALLEY
Date: 4/8/2003
Scale: 1 inch equals 1333 feet

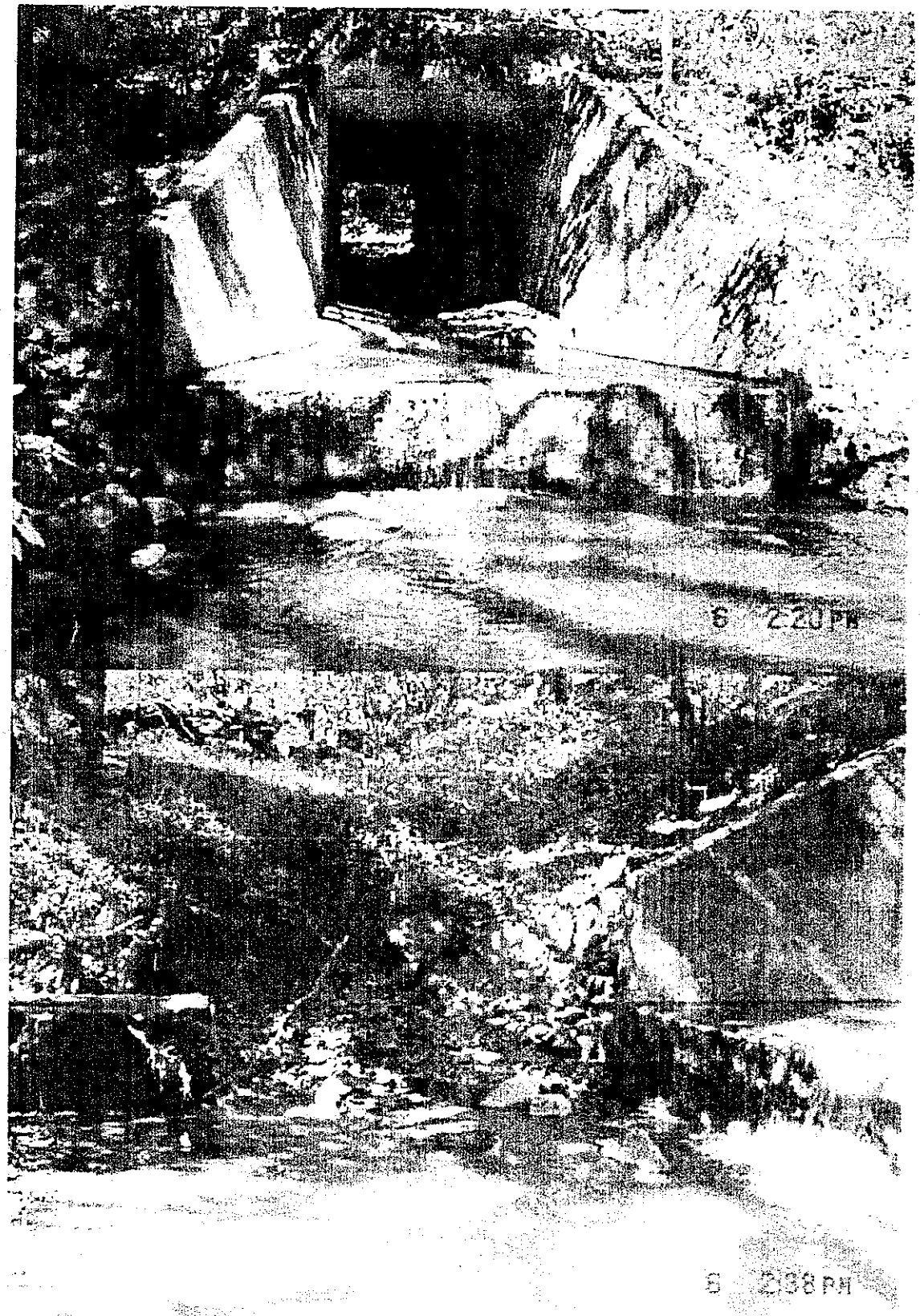
Location: 038° 55' 39.0" N 123° 16' 29.1" W
Caption: Men-128-PM 36.63
Drainage Area 588 Acres. 0.92 mi2
2.4m x 2.4m x 24.6m RCB

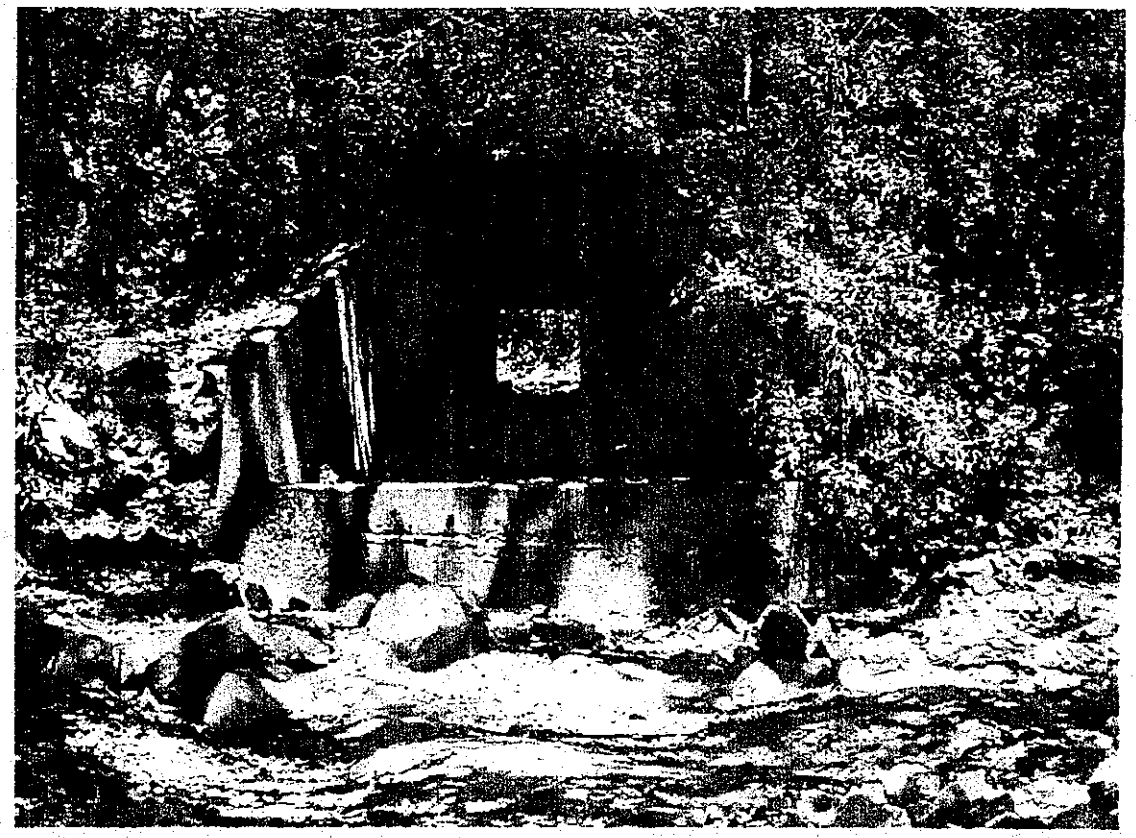
2.4m X 2.4m x 24.6m RCB Culvert @ Men-128-PM 36.63 Lost Creek
Drainage Area = 588 acres. 0.92 mi2
01-378100



Men-128-PM 36.63
24.6m x 2.4m x 2.4m RCB
4.1 % Slope
headwall & wingwalls @ inlet and outlet



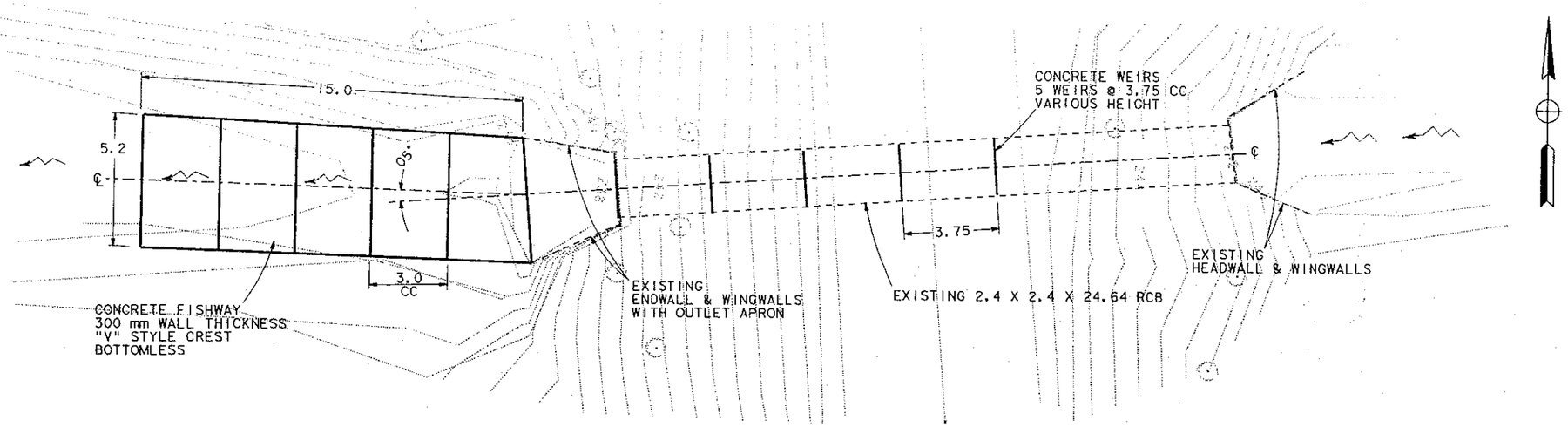

6 2:20PM
6 2:38PM

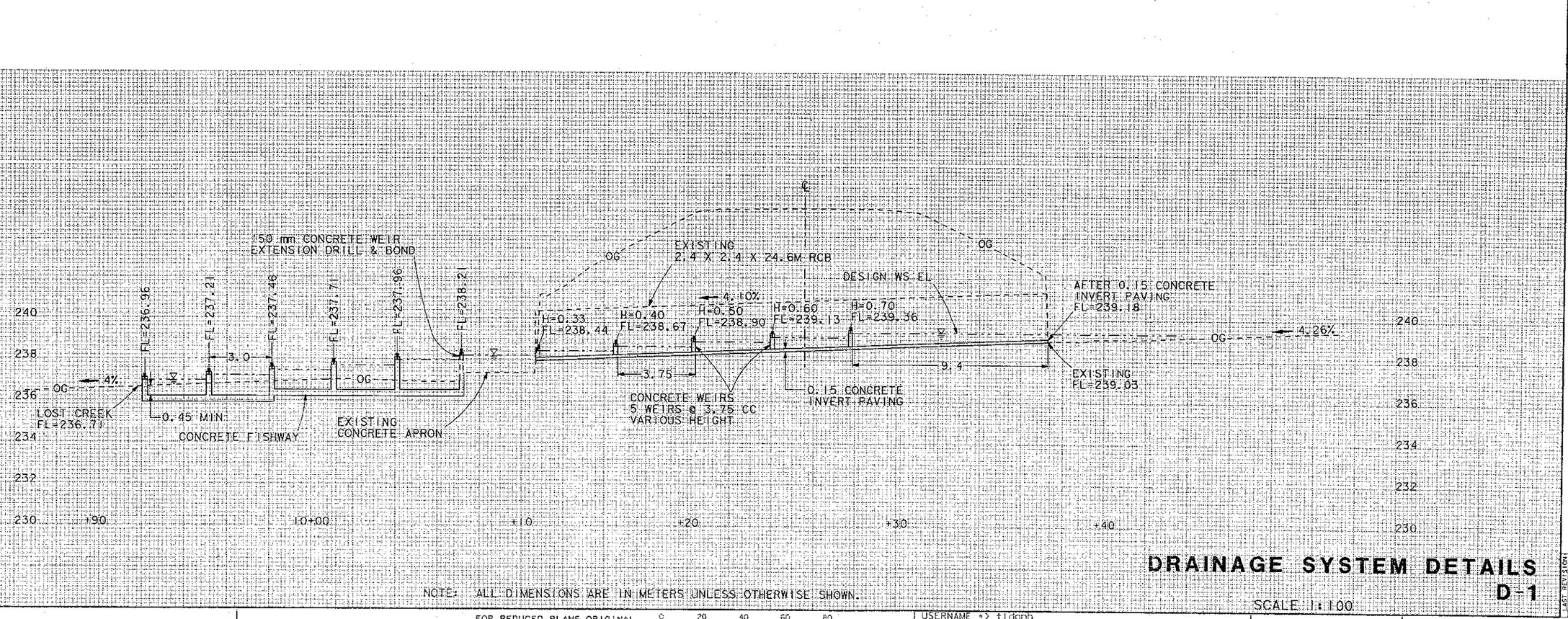


DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Men	128	36.63	1	2

FOR DESIGN STUDY ONLY

Caltrans Metric





DRAINAGE SYSTEM DETAILS D-1

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

SCALE 1:100

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => tidonh
DGN FILE => 128_3663_0001.dgn

CU 03230

EA 378101

LAST REVISION 00-00-00

DATE PLOTTED => 17-SEP-2003

DATE	REVISED BY	DATE REVISED

CALCULATED/DESIGNED BY

CHECKED BY

PROJECT ENGINEER: Sebastian Cohen

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

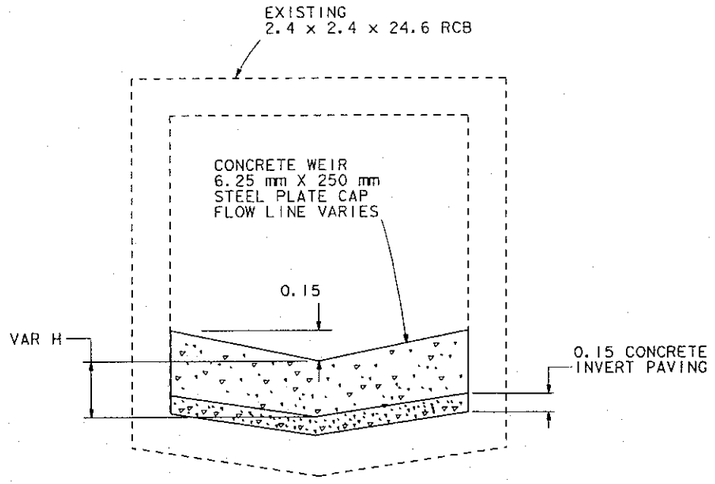
Caltrans

HYDRAULICS

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Men	128	36.63	2	2

FOR DESIGN STUDY ONLY

Caltrans Metric



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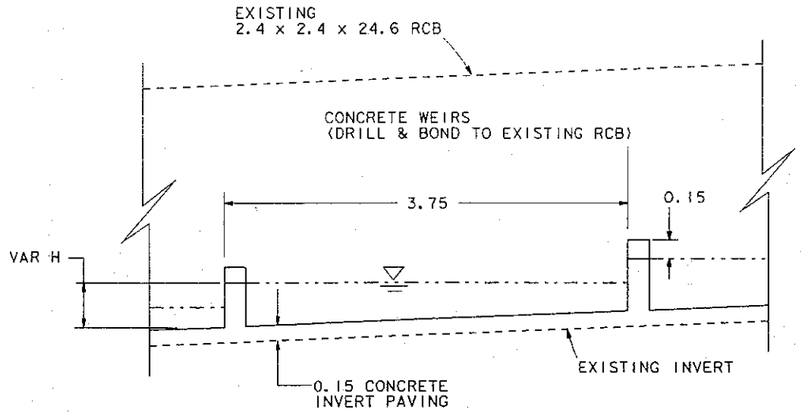
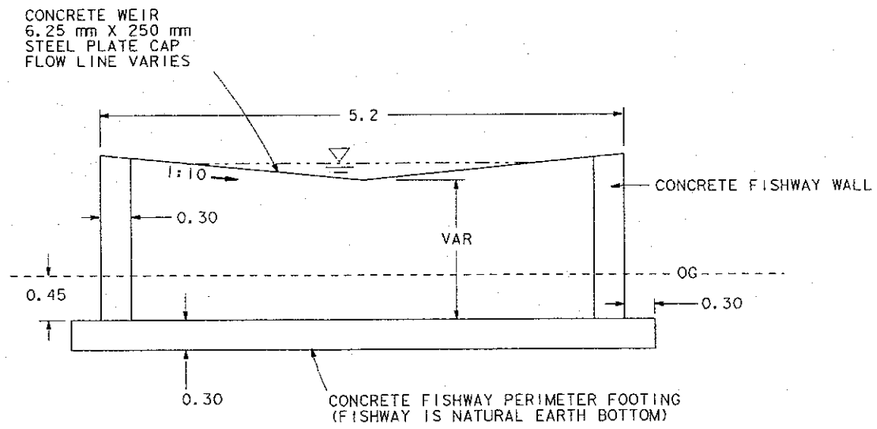


PROFILE

CONCRETE WEIR



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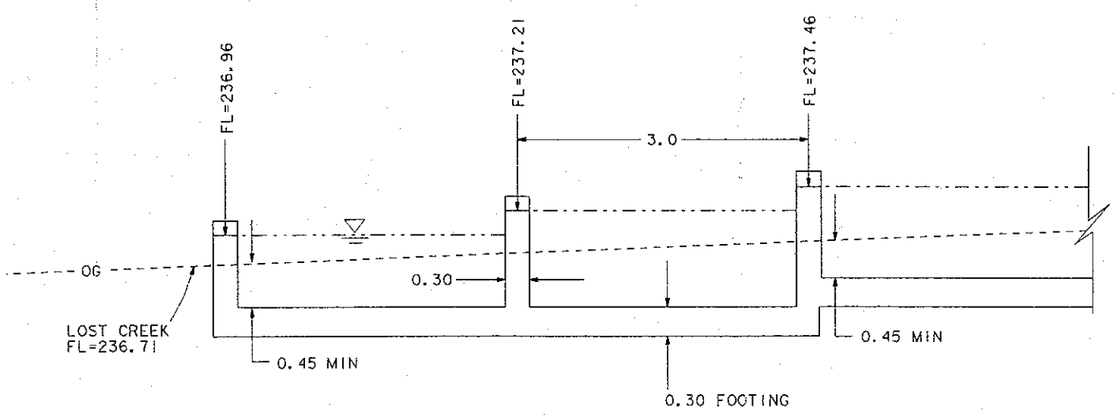


PROFILE

CONCRETE FISHWAY

DRAINAGE SYSTEM DETAILS D-2

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

NO SCALE

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => tidonh
DGN FILE => 128_3663_002.dgn

CU 03230

EA 378101

LAST REVISION 00-0 DATE PLOTTED => 12-FEB-2007

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans HYDRAULICS
PROJECT ENGINEER Sebastian Cohen
CALCULATED/ DESIGNED BY
CHECKED BY
DATE REVISED BY
DATE REVISED

SR 128 / PM 39.88 John Hiatt Creek

Beebee Creek

Men-128-PM 39.88

Existing: 2100 mm (7ft) x 55.5 m (181 ft) SSPP @ 2.69% slope
Active Channel Width = 13.7ft
4.8 % US Channel Grade, 1.2% DS Channel Grade

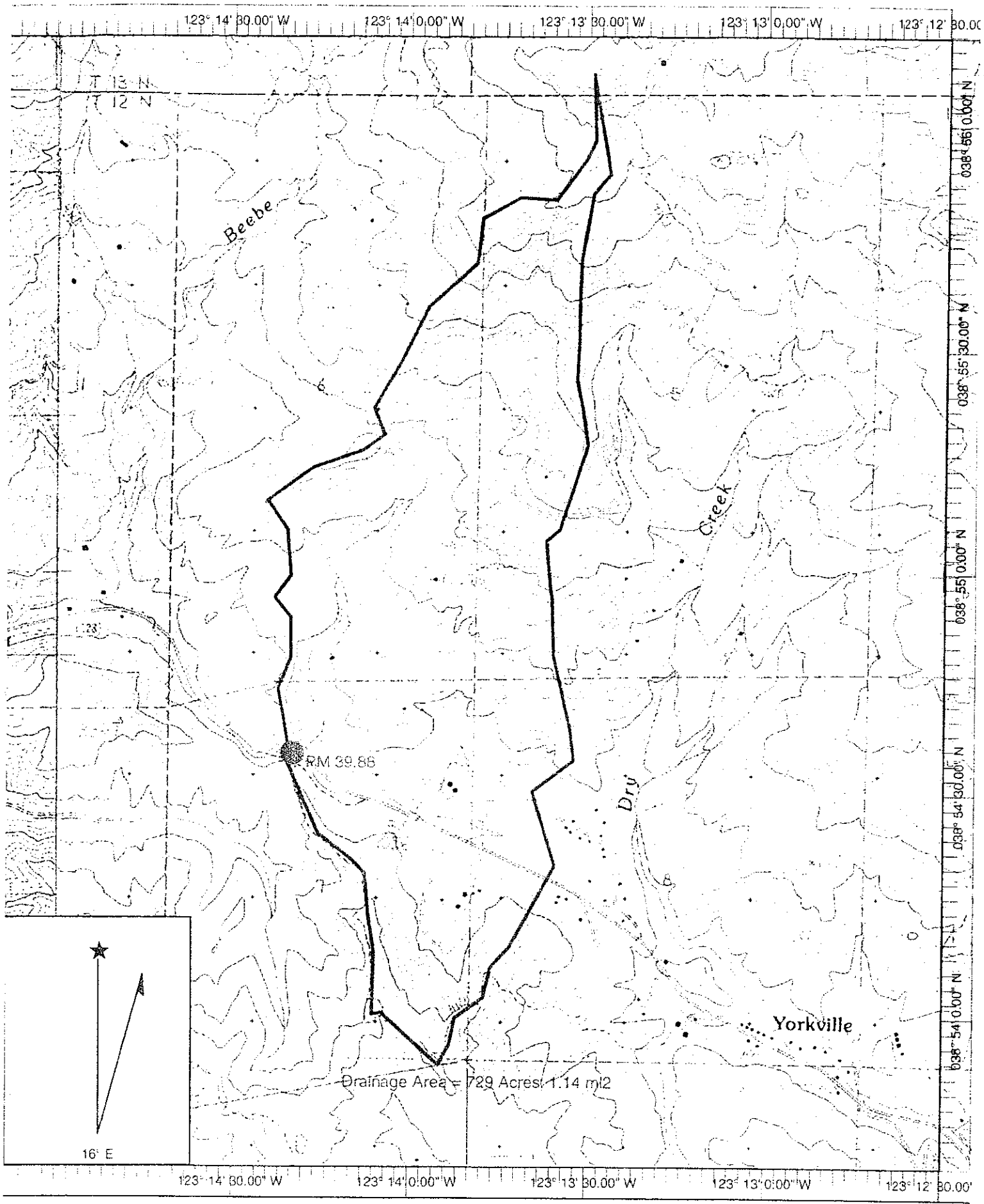
Proposed: Roughened Channel Design, Concrete Weirs and RSP @ Outlet, Bank stabilization RSP on channel bank at outlet.

	*Existing Conditions				**Proposed Conditions			
Adult Anadromous	**Velocities (fps)**	**Depths (ft)**	**Flow Area (ft^2)**	**EDF**	**Velocities (fps)**	**Depths (ft)**	**Flow Area (ft^2)**	**EDF**
Lower Q50% (cfs) 3.00	5.97	0.27	0.49	10.28	3.06	0.43	0.98	5.14
Upper Q1% (cfs/cfs) 25.48	11.44	0.75	2.2	19.44	5.34	1.27	4.76	8.99
Resident Trout								
Lower Q90% (cfs) 2.00	5.28	0.23	0.39	8.61	2.76	0.35	0.72	4.66
Upper Q5% (cfs) 8.63	8.24	0.45	1	14.49	4.01	0.73	2.13	6.80
Juvenile Salmonids								
Lower Q95% (cfs) 1.00	4.27	0.16	0.22	7.63	2.32	0.25	0.44	3.81
Upper Q10% (cfs) 4.40	6.85	0.32	0.63	11.72	3.38	0.52	1.29	5.73

			Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D	Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D
Q10=	225.9	cfs	19.09	2.42	Inlet	0.9	10.48	4.02	Outlet	1.28
Q100=	459.6	cfs	22.07	3.73	Inlet	1.47	15	5.65	Outlet	5.46

NOTES:

* Velocities and depths determined using Culvert Master software program (FHWA Equations) (diam=7.0ft, n=0.024)
** Velocities and depths determined using Culvert Master software program (FHWA Equations) (diam=6.0ft, n=0.060)
Fish Design Flow Rates determined from Exceedence flow curves derived from local gauge stations
Q10 and Q100 flow rates detrmined from Regional Method, based on Q annual of 50 in/yr



Name: YORKVILLE
Date: 4/8/2003
Scale: 1 inch equals 1666 feet

Location: 038° 54' 55.9" N 123° 13' 49.2" W
Caption: Men-128-PM 39.88
2.1m x 55.2m SSPP w/ Invert Paving

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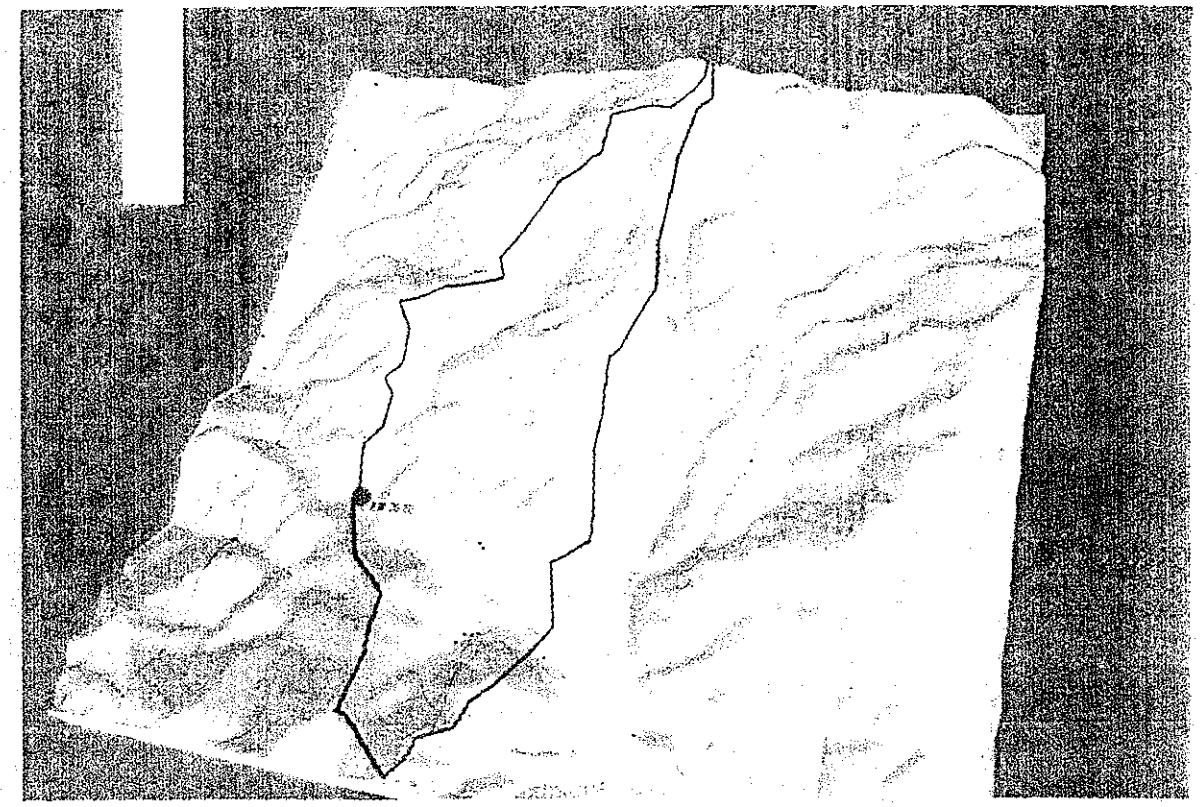
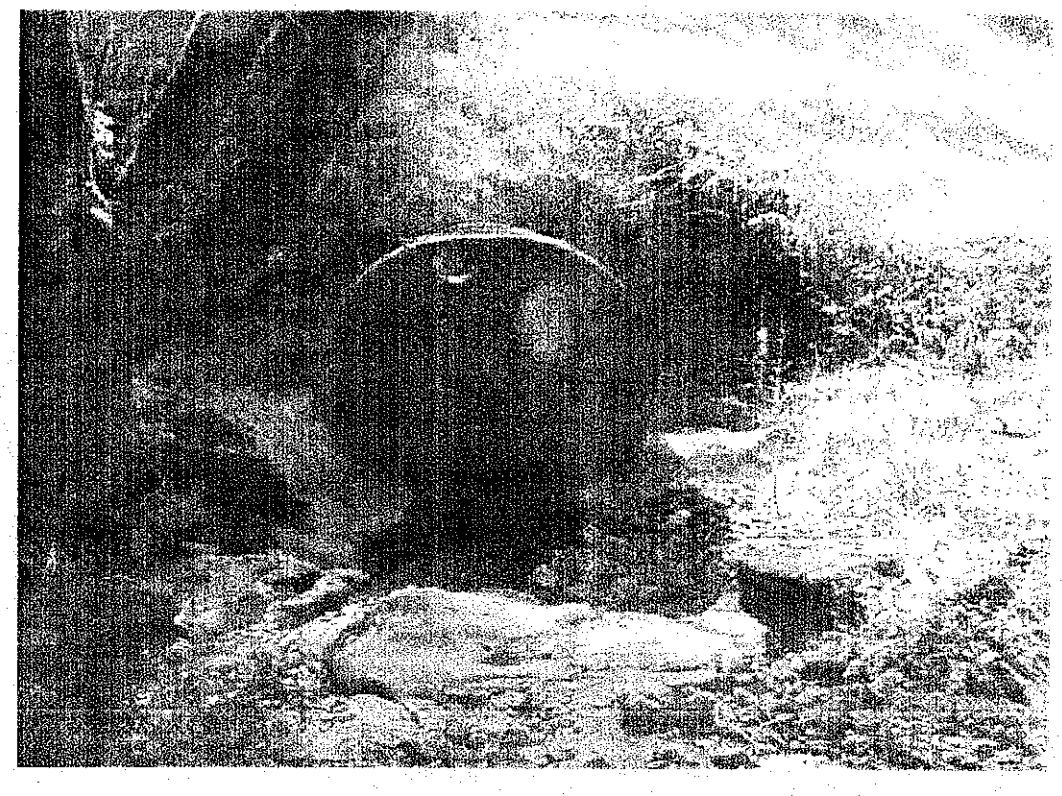
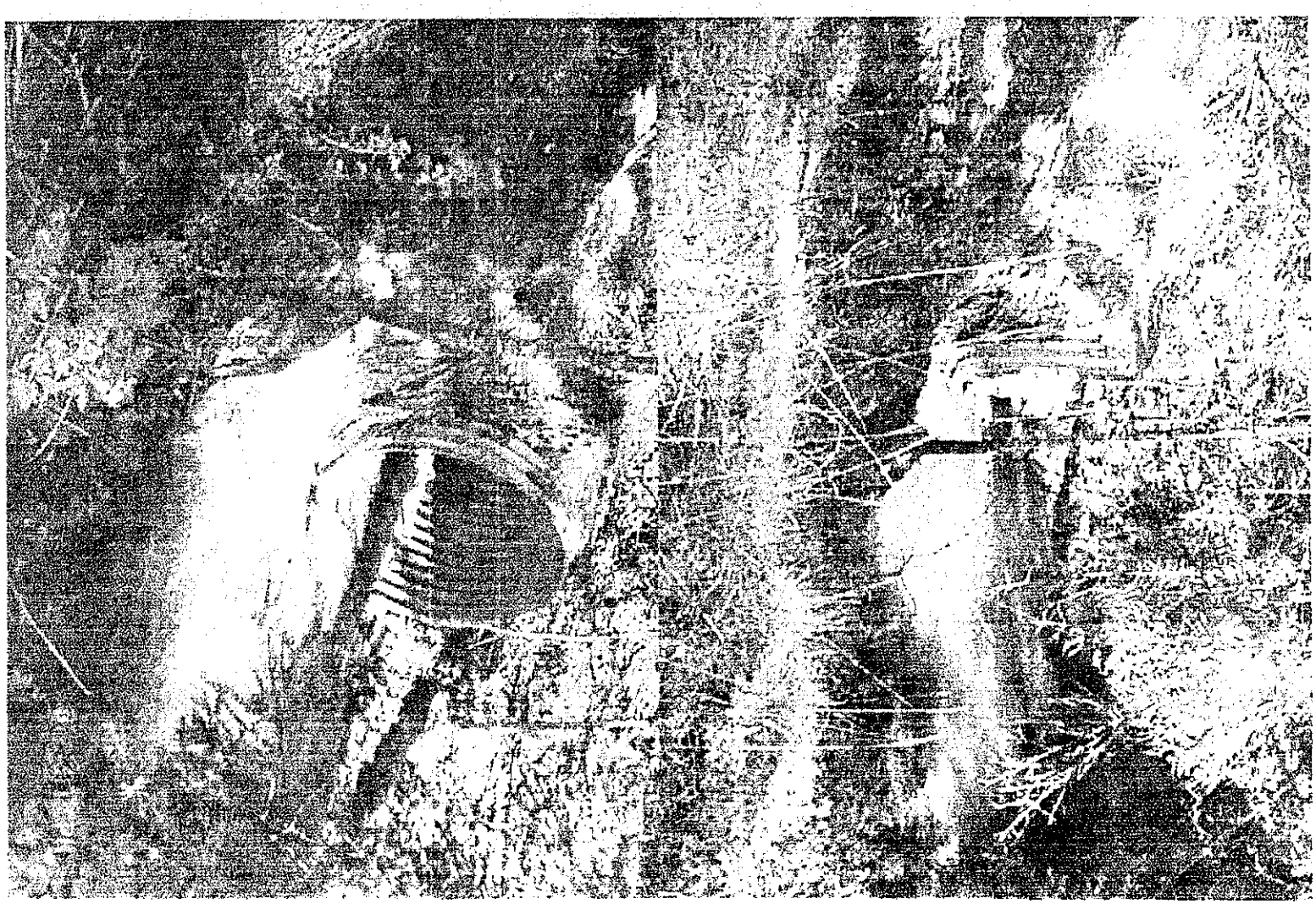
John Hiatt

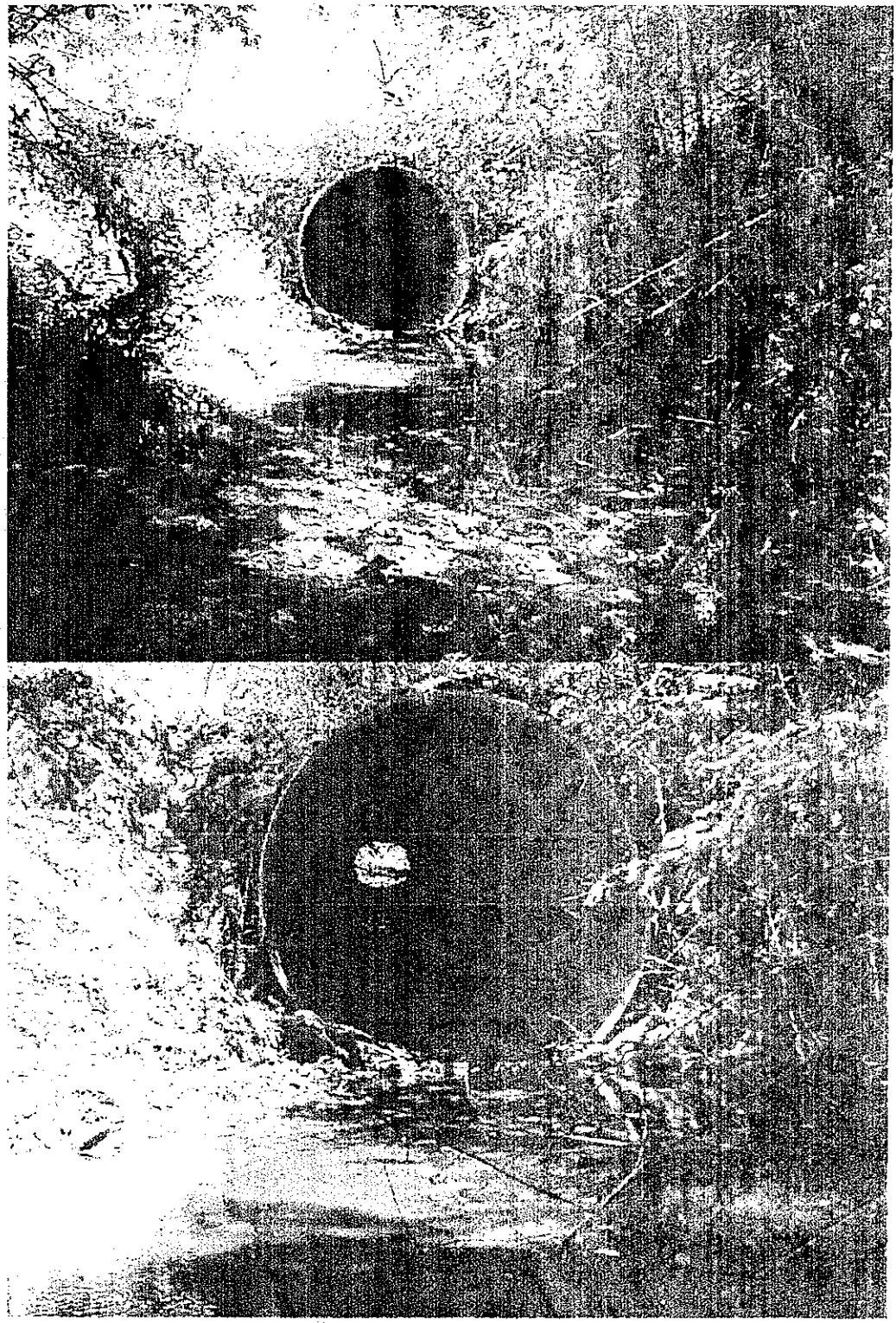
PM 39.88 [redacted] Creek, 2.1m x 55.2m CSP w/ Invert Paving
Drainage Area = 729 Acres, 1.14 mi2
01-378100



Men-128-PM 39.88, John Hiatt Creek
55.2m x 2.1m CSP with concrete invert paving
2.69 % Slope
Projecting inlet and outlet



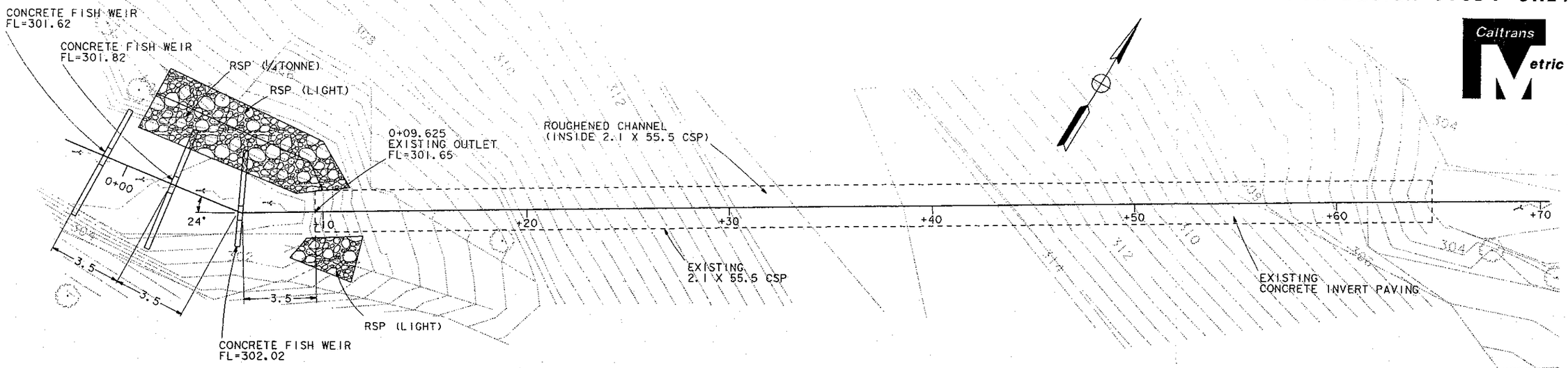


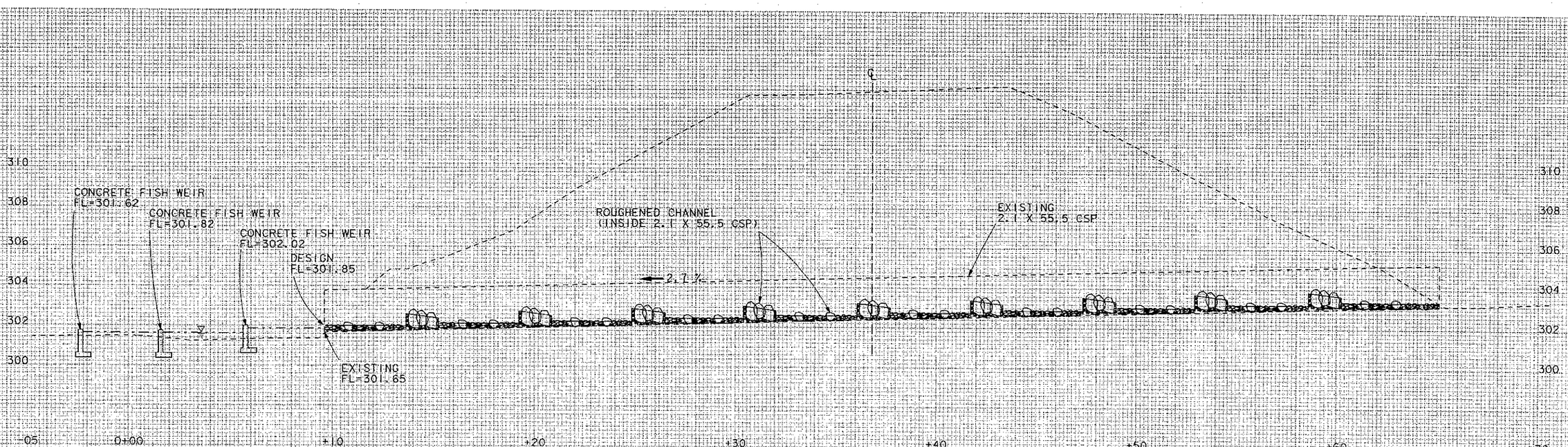


DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
01	Men	128	39.88	1	4

FOR DESIGN STUDY ONLY

Caltrans Metric





DRAINAGE SYSTEM DETAILS
D-1

SCALE 1:100

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS

PROJECT ENGINEER
Sebastian Cohen

CALCULATED/ DESIGNED BY

CHECKED BY

DATE	REVISED BY	DATE REVISED

LAST REVISION 00-00-00

DATE PLOTTED => 17-SEP-2003

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => fldonh
DGN FILE => 128_3988_001.dgn

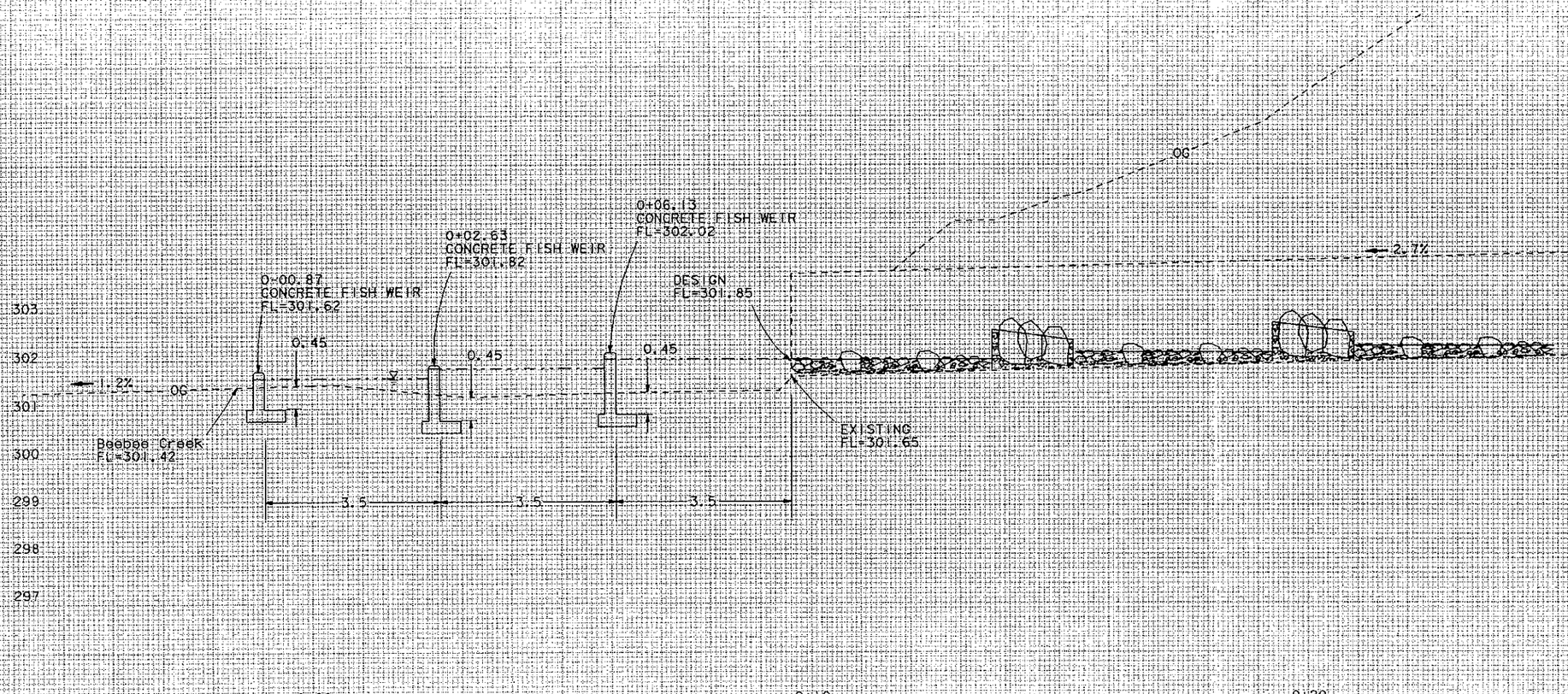
CU 03230

EA 378101

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
01	Men	128	39.88	2	4

FOR DESIGN STUDY ONLY

Caltrans Metric



NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

DRAINAGE SYSTEM DETAILS
D-2

SCALE 1:50

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	PROJECT ENGINEER
Caltrans HYDRAULICS	Sebastian Cohen

DATE	REVISED BY	DATE REVISED

CALCULATED/ DESIGNED BY

CHECKED BY

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => tldonh
DGN FILE => 128_3998_002.dgn

CU 03230

EA 378101

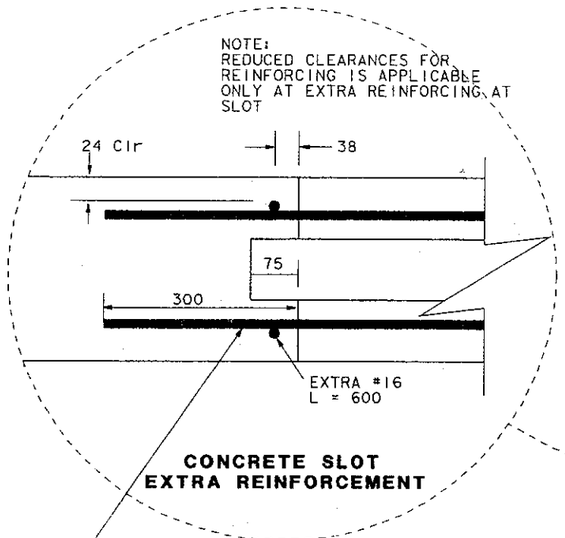
LAST REVISION 10-01-200-

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
01	Men	128	39.88	3	4

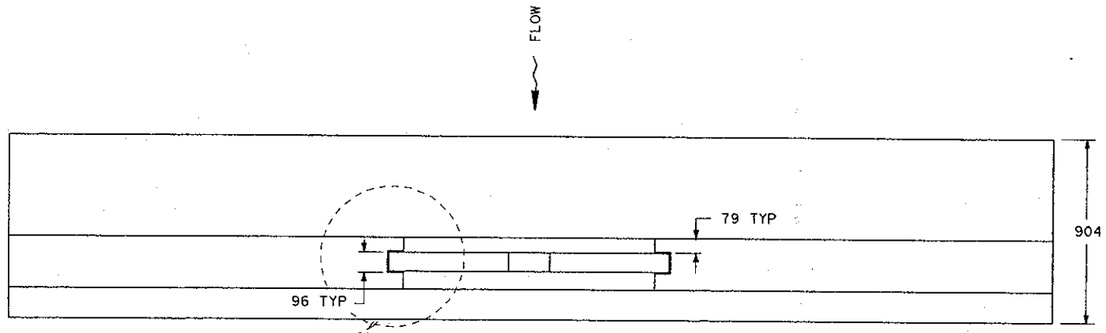
FOR DESIGN STUDY ONLY

Caltrans Metric

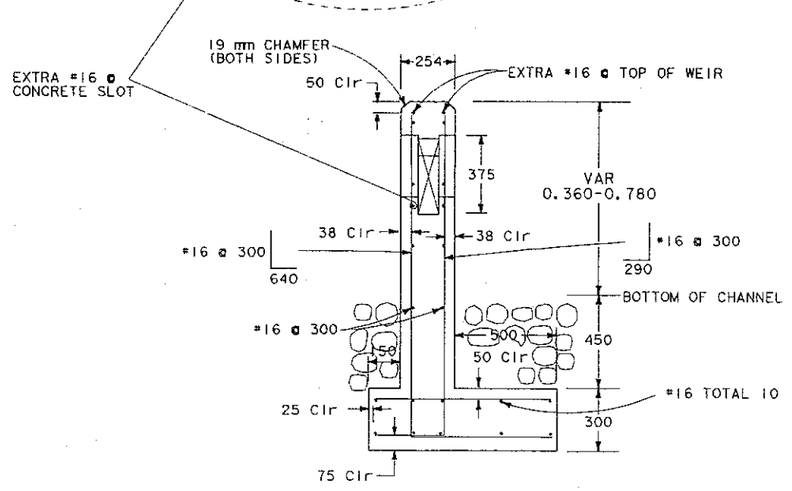
CONCRETE WEIR		
WEIR STATION	H	L
	m	
0-0.87	0.6	6.00
0+2.63	1.0	6.40
0+6.13	1.2	4.85



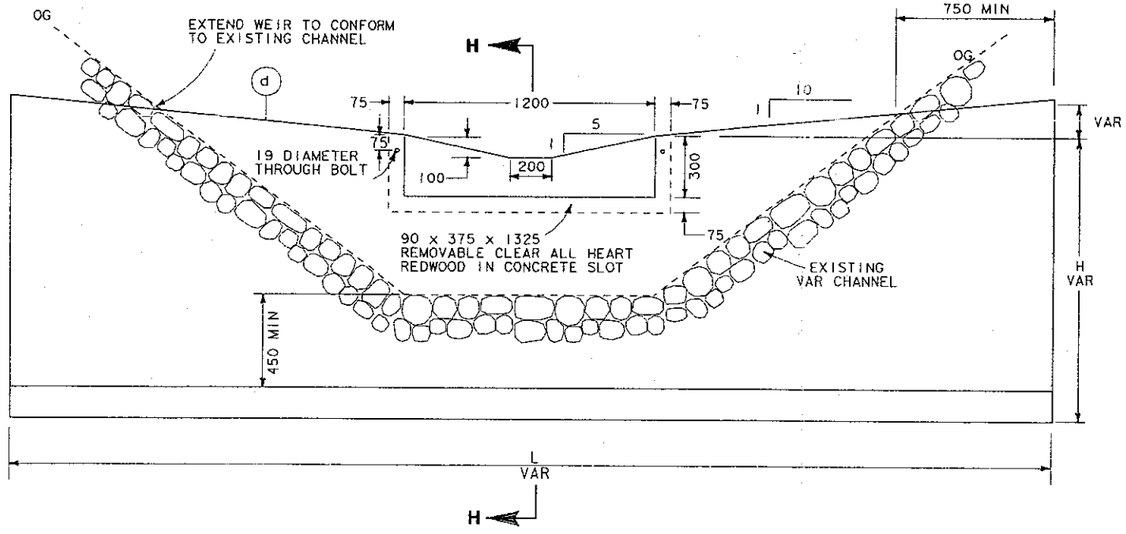
CONCRETE SLOT EXTRA REINFORCEMENT



PLAN



SECTION H-H CONCRETE REINFORCEMENT



ELEVATION

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

FISH WEIR DETAILS

D-3

NO SCALE

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS
PROJECT ENGINEER: Sebastian Cohen
CALCULATED/ DESIGNED BY
CHECKED BY
DATE REVISED BY
DATE REVISED

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => tidonn
DGN FILE => 128_3988_003.dgn

CU 03230

EA 378101

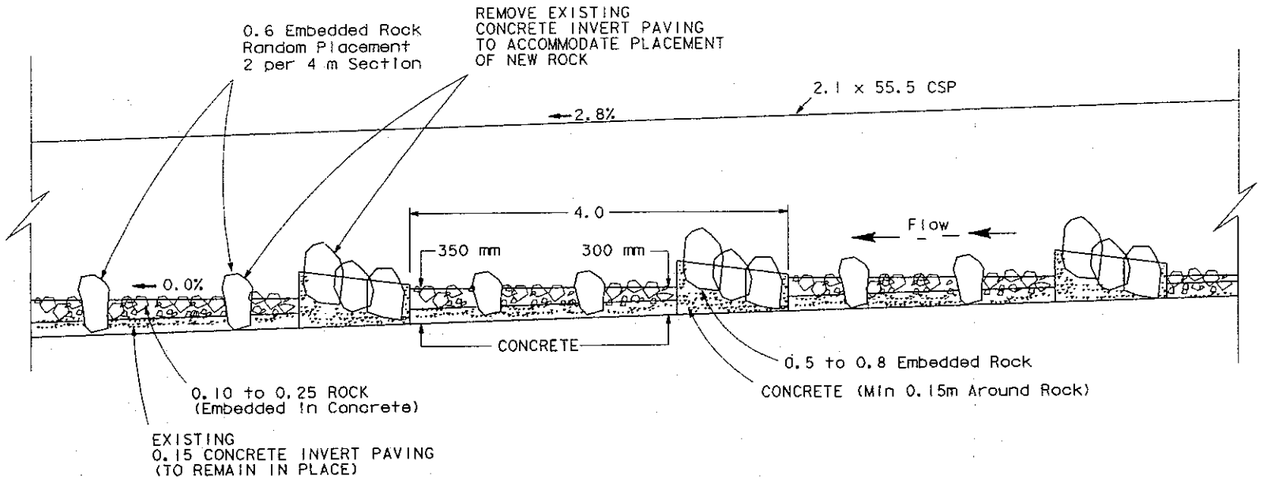
LAST REVISION 00-00-00

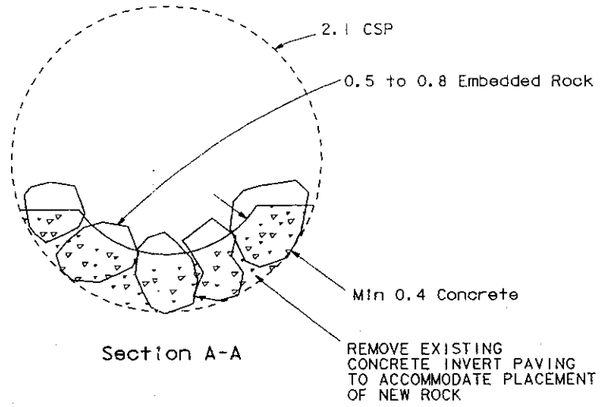
DATE PLOTTED => 17-SEP-2003

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
01	Men	128	39.88	4	4

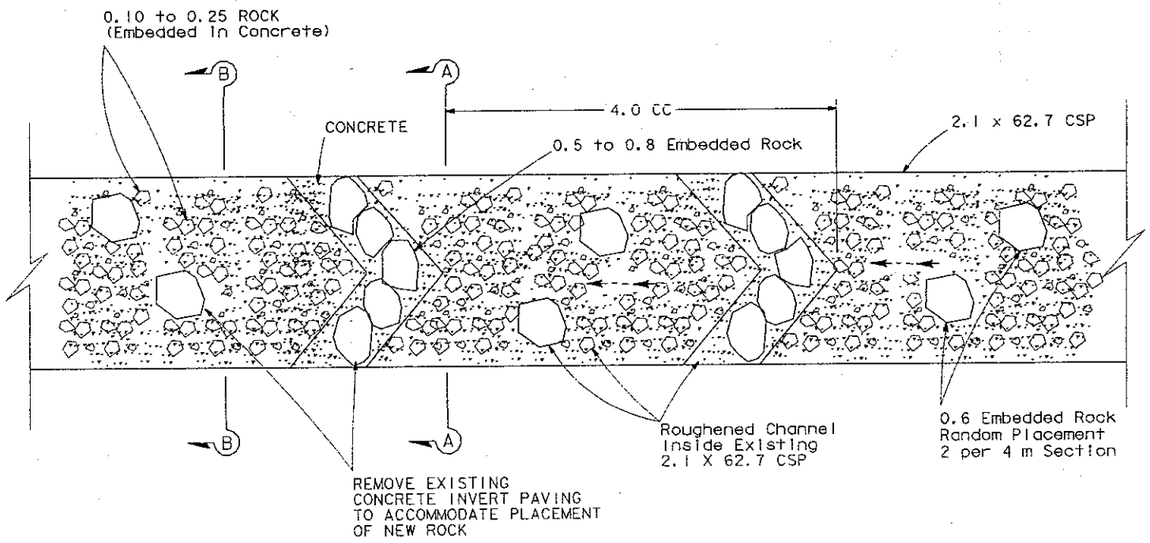
FOR DESIGN STUDY ONLY

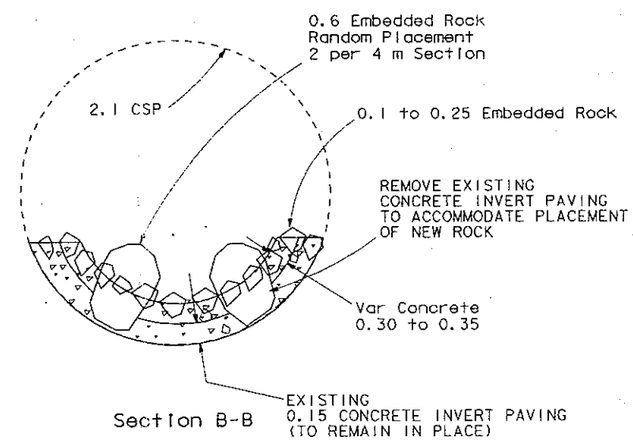
Caltrans Metric





Section A-A





Section B-B

ROUGHENED CHANNEL DETAILS
D-4

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

NO SCALE

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS

PROJECT ENGINEER: Sebastian Cohen

CALCULATED/DESIGNED BY | CHECKED BY | DATE | REVISED BY | DATE REVISED

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => tldanh
DGN FILE => 128_3988_004.dgn

CU 03230 | EA 378101

LAST REVISION | DATE PLOTTED => 12-SEP-2002

SR 128 / PM 49.66 Edwards Creek

Edwards Creek Trib

Men-128-PM 49.66

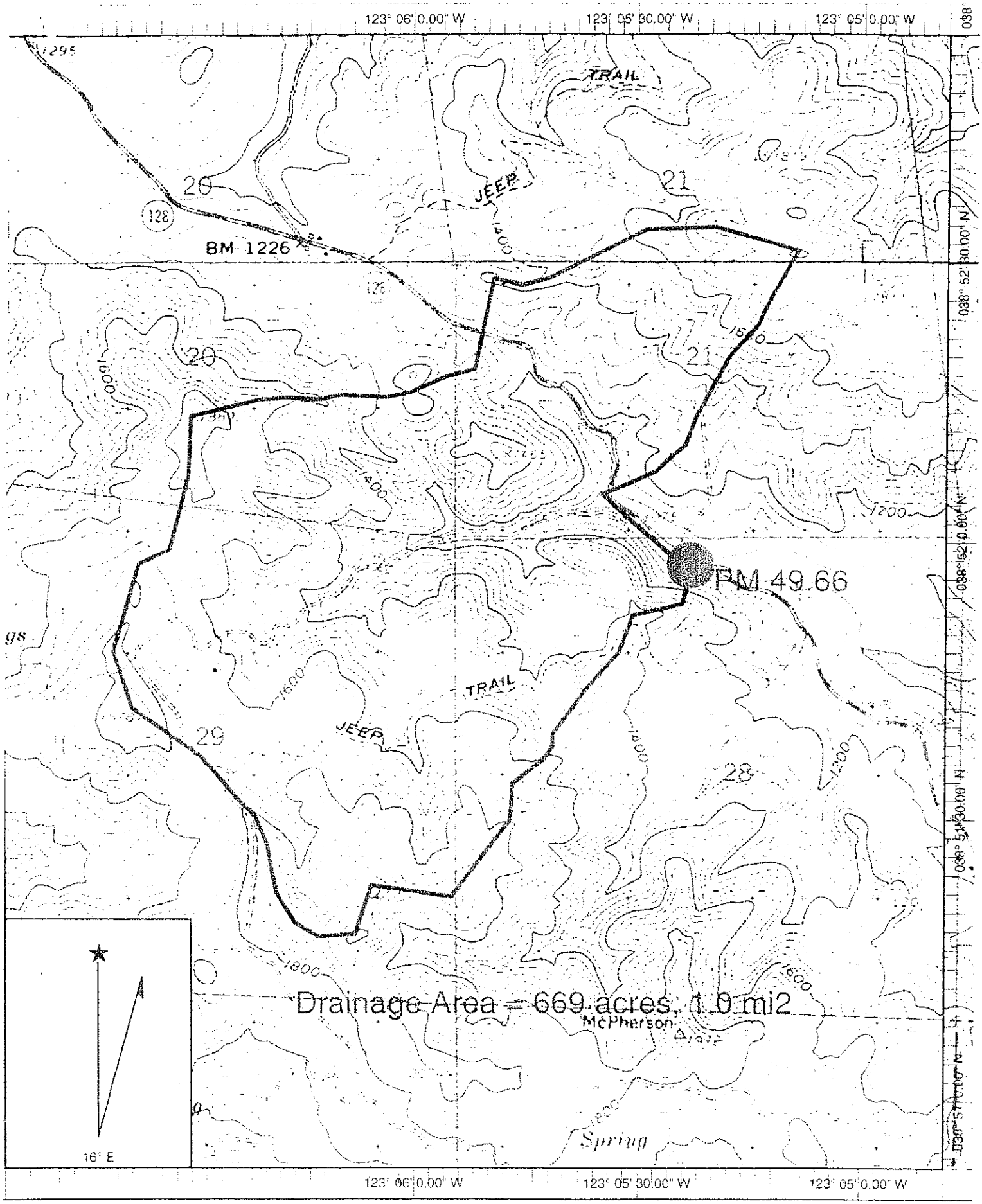
Existing: (1)- 50% embedded 1200mmCSP (2)-50% embedded 1500mmCSP
Active Channel Width = 13 ft
0.6 % US Channel Grade, 0.6% DS Channel Grade

Proposed: Embedded 4300mm x 2000mm RCB, concrete headwall and endwall
Import 3" Minus Cobble, Gradation Commensurate With Upstream and Downstream Stream Gradation

	*Existing Conditions (1200mm/1500mm)				**Proposed Conditions
Adult Anadromous	**Velocities (fps)**	**Depths (ft)**	**Flow Area (ft^2)**	**EDF**	
Lower Q50% (cfs) 3.00	2.59	0.31	0.37	0.51	**Embedded 4.3m (14 ft) Diameter RCB Culvert**
Upper Q1% (cfs/cfs) 23.38	4.39	0.87	1.04	1.40	
Resident Trout					
Lower Q90% (cfs) 2.00	2.34	0.25	0.3	0.42	
Upper Q5% (cfs) 7.92	3.32	0.51	0.61	0.81	
Juvenile Salmonids					
Lower Q95% (cfs) 1.00	1.96	0.18	0.22	0.28	
Upper Q10% (cfs) 4.03	2.84	0.37	0.44	0.57	

			Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D	Velocities (fps)	Outlet Depths (ft)	Control Type	HW/D
Q10=	105.3	cfs	7.52	2.18	Outlet	1.2	3.37	2.23	Outlet	0.74
Q100=	426.5	cfs	17.12	3.08	Outlet	5.1	5.09	4.52	Outlet	1.51

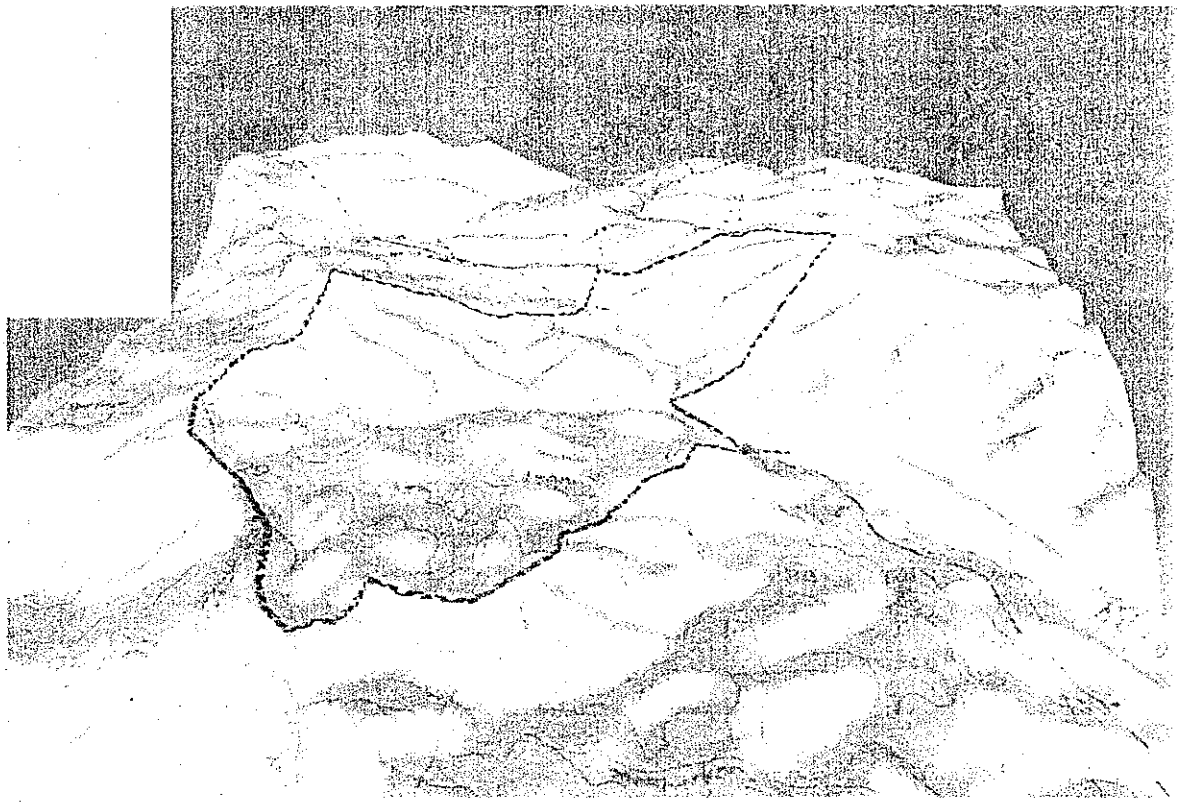
NOTES:
* Velocities and depths determined using Culvert Master software program (FHWA Equations) and FHWA Visual Urban Software Program.
* Stream Flow was assumed to be equally split between both existing culverts (velocities and depths are for each individual culvert, EDF stated is for 1200mm CSP)
** Velocities and depths not necessary for Stream Simulation designs
Fish Design Flow Rates determined from Exceedence flow curves derived from local gauge stations
Q10 and Q100 flow rates detrmined from Regional Method, based on Q annual of 50 in/yr



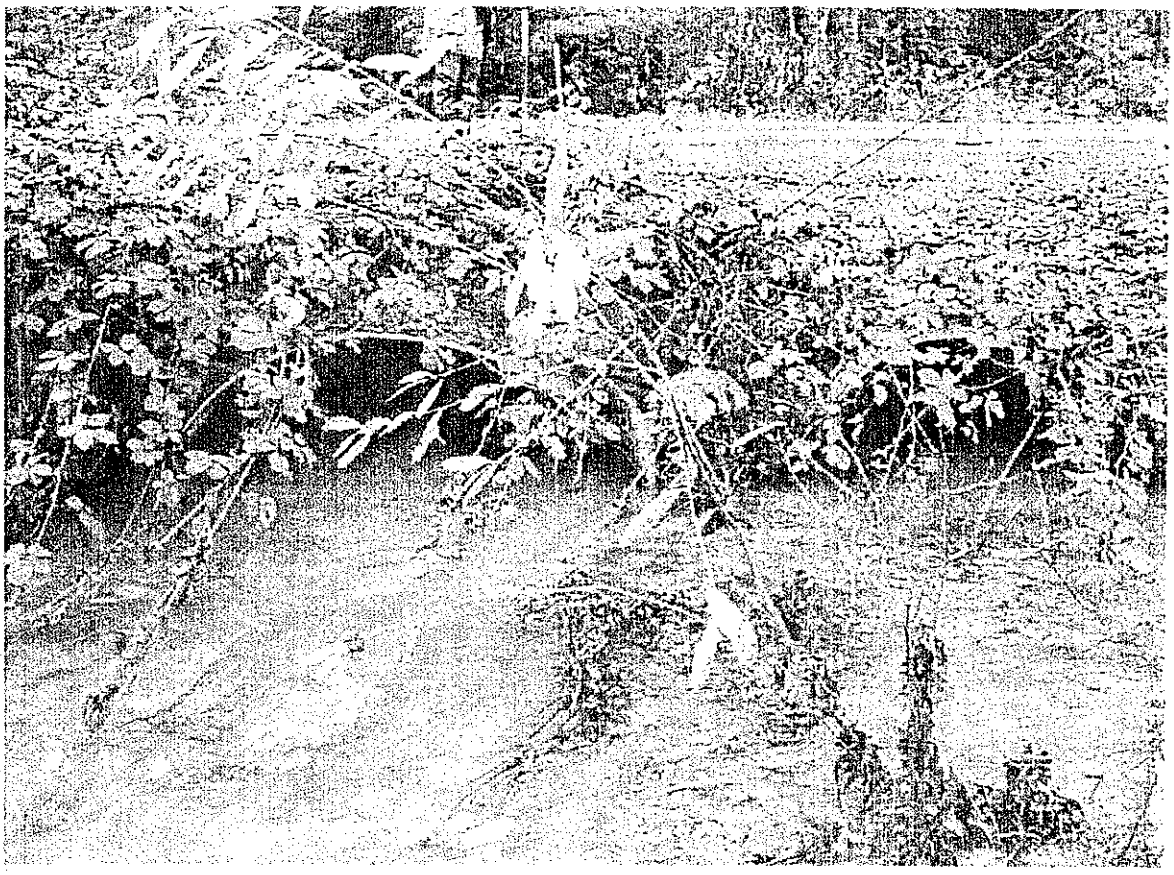
Name: CLOVERDALE
Date: 4/8/2003
Scale: 1 inch equals 1333 feet

Location: 038° 51 53.5" N 123° 05 52.0" W
Caption: Drainage Area = 669 acres, 1.0mi2

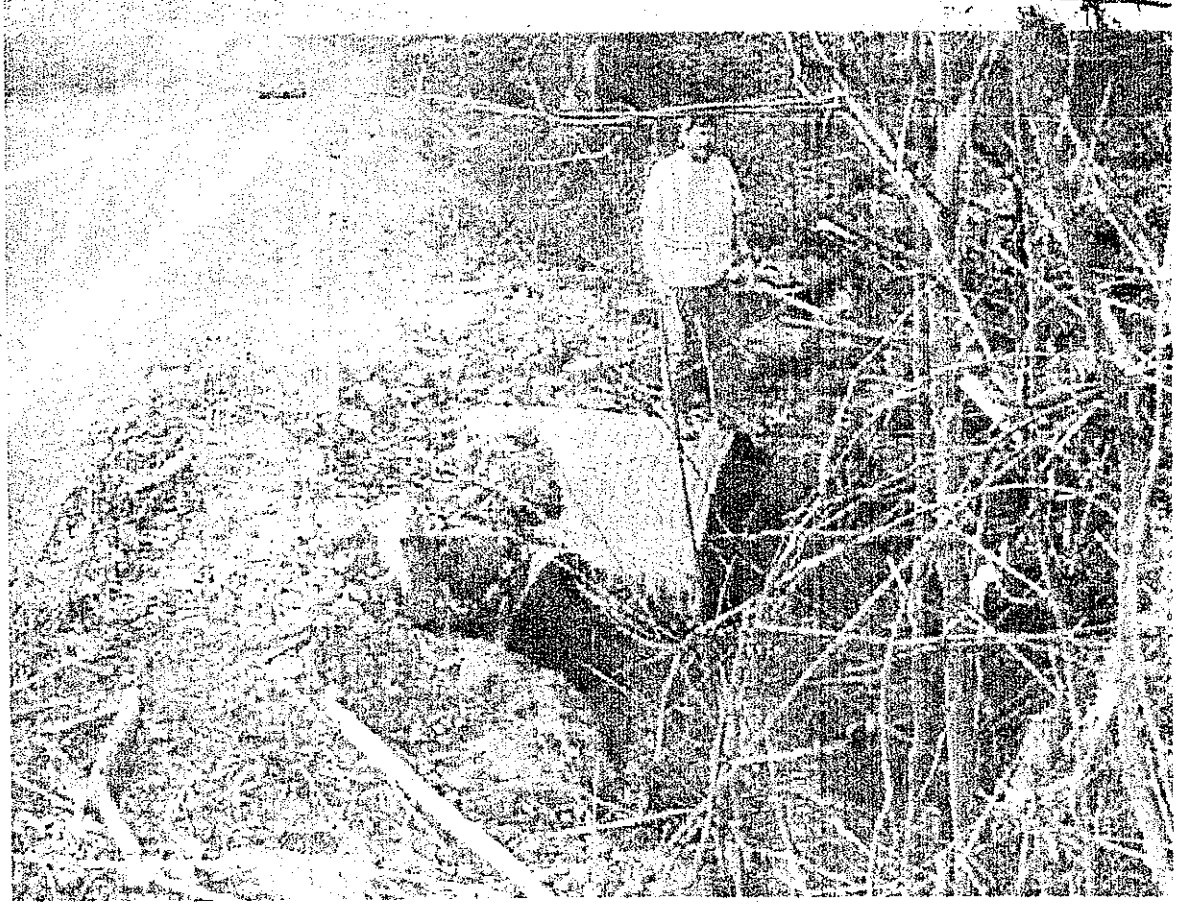
PM 36.63 Lost Creek, 1800mm (72") x 17.6m and 1200mm (48") x 17.6m CSP -50% embedded.
Drainage Area = 669 acres, 1.0 mi2
01-378100

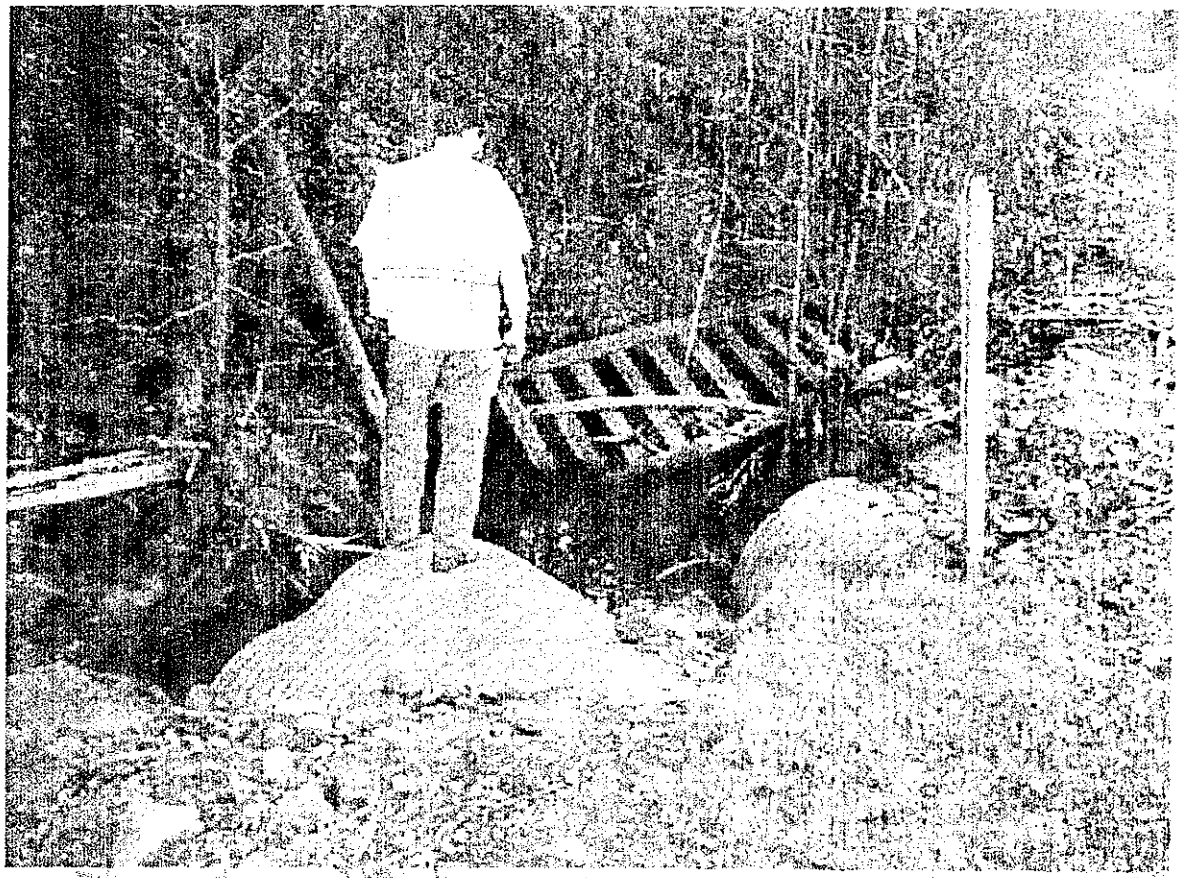


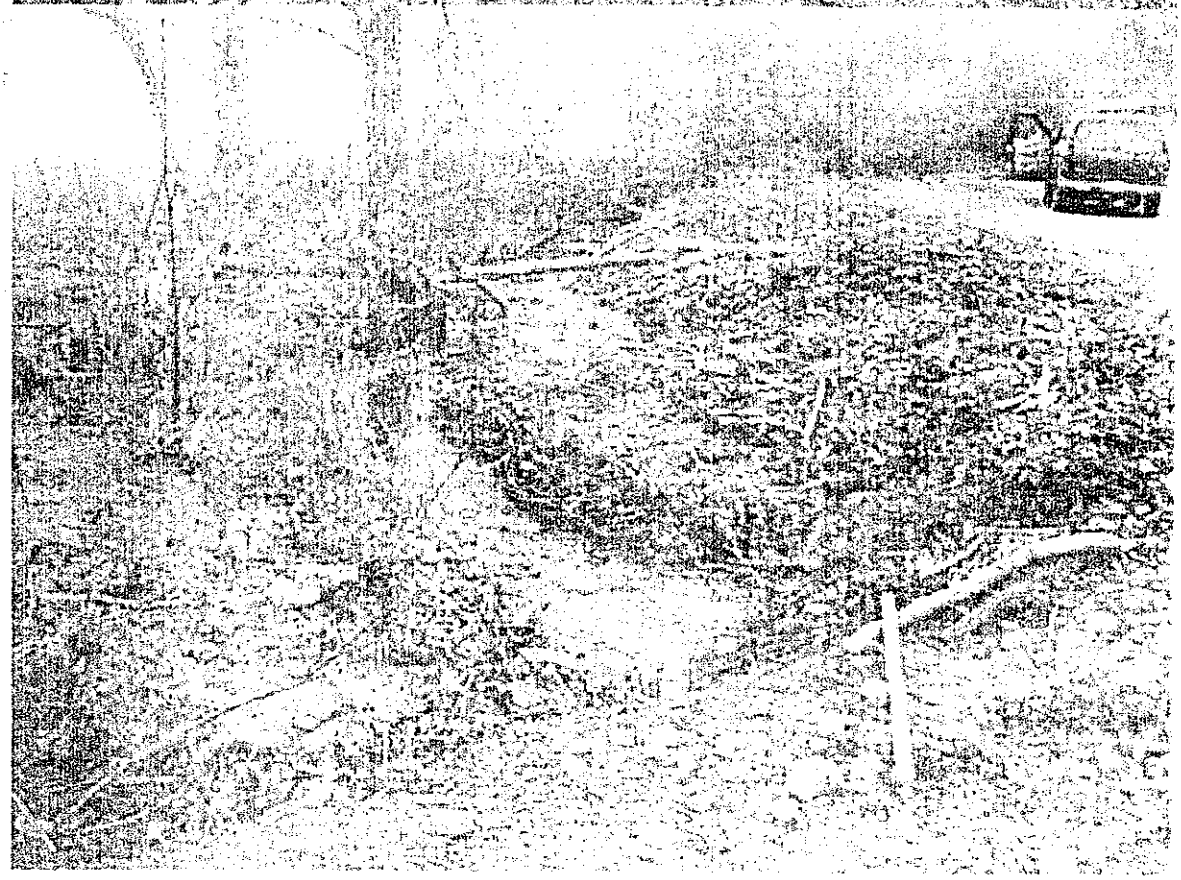
Men-128-PM 49.66, Edwards Creek Tributary
1- 1.2m CSP, 1-1.8m CSP Both 50% + Embedded
0 % Slope
Projecting inlet and outlet

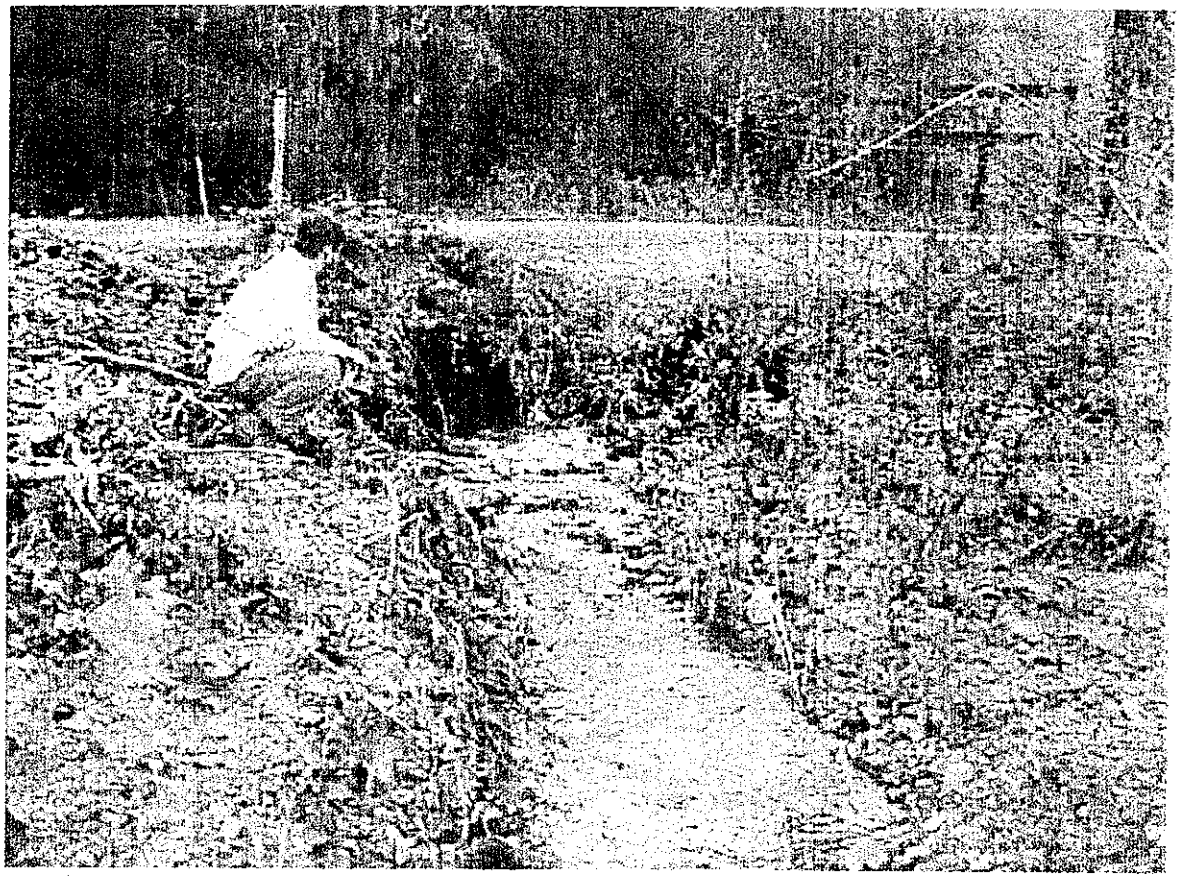


2002 1 7





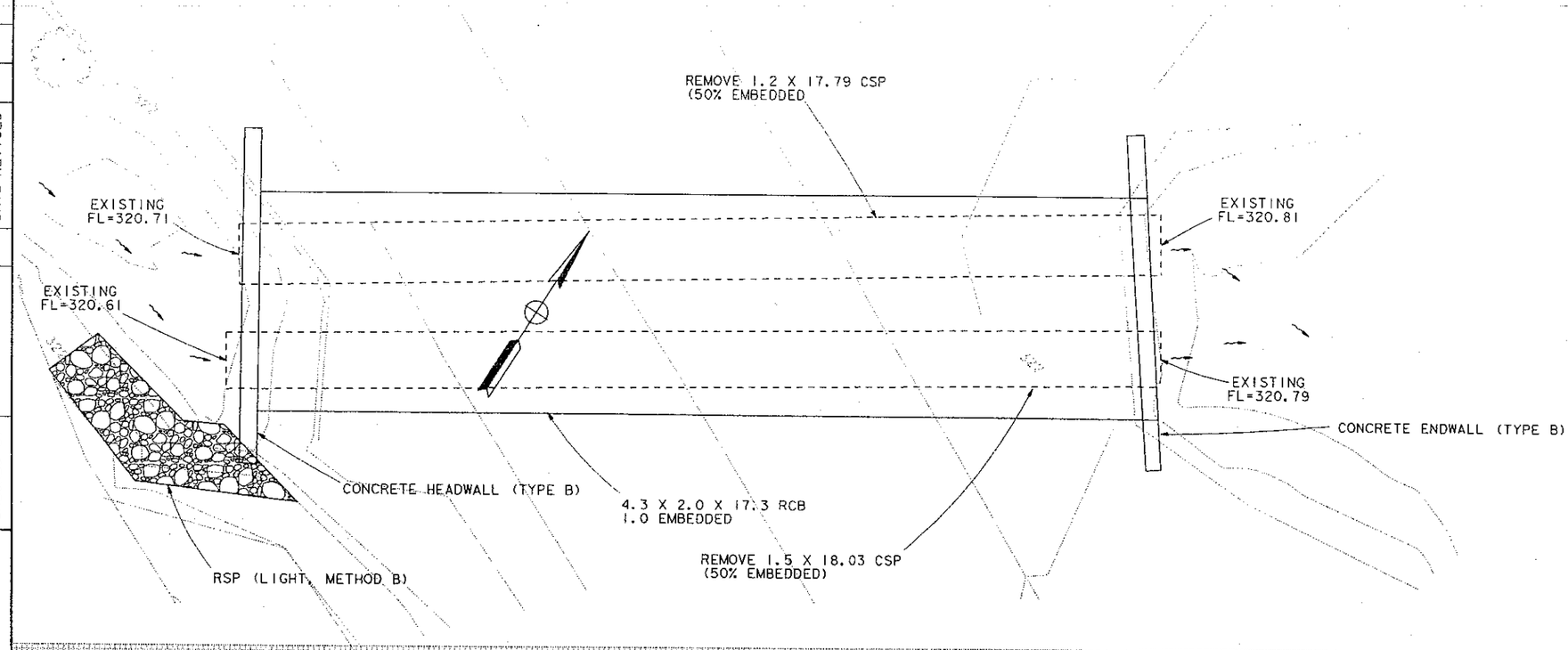


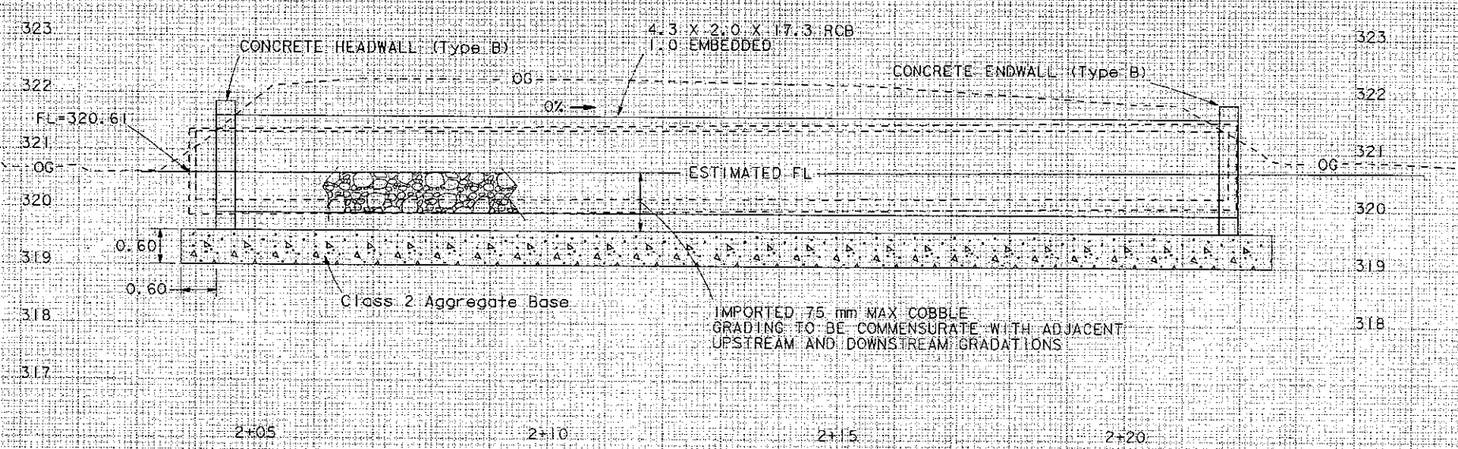


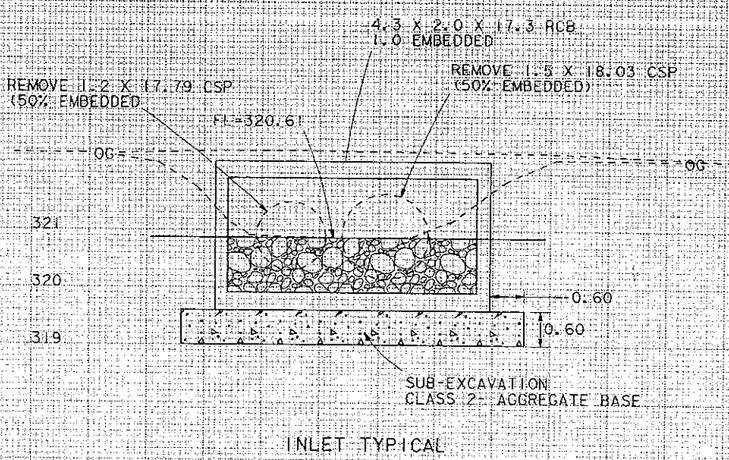
DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
01	Men	128	49.66	1	1

FOR DESIGN STUDY ONLY

Caltrans Metric







INLET TYPICAL

NOTE: ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

DRAINAGE SYSTEM DETAILS
D-1

SCALE 1:200

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
HYDRAULICS

PROJECT ENGINEER
Sebastian Cohen

CALCULATED/DESIGNED BY
CHECKED BY
DATE
REVISED BY
DATE REVISED

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => tldonh
DGN FILE => 128_4966_001.dgn

CU 03230

EA 378101

LAST REVISION 00-00-00

DATE PLOTTED => 17-SEP-2003

Summary of Hydraulic Analyses

						Regional Method Hydrology			Adult Anadromous		Resident Trout		Juvenile Salmonids	
Post Mile	Trib Name or Description	Drainage Area (Acres)	Drainage Area (Mi2)	Average Annual Precip. (in/yr)	Altitude Index	Q2 (cfs)	Q10 (cfs)	Q100 (cfs)	LP	HP 50% of Q2	LP	HP 30% of Q2	LP	HP 10 % of Q2
21.80	Clow Creek	485	0.76	50	1	89.2	185.0	322.4	3.0	44.6	2.0	26.8	1.0	8.9
27.54	Graveyard Creek	438	0.68	50	1	81.4	169.1	295.1	3.0	40.7	2.0	24.4	1.0	8.1
36.63	Lost Creek	588	0.92	50	1.6	85.0	193.0	381.2	3.0	42.5	2.0	25.5	1.0	8.5
39.88	[illegible] Creek	729	1.14	50	1.8	97.6	225.9	459.6	3.0	48.8	2.0	29.3	1.0	9.8
49.66	Edwards Creek	669	1.05	50	1.3	105.3	228.7	426.5	3.0	52.6	2.0	31.6	1.0	10.5

						Exceedence Flow Hydrology		Adult Anadromous		Resident Trout		Juvenile Salmonids	
Post Mile	Trib Name or Description	Drainage Area (Acres)	Drainage Area (Mi2)	MAP (in/yr)	PET (in/yr)	Average Annual Runoff (in)	Qave (cfs)	Lower Q50% (cfs/cfs)	Upper Q1% (cfs/cfs)	Lower Q90% (cfs/cfs)	Upper Q5% (cfs/cfs)	Lower Q95% (cfs/cfs)	Upper Q10% (cfs/cfs)
	Dimensionless Flow Duration (cfs/cfs)							0.13	12.4	0.02	4.2	0.01	2.14
21.80	Clow Creek	485	0.76	50	41	24.5	1.37	0.18	16.95	0.03	5.74	0.01	2.92
27.54	Graveyard Creek	438	0.68	50	41	24.5	1.23	0.16	15.31	0.02	5.18	0.01	2.64
36.63	Lost Creek	588	0.92	50	41	24.5	1.66	0.22	20.55	0.03	6.96	0.02	3.55
39.88	[illegible] Creek	729	1.14	50	41	24.5	2.05	0.27	25.48	0.04	8.63	0.02	4.40
49.66	Edwards Creek	669	1.05	50	41	24.5	1.89	0.25	23.38	0.04	7.92	0.02	4.03

Flow Duration Summary - Highway 128

USGS Station Number	Stream Name	Latitude (ddmmss)	Longitude (dddmmss)	Record Length (years)	Coverage (WY)	Drainage Area (sq. miles)	MAP (in/yr)	PET (in/yr)	Ave Annual Runoff (in)	Qave (cfs)	Fish Passage Flows Q/Qave: Adult Anadromous Lower Q50% (cfs/cfs)	Adult Anadromous Upper Q1% (cfs/cfs)	Resident Trout/2+yr Steelhead Lower Q90% (cfs/cfs)	Resident Trout/2+yr Steelhead Upper Q5% (cfs/cfs)	Young of the Year Salmonids Lower Q95% (cfs/cfs)	Young of the Year Salmonids Upper Q10% (cfs/cfs)
11468600	Mf Tenmile R Nr Fort Bragg Ca	393422	1234157	9	1955-73	32.90	58	39.0	33.3	80.7	0.22	13.02	0.04	4.75	0.03	2.55
11466540	Pudding C Nr Fort Bragg Ca	392725	1234320	8	1964-71	12.50	50	38.0	25.7	23.6	0.08	13.16	0.00	4.42	0.00	2.11
NFC (USFS)	NF Casper Creek	392140	1234402	33	1963-95	1.83	50	37.5	25.9	3.5	0.14	13.10	0.02	4.46	0.02	2.17
SFC (USFS)	SF Casper Creek	392031	1234509	33	1963-95	1.64	50	37.5	25.9	3.1	0.15	14.11	0.03	4.56	0.02	2.23
11468010	Albion R Nr Comptche	391540	1233700	8	1962-69	14.40	60	39.0	35.3	37.4	0.04	6.55	0.00	2.67	0.00	1.36
11468070	SF Big R Nr Comptche	391347	1232753	11	1961-71	36.20	50	41.0	24.5	65.3	0.12	11.99	0.02	3.84	0.01	1.89
11467850	Soda C Trib Nr Boonville Ca	390132	1231725	4	1965-68	1.53	48	41.0	22.5	2.5	0.08	12.94	0.00	3.95	0.00	2.39
11467800	Rancheria C Nr Boonville Ca	385935	1232600	9	1960-68	65.60	52	41.0	26.5	128.0	0.18	14.17	0.02	4.83	0.01	2.50

Flow Duration Table for Coastal Mendocino Streams

% of time indicated Q/Qave is equalled or exceeded	MF Tenmile River	Pudding Creek	NF Casper Creek	SF Casper Creek	Albion River	SF Big River	Soda Creek	Rancheria Creek	Regional median	Regional average	+1 Standard Deviation	-1 Standard Deviation
0%	53.1	56.2	60.0	61.8	36.3	84.5	106.5	102.4	60.9	70.1	95.10	45.13
1%	13.0	13.2	13.1	14.1	6.5	12.0	12.9	14.2	13.1	12.4	14.84	9.92
2%	8.5	7.9	8.6	9.1	4.9	7.7	8.6	9.4	8.5	8.1	9.50	6.66
3%	6.6	6.2	6.6	6.8	3.9	5.8	6.3	7.3	6.4	6.2	7.20	5.18
4%	5.5	5.2	5.4	5.5	3.1	4.6	5.5	5.6	5.4	5.1	5.92	4.21
5%	4.8	4.4	4.5	4.6	2.7	3.8	3.9	4.8	4.4	4.2	4.89	3.48
6%	4.1	3.8	3.7	3.9	2.3	3.2	3.6	4.2	3.7	3.6	4.20	2.97
7%	3.5	3.2	3.2	3.3	2.0	2.8	3.3	3.7	3.3	3.1	3.65	2.60
8%	3.2	2.8	2.8	2.9	1.7	2.4	2.9	3.2	2.9	2.7	3.22	2.26
9%	2.8	2.5	2.5	2.5	1.5	2.2	2.6	2.9	2.54	2.4	2.86	2.01
10%	2.6	2.1	2.2	2.2	1.4	1.9	2.3	2.5	2.20	2.14	2.52	1.76
11%	2.3	1.9	1.9	2.0	1.2	1.7	2.1	2.3	1.93	1.92	2.28	1.57
12%	2.2	1.6	1.7	1.7	1.0	1.5	2.0	2.0	1.73	1.73	2.08	1.38
13%	2.0	1.4	1.5	1.6	0.9	1.3	1.8	1.9	1.57	1.55	1.89	1.22
14%	1.8	1.3	1.4	1.4	0.8	1.2	1.6	1.6	1.41	1.39	1.70	1.09
15%	1.7	1.1	1.2	1.3	0.7	1.1	1.5	1.5	1.25	1.26	1.56	0.96
16%	1.6	1.0	1.1	1.1	0.7	1.0	1.3	1.3	1.14	1.14	1.42	0.87
17%	1.5	0.9	1.0	1.0	0.6	0.9	1.3	1.2	1.03	1.05	1.32	0.78
18%	1.4	0.8	0.9	0.9	0.5	0.8	1.2	1.1	0.93	0.96	1.23	0.69
19%	1.3	0.8	0.8	0.9	0.5	0.8	1.1	1.0	0.85	0.88	1.13	0.63
20%	1.2	0.7	0.8	0.8	0.4	0.7	1.0	0.9	0.78	0.81	1.04	0.58
21%	1.1	0.6	0.7	0.7	0.4	0.6	0.9	0.9	0.72	0.74	0.96	0.53
22%	1.0	0.6	0.7	0.7	0.3	0.6	0.9	0.8	0.67	0.69	0.90	0.49
23%	0.9	0.5	0.6	0.6	0.3	0.6	0.8	0.8	0.62	0.64	0.83	0.46
24%	0.9	0.5	0.6	0.6	0.3	0.5	0.7	0.7	0.58	0.60	0.77	0.43
25%	0.8	0.5	0.5	0.5	0.3	0.5	0.7	0.6	0.54	0.56	0.72	0.39
26%	0.8	0.5	0.5	0.5	0.3	0.4	0.6	0.6	0.51	0.52	0.67	0.37
27%	0.8	0.4	0.5	0.5	0.2	0.4	0.5	0.6	0.47	0.49	0.63	0.34
28%	0.7	0.4	0.4	0.4	0.2	0.4	0.5	0.5	0.45	0.46	0.60	0.31
29%	0.7	0.4	0.4	0.4	0.2	0.4	0.5	0.5	0.42	0.43	0.56	0.30
30%	0.6	0.3	0.4	0.4	0.2	0.4	0.4	0.5	0.39	0.40	0.53	0.28
31%	0.6	0.3	0.4	0.4	0.2	0.3	0.4	0.4	0.37	0.38	0.49	0.26
32%	0.6	0.3	0.3	0.4	0.2	0.3	0.4	0.4	0.35	0.35	0.46	0.24
33%	0.5	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.32	0.33	0.44	0.22
34%	0.5	0.3	0.3	0.3	0.1	0.3	0.3	0.4	0.29	0.31	0.41	0.21
35%	0.5	0.2	0.3	0.3	0.1	0.3	0.2	0.4	0.28	0.29	0.39	0.19
36%	0.4	0.2	0.3	0.3	0.1	0.3	0.2	0.3	0.27	0.28	0.37	0.18
37%	0.4	0.2	0.3	0.3	0.1	0.2	0.2	0.3	0.25	0.26	0.35	0.17
38%	0.4	0.2	0.2	0.3	0.1	0.2	0.2	0.3	0.24	0.25	0.33	0.16
39%	0.4	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.23	0.23	0.32	0.14
40%	0.4	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.21	0.22	0.30	0.13
41%	0.4	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.21	0.21	0.29	0.13
42%	0.3	0.1	0.2	0.2	0.1	0.2	0.2	0.3	0.19	0.20	0.28	0.12
43%	0.3	0.1	0.2	0.2	0.1	0.2	0.1	0.3	0.19	0.19	0.27	0.11
44%	0.3	0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.18	0.17	0.25	0.09
45%	0.3	0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.17	0.16	0.24	0.09
46%	0.3	0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.16	0.16	0.23	0.08
47%	0.3	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.15	0.15	0.22	0.08
48%	0.2	0.1	0.2	0.2	0.0	0.1	0.1	0.2	0.14	0.14	0.21	0.08
49%	0.2	0.1	0.1	0.2	0.0	0.1	0.1	0.2	0.14	0.13	0.19	0.07
50%	0.2	0.1	0.1	0.2	0.0	0.1	0.1	0.2	0.13	0.13	0.19	0.07
51%	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.12	0.12	0.17	0.06
52%	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.11	0.11	0.17	0.06
53%	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.11	0.10	0.16	0.05
54%	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.10	0.10	0.15	0.05
55%	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.10	0.09	0.14	0.04
56%	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.09	0.09	0.13	0.04
57%	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.09	0.08	0.12	0.04
58%	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.08	0.08	0.12	0.04
59%	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.07	0.07	0.11	0.03
60%	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.07	0.07	0.11	0.03
61%	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.06	0.07	0.10	0.03
62%	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.06	0.06	0.10	0.02
63%	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.05	0.06	0.09	0.02
64%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.05	0.05	0.09	0.02
65%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.05	0.05	0.08	0.02
66%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.05	0.05	0.08	0.01
67%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.04	0.04	0.08	0.01
68%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.04	0.04	0.07	0.01
69%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.04	0.04	0.07	0.01
70%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.03	0.04	0.07	0.01
71%	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.03	0.04	0.06	0.01
72%	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.03	0.03	0.06	0.01
73%	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.03	0.03	0.06	0.01
74%	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.03	0.03	0.06	0.01
75%	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.03	0.03	0.05	0.01
76%	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.03	0.03	0.05	0.00
77%	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.03	0.03	0.05	0.00
78%	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.03	0.03	0.05	0.00
79%	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.03	0.05	0.00
80%	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.04	0.00
81%	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.04	0.00
82%	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.04	0.00
83%	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.04	0.00
84%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.04	0.00
85%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.04	0.00
86%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.03	0.00
87%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.03	0.00
88%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.03	0.00
89%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.03	0.00
90%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.02	0.03	0.00
91%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.03	0.00
92%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.03	0.00
93%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.03	0.00
94%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.02	0.00
95%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.02	0.00
96%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.02	0.00
97%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.02	0.00
98%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.02	0.00
99%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.01	0.01	0.00
100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

APPENDIX B – REVEGETATION GUIDELINES

A. Prior to any planting or seeding, all exotic plants/weeds will be removed from all areas to be revegetated. Mechanical control methods should be employed, if feasible; however, heavy equipment (e.g., bulldozers, backhoes) should not be used to eradicate exotic plants and weeds. In circumstances where mechanical control is not effective, it will be necessary to utilize systemic herbicides that have been approved by the U.S. Environmental Protection Agency (EPA) for use in aquatic situations (e.g., Rodeo by Monsanto).

B. Plant materials for the revegetation effort will be locally obtained. The use of locally obtained materials, which are adapted to local conditions, increases the likelihood that revegetation will be successful, and maintains the genetic integrity of the local ecosystem. For widespread herbaceous species (e.g., California poppy) that are more likely to be genetically homogeneous, site specificity is a less important consideration, and stock from commercial sources may be used.

C. Arrangements will be made well in advance of the start of revegetation to ensure that plant materials are available at the appropriate time. Sufficient time will be allocated for seed collection and contract growing, if necessary (up to 12 months may be required for some woody species).

D. Appropriate native species (as shown in Table E) will be planted and seeded in locations where they are most likely to persist without human assistance after a period of establishment. Most trees and shrubs will be planted from containers or cuttings. Grasses and herbs will be hydroseeded or broadcast seeded and raked into the soil. Trees and shrubs will be planted in random groups to more closely resemble a natural setting and to take advantage of favorable microclimate conditions. Prior to implementation, separate plant palettes and seed mixes will be prepared and will include specific information such as percent purity/germination, application rates, container plant spacing, etc.

E. During placement of RSP, willow tubes will be inserted between the rock to allow for will cutting installation upon completion of construction

F. Planting and seeding will take place following completion of final grading and/or site preparation (i.e., weed removal and respreading of topsoil), preferably between November 15 and December 31 but not before October 15 or after February 1. These periods may be altered based on an assessment of the current and projected weather pattern at the time of installation.

G. Revegetation areas will be maintained for a minimum of three years following installation. In general, maintenance will include any activities required to meet the performance standards set for this revegetation program.

H. The final success criteria for implementation of this plan will be developed as a goal to determine whether the revegetation effort is successful. Success criteria will include survival and coverage criteria for native vegetation.

I. The revegetation effort will continue for three to five years following installation, based on length of time needed for the revegetation to meet the performance standards. Monitoring will include regular site visits to monitor the maintenance activities and annual performance monitoring to collect data and assess the progress of the revegetation effort.

Revegetation Plant Palettes

SCIENTIFIC NAME	COMMON NAME	CONTAINER SIZE
Riparian Areas		
Salix lasiolepis	Arroyo willow	Cutting or D-40
Alnus rubra	Red alder	D-40
Acer macrophyllum	Big-leaf maple	D-40
Umbellularia californica	California bay	D-40
Rubus ursinus	California blackberry	D-40
Rubus parviflorus	Thimbleberry	D-40
Urtica diocea	Stinging nettle	Seed
Stachys bullata	Hedgenettle	Seed
Lotus purshianus	Spanish clover	Seed
Lupinus nanus	Lupine	Seed
Lupinus bicolor	Miniature lupine	Seed
Claytonia perfoliata	Miner's lettuce	Seed
Bromus carinatus	California brome	Seed
Hordeum brachyantherum	Meadow barley	Seed
Elymus X triticum	Regreen	Seed
Upland/Cismontane Areas		
Stachys bullata	Hedgenettle	Seed
Lotus purshianus	Spanish clover	Seed
Lupinus nanus	Sky lupine	Seed
Lupinus bicolor	Miniature lupine	Seed
Claytonia perfoliata	Miner's lettuce	Seed
Eschscholzia californica	California poppy	Seed
Nassella pulchra	Purple needlegrass	Seed
Bromus carinatus	California brome	Seed
Hordeum brachyantherum	Meadow barley	Seed
Elymus X triticum	Regreen	Seed

APPENDIX C – SUMMARY OF AVOIDANCE AND MINIMIZATION MEASURES

ALL SITES

1. Riparian areas outside the designated work areas will be designated as Environmentally Sensitive Areas (ESA's) and clearly indicated as such on project construction plans. Project specifications will include a requirement that ESA's are clearly delineated with brightly colored fencing, rope or equivalent prior to beginning construction.
2. Water for dust abatement (if necessary) will be acquired from an off-site source. No drafting will be permitted.
3. Measures consistent with the current Caltrans' Construction Site Best Management Practices (BMPs) Manual (including the Storm Water Pollution Prevention Plan [SWPPP] and Water Pollution Control Program [WPCP] Manuals (http://www.dot.ca.gov/hq/construc/Construction_Site_BMPs.pdf]) will be implemented to minimize effects to anadromous fish habitat (e.g., siltation, etc.) during construction.

NON-FISH PASSAGE SITES

1. No work will be conducted in the live channel of perennial anadromous fish-bearing streams (e.g., the Navarro River).
2. Work in non-fish bearing streams (i.e., intermittent or ephemeral streams) will be conducted when the channel is dry. In the event of sudden thunderstorms or other unusual rain event, temporary dewatering (using sandbags or bladders) may be used to avoid siltation of the channel.
3. Work on the bank of fish-bearing streams (e.g., the Navarro River) will be conducted between June 15 and October 15.
4. For those sites located in the redwood forest (i.e., along the Navarro River and North Fork Navarro River), impacts are primarily limited to minor grading of mostly unvegetated understory areas that are covered by a thick layer of duff. At these sites, the duff within the proposed work area will be collected and stockpiled prior to the start of work, and then re-spread on the graded/bare areas following construction. Provided sufficient duff is available to cover all graded/bare areas, no compensatory measures is proposed at these sites.
5. With the exception of item 6 above, graded or otherwise bare areas resulting from construction activities will be revegetated using native species. At least six months prior to the start of project construction, Caltrans will prepare detailed construction drawings and specifications for implementation of the revegetation effort. The guidelines in Appendix B have been prepared to outline the revegetation strategy to be implemented by Caltrans for temporary impacts to riparian vegetation during construction.

FISH PASSAGE SITES

1. Instream work and work on the banks of perennial anadromous fish-bearing streams will be conducted between June 15 and October 15.

2. Dewatering, if necessary, will consist of using sandbags or equivalent method to construct a temporary cofferdam upstream of the work area at the inlet, and downstream of the work area at the outlet. Following construction of the cofferdams, a gravity siphon hose system will be installed to transport upstream flows through the work area to the channel downstream of the work area. If necessary, a pump will be used to convey flows through the hose.
3. Graded or otherwise bare areas resulting from construction activities will be revegetated using native species. At least six months prior to the start of project construction, Caltrans will prepare detailed construction drawings and specifications for implementation of the revegetation effort. The guidelines in Appendix B have been prepared to outline the revegetation strategy to be implemented by Caltrans for temporary impacts to riparian vegetation during construction.
4. At Men 128 PM 21.8, equipment staging for removal of the exitisting culvert will occur in the outlet channel; the temporary access road to the staging area will be constructed down the road embankment west of the existing culvert.
5. At Men 128 PM 27.54, the temporary access road at the inlet will be constructed down the road embankment east of the existing culvert; at the outlet, the temporary access road will be constructed down the road embankment west of the existing culvert
6. At Men 128 PM 36.63, the temporary access road will be constructed on the west side of the channel from an existing gravel road that connects to SR 128.
7. At Men 128 PM 39.88, the temporary access road to the outlet will be constructed on the SR 128 embankment west of the existing culvert.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

JAN 14 2005

In Response Reply To:
151422SWR2004SR20089:DJL

Gene K. Fong
Division Administrator
United States Department of Transportation
Federal Highway Administration
980 Ninth Street, Suite 400
Sacramento, California 95814-2724

Dear Mr. Fong:

This document transmits the National Marine Fisheries Service's (NOAA Fisheries) biological opinion (Enclosure) based on its review of the Federal Highway Administration's (FHWA) and California Department of Transportation's (CalTtrans) proposed retrofit or replacement of 274 culverts along State Routes 128 and 253 in Mendocino County, California (FHWA reference: HDA-CA, File # 01-MEN-128/253-VAR, EA 01-378100, Document # P49070) and its effects on threatened Northern California steelhead (*Oncorhynchus mykiss*), threatened Central California Coast steelhead, threatened Central California Coast coho salmon (*O. kisutch*), and designated critical habitat for Central California Coast coho salmon in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*). In addition, this letter documents the result of NOAA Fisheries' Essential Fish Habitat (EFH) consultation pursuant to section 305(b)(2) of the Magnuson-Stevens Fisheries Conservation and Management Act (MSFCMA).

Endangered Species Act Consultation

CalTrans has determined that the proposed culvert retrofit or replacement actions at 225 locations will have no effect on listed salmonids; these actions are not analyzed in the enclosed biological opinion. In the enclosed opinion, NOAA Fisheries concurs with CalTrans' determination that 44 of the culvert projects are not likely to adversely affect listed salmonids. In addition, NOAA Fisheries concludes that the five projects likely to adversely affect listed salmonids and critical habitat are not likely to jeopardize the continued existence of these species or destroy or adversely modify designated critical habitat. However, take of listed species as a result of these five remaining projects is anticipated. An incidental take statement with non-discretionary terms and conditions is included with the enclosed biological opinion.

Essential Fish Habitat Consultation

NOAA Fisheries has evaluated the proposed projects for potential adverse effects to EFH pursuant to section 305(b)(2) of the MSFCMA. After reviewing the effects of the projects as described in the enclosed biological opinion, NOAA Fisheries has determined that the proposed action will have a minimal adverse effect on EFH of Pacific Coast salmon in the Navarro and Russian River watersheds.

Section 305(b)(4)(A) of the MSFCMA authorizes NOAA Fisheries to provide EFH Conservation Recommendations that will minimize adverse effects of an activity on EFH. For this project, conservation measures were already included in the project description. In addition, the enclosed biological opinion contains non-discretionary terms and conditions that will minimize adverse effects to EFH. Therefore, NOAA Fisheries has not provided EFH Conservation Recommendations.

If you have any questions about this section 7 consultation and EFH consultation, or if you require additional information, please contact Mr. Daniel Logan at (707) 575-6053.

Sincerely,

Rodney R. McInnis
Regional Administrator

Enclosure

cc: Lena Ashley, California Department of Transportation, Eureka
NOAA Fisheries, Long Beach

Enclosure

BIOLOGICAL OPINION

ACTION AGENCY: California Department of Transportation and the Federal Highway Administration, California Division

ACTION: Highways 128 and 253 culvert rehabilitation project, Mendocino County, California.

CONSULTATION CONDUCTED BY: National Marine Fisheries Service, Southwest Region

FILE NUMBER: 151422SWR2004SR20089

DATE ISSUED: JAN 4 2005

I. CONSULTATION HISTORY

On January 3, 2003, the National Marine Fisheries Service (NOAA Fisheries) received some preliminary maps and information on the proposed project from LSA Associates, a contractor of the California Department of Transportation (CalTrans). On January 7, 2003, and April 15, 2003, staff from NOAA Fisheries, CalTrans, the California Department of Fish and Game (CDFG), and LSA Associates met to discuss design and consultation under section 7 of the Endangered Species Act of 1973, as amended (ESA). On May 11, 2004, NOAA Fisheries received from CalTrans a biological assessment and request for concurrence and request for initiation of section 7 consultation.

Given the complex nature and scope of the proposed action the consultation process was extended in order to gather additional information. On May 12, 2004, and September 15, 2004, staff from NOAA Fisheries and CalTrans met at the fish passage sites to discuss the project and to identify potential impacts to salmonids. On September 23, 2004, NOAA Fisheries requested additional information relative to the proposed activities on Clow Creek at the sites CalTrans determined that there would be no effect on ESA-listed salmonids. On October 4, 2004, CalTrans offered some information on the no effect determinations, and hand delivered the Clow Creek information on October 5, 2004. On October 26, 2004, NOAA Fisheries requested additional information relative to factors affecting the action area; CalTrans replied on October 27, 2004. On October 28, 2004, CalTrans notified NOAA Fisheries that one of the fish passage projects (on an unnamed creek at post mile 20.15) had been modified to include only a minor repair of the outlet – an action not leading to take. On November 23, 2004, NOAA Fisheries asked for clarification on the amount of stream channel dewatered at each site; CalTrans provided that information on November 24, 2004. On December 7, 2004, NOAA Fisheries

requested information on projected sound levels related to Clow Creek activities and the anticipated level of barotrauma on ESA-listed salmonids; CalTrans responded the same day.

This biological opinion is based on information provided in the submitted document titled *Men 128/253 Culvert Rehabilitation Project Biological Assessment for National Marine Fisheries Service Consultation (January 2004)*, subsequent discussions and submissions, and other sources of scientific and commercial information. A complete administrative record of this consultation is on file in the NOAA Fisheries Santa Rosa Area Office, Santa Rosa, California.

II. DESCRIPTION OF THE PROPOSED ACTION

The FHWA proposes to provide funding to CalTrans for retrofitting or replacing deteriorated culverts and appurtenant structures at 274 locations along State Route (SR) 128 and SR 253 in Mendocino County, California (FHWA reference: HDA-CA, File # 01-MEN-128/253-VAR, EA 01=378100, Document # P49070). The proposed work on SR 128 is located between Post Miles (PM) 0.18 and 50.59, and involves culvert rehabilitation or replacement at 216 locations. The proposed work on SR 253 includes 58 locations for culvert rehabilitation or replacement between PM 0.99 and 17.15. The purpose of the proposed project is to retrofit or replace 30 to 45-year old pipes that are deteriorating and have reached the end of their maximum useful life. If the culverts are not replaced or retrofitted, further deterioration will take place. The deterioration will eventually lead to the pipes collapsing under the weight of the roadway and the roadway itself will deteriorate, possibly resulting in unsafe conditions and increasing the costs of repair. Also, substantial environmental damage could result if the roadway fill and/or road surface materials erode into a stream before the culverts are repaired or replaced. CalTrans anticipates that the proposed construction actions will take three consecutive construction seasons to complete. The proposed work is scheduled to be implemented between 2007 and 2010.

CalTrans evaluated 274 culverts and concluded that the proposed actions at 225 locations will have no effect on ESA-listed salmonids because the project sites are in areas above barriers to anadromy or ephemeral streams with no surface flow during the proposed construction period. These projects will not be discussed further in this biological opinion. At 44 construction sites, the presence of ESA-listed salmonids is not likely because of high channel gradient or because the streams are intermittent many years. Even if ESA-listed salmonids use these 44 sites during some time of the year, the projects will be completed during the driest time of year. Also, these projects are small in scope, and the anticipated amount of sediment attributable to construction activities is negligible. Based on this information, CalTrans determined that adverse effects to listed species at these sites is unlikely.

At the remaining five sites, all of which occur along SR 128, CalTrans concludes that the streams support or potentially support ESA-listed species during the proposed construction time; therefore, repair, replacement or retrofitting of these five culverts (PMs 21.8, 27.54, 36.63, 39.88, and 49.66) is likely to adversely affect ESA-listed salmonids. Given that ESA-listed salmonids

are likely present at the construction site, CalTrans has proposed to incorporate design elements to improve fish passage.

Because the existing culverts convey water beneath roadways, most of the required work at the remaining five sites will occur within CalTrans' right-of-ways. Work may extend away from the road and outside of right-of-ways where deemed necessary, depending upon final design determinations. Some drainage work will be done at inlets and outlets to culverts, and minor vegetation removal may be performed to improve water flow. Minor grading may also be performed when deemed necessary to prevent water buildup at inlets and/or outlets. At most sites, work will be confined to an area within 15 meters (m) of either side of the road, and within 15 m on either side of the culvert, for a maximum total impact area (excluding the road surface) of about 0.09 hectares (ha). At the Clow Creek site work will be confined to an area within 15 m of either side of the road, within 15 m of the upstream end of the existing culvert, and within 35 m of the downstream end of the existing culvert, for a maximum total impact area (excluding the road surface) of about 0.21 ha. Rubber tire backhoes are the most common equipment employed for this type of work, though crawler mounted excavators may also be used when the depth or reach of excavation is greater than 4.5 m. At most of the following sites, temporary access roads will need to be built. The access roads will require no imported material, with all necessary construction equipment driving on existing earthen material. The contractor assumes ownership of and responsibility for disposal of any and all excess material generated on a project. Any excess material generated on a project will be disposed of an approved offsite location. Some vegetation will be removed to build temporary roads; however any bare areas resulting from construction activities will be revegetated using native species.

Work associated with the five proposed sites may involve dewatering the stream at the construction site. Dewatering, if necessary, will be achieved by constructing temporary cofferdams both upstream and downstream of the work area. Following construction of the cofferdams, a gravity siphon hose system will be installed to transport any residual stream flow around the work area to the channel downstream of the work area. If necessary, a pump will be used to convey flows through the hose. All of the water between the cofferdams will be removed and returned to the stream downstream of the construction site. Before the water between the cofferdams is pumped out, all fish between the cofferdams will be captured and relocated to another section of the creek in which water flow and other habitat parameters are sufficient for their survival. Dewatering the construction site will occur prior to any work within the stream channel.

A. Description of Proposed Work

Although the conceptual design for culvert replacement or rehabilitation is described in this opinion, design details will be developed during the engineering phase of the project. The engineering design and placement will consider the expected flow regimes, channel sinuosity and gradient, opportunity for fish passage, and aesthetics. The engineering design will begin once the proposed conceptual design is accepted by NOAA Fisheries. All components of the

proposed actions related to fish passage will meet or exceed NOAA Fisheries fish passage guidelines. Removal or retrofitting of the existing culverts at the fish passage sites will be constructed in the same location as the existing culverts and will utilize standard methods of construction to be determined during the design phase of the project. The method of construction will conform to the conditions provided by NOAA Fisheries regarding construction windows protection of the water in the creek.

1. MEN 128 - PM 21.80 Clow Creek

Proposed work at this site consists of replacing the existing 1.5 m by 44.3 m corrugated steel pipe (CSP) with 3.0 m by 44.0 welded steel pipe. The new pipe will be installed under SR 128 from the outlet side. A temporary access road will be constructed at the outlet side of the culvert. The road will be cut out of the existing roadway fill prism. It will begin west of the culvert and continue down to the existing outlet pool area. To stage equipment at the outlet pool area, an area approximately 10 m by 30 m will be cleared for placement of trenchless construction equipment. This area will begin at the exit of the existing culvert and continue downstream. The clearing will include excavation, leveling and removal of vegetation. The excavation will be a maximum of 2 m below the elevation of the existing pool. Existing earthen material will be used for leveling and no imported material will be used. Excavated material, not used during construction activities, will be stored adjacent to the cleared area temporarily. This work pad area is temporary and once construction is completed the creek bed will be restored to its original topographical configuration and revegetated with native species.

The new culvert (3 m diameter) will be installed over the existing 1.5 m diameter culvert. Horizontal jacking or hydraulic ramming equipment will be used, avoiding the need to dig a trench in the existing road prism. Jacking is a method for installation of culverts utilizing horizontal jacks on the work pad to apply constant and uniform pressure onto the culvert to push the culvert through the present soils; whereas, ramming is a method in which a pneumatic tool is used to hammer or vibrate the culvert into place. Approximately 10 steel piles, 30 centimeters (cm) by 30 cm in cross-section, will be driven vertically at the end of the cleared area to provide horizontal support for the trenchless construction equipment. Additional piles (approximately 4) will be used to construct a landing directly above the culvert outlet to allow for a crane to place new culvert segments into the trenchless installation equipment. As the new culvert is installed, the existing culvert and accompanying material will be removed and disposed of off site. Cobble, approximately 8 cm in diameter, will be imported to place in the culvert bottom.

2. MEN 128 - PM 27.54 Graveyard Creek

The proposed retrofits at this site will consist of removal of 9.5 m of the 71.1 m long culvert at the inlet, construction of a new concrete headwall, and roughening the culvert invert. The section of the channel where the culvert is removed will be regraded to natural contours. Two concrete fish weirs will be constructed in the outlet channel and a new concrete headwall will be constructed. In addition, a roughened channel bottom will be installed in the existing CSP.

Temporary access roads will be required at both the inlet and outlet. At the inlet, an access road will be constructed down the road embankment east of the existing culvert. At the outlet, an access road will be constructed down the road embankment west of the existing culvert.

3. MEN 128 - PM 36.63 Lost Creek

The existing 2.4 m by 24.6 m square reinforced concrete box (RCB) will be retrofitted with baffles to improve salmonids passage. Work will include invert paving and installation of six concrete weirs immediately downstream of the existing concrete outlet apron of the RCB. A temporary access road will be required at the outlet to construct the weirs. The access road will be constructed on the west side of the channel from an existing gravel road that connects to SR 128.

4. MEN 128 - PM 39.88 John Hiatt Creek

The existing 2.1 m by 55.5 m CSP will be retrofitted with installation of a roughened channel bottom in the existing CSP and construction of three concrete weirs in the outlet channel. Approximately 32 m^2 of quarter-ton and smaller rock slope protection (RSP) will be placed on the banks at the outlet. A temporary access road will be required at the outlet to construct the weirs. The access road will be constructed on the SR 128 embankment west of the existing culvert.

5. MEN 128 - PM 49.66 Edwards Creek

Proposed work at this site consists of replacing the existing 1.2 m by 17.8 m and 1.5 m by 18.0 m CSPs with a 2 m by 17.3 m double RCB. Cobble, approximately 8 cm in diameter, will be imported and placed in the culvert bottom. New concrete headwall and endwalls will be constructed and approximately 24 m^2 of light RSP will be placed on the banks at the inlet. A temporary access road is not required as the site is accessible from the highway and movement of the equipment off the shoulder is not anticipated.

In order to keep traffic moving throughout construction actions, this culvert will be replaced in two stages to allow continued use of the roadway during the construction activities. CalTrans will shift traffic into one shared lane, then dig through the road surface in the unused lane to access and remove the existing culvert. The new culvert segment will be placed at the planned grade and backfilled with native soils or concrete slurry; when slurry backfill is used, earth plugs will be used to contain the slurry within the trench. Lastly, the road surface will be repaired. After completing the first phase, traffic will be shifted to the repaired portion of the roadway and the remaining portion of the existing culvert will be replaced as described for the first portion.

B. Summary of Avoidance and Minimization Measures

CalTrans has proposed the following measures to avoid and minimize disturbance to aquatic habitats associated with the proposed construction activities:

1. Riparian areas outside the designated work areas will be designated as Environmentally Sensitive Areas and clearly indicated as such on project construction plans. Project specifications will include a requirement that Environmentally Sensitive Areas are clearly delineated with brightly colored fencing, rope or equivalent prior to beginning construction.

2. Graded or otherwise bare areas resulting from construction activities will be revegetated using native species. At least six months prior to the start of project construction, CalTrans will prepare detailed construction drawings and specifications for implementation of the revegetation effort.

3. Water for dust abatement, if necessary, will be acquired from an off-site source. No water drafting will be permitted.

4. Measures consistent with the current CalTrans Construction Site Best Management Practices (BMPs) will be implemented to minimize effects to anadromous fish habitat during construction. The manual is available at: http://www.dot.ca.gov/hq/construc/Construction_Site_BMPs.pdf.

5. Equipment staging/storage area will be outside of the creek bed and bank.

6. Instream work and work on the banks of fish-bearing streams will be conducted between June 15 and October 15.

7. No work will be conducted in the live channel of perennial anadromous fish-bearing streams.

C. Description of the Action Area

The action area is defined as all areas affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area is located within the Navarro River and Russian River watersheds in Mendocino County, California and is distributed at the discrete sites at which SR 128 crosses Clow, Graveyard, Lost, John Hiatt, and Edwards Creeks (Figure 1). Edwards Creek is a tributary of the Russian River; the other sites are in the Navarro River watershed. Clow Creek enters the Navarro River approximately 2 kilometers (km) northwest of Philo. Graveyard Creek enters the Navarro River approximately 3 km northwest of Boonville. Lost Creek enters Rancheria Creek approximately 6 km northwest of Yorkville. John Hiatt Creek enters Beebe Creek approximately 2.5 km northwest of

Yorkville. Although direct impacts to ESA-listed salmonids are anticipated to be localized to the areas within the five sets of cofferdams (described previously), the action area has been extended 100 m downstream of the project sites due to the anticipated indirect effects of the project, such as the relocation of steelhead and the possibility of measurable turbidity associated with the proposed action.

III. STATUS OF THE SPECIES AND CRITICAL HABITAT

This biological opinion analyzes the effects of the proposed action on the following Evolutionarily Significant Units (ESU)[1] of Pacific salmonids and critical habitat:

1. Threatened Central California Coast (CCC) steelhead (62 FR 43937; August 18, 1997).

2. Threatened Northern California (NC) steelhead (65 FR 36074; June 7, 2000).

3. Threatened Central California Coast (CCC) coho salmon (61 FR 56138; October 31, 1996).

4. Designated critical habitat for Central California Coast (CCC) coho salmon (64 FR 24049; May 5, 1999).

NOAA Fisheries found no records of Chinook salmon from the Navarro River and assumes that threatened California Coastal (CC) Chinook salmon (*O. tshawytscha*) (September 16, 1999; 64 FR 50394) are not likely to be present in the action area and, therefore, not likely to be adversely affected by the proposed action. Chinook salmon will not be considered further in this opinion.

A. Species Description and Life History

Coho salmon and steelhead are anadromous fish, spending some time in both fresh- and saltwater. The older juvenile and adult life stages occur in the ocean, until the adults ascend freshwater streams to spawn. Eggs (laid in gravel nests called redds), alevins (gravel dwelling hatchlings), fry (juveniles newly emerged from stream gravels), and young juveniles all rear in freshwater until they become large enough to migrate to the ocean to finish rearing and maturing to adults. Juveniles migrating to the ocean are called smolts. Both smolts and adults go through physiological changes as they emigrate from fresh- to saltwater (smolts) and immigrate from

[1] For purposes of conservation under the Endangered Species Act, an Evolutionarily Significant Unit (ESU) is a distinct population segment that is substantially reproductively isolated from other conspecific population units and represents an important component in the evolutionary legacy of the species (Waples 1991).

salt- to freshwater (adults). The timing of migrations, freshwater habitat preferences for spawning and rearing, the duration of freshwater and ocean rearing, distribution in the ocean, age at maturity, and other traits vary by species. Coho salmon die after spawning, whereas steelhead can sometimes survive to spawn again (Shapovalov and Taft 1954, Sandercock 1991, Busby *et al.* 1996).

1. Coho Salmon

The life history of the coho salmon in California has been well documented (Shapovalov and Taft 1954, Hassler 1987, Weitkamp *et al.* 1995). In contrast to the life history patterns of other anadromous salmonids, coho salmon in California generally exhibit a relatively simple 3-year life cycle. Adult salmon typically begin the immigration from the ocean to their natal streams after heavy late-fall or winter rains breach the sand bars at the mouths of coastal streams (Sandercock 1991). Coho salmon are typically associated with small to moderately-sized coastal streams characterized by heavily forested watersheds; perennially-flowing reaches of cool, high-quality water; dense riparian canopy; deep pools with abundant overhead cover; instream cover consisting of large, stable woody debris and undercut banks; and gravel or cobble substrates (Sandercock 1991). Immigration continues into March, generally peaking in December and January, with spawning occurring shortly after arrival at the spawning ground (Shapovalov and Taft 1954).

The eggs generally hatch after four to eight weeks, depending on water temperature. Survival and development rates depend, in part, on fine sediment levels within the redd. Under optimum conditions, mortality during this period can be as low as 10 percent; under adverse conditions of high scouring flows or heavy siltation, mortality may be close to 100 percent (Baker and Reynolds 1986). McMahon (1983) found that egg and fry survival drops sharply when fines make up 15 percent or more of the substrate. The newly-hatched fry remain in the redd from two to seven weeks before emerging from the gravel (Shapovalov and Taft 1954). Upon emergence, fry seek out shallow water, usually along stream margins. As they grow, juvenile coho salmon often occupy habitat at the heads of pools, which generally provide an optimum mix of high food availability and good cover with low swimming cost (Nielsen 1992). Chapman and Bjornn (1969) determined that larger juveniles tend to occupy the head of pools, whereas smaller juveniles are found further down the pools. As the fish continue to grow, they move into deeper water and expand their territories until, by July and August, they reside exclusively in deep pool habitat. Preferred rearing habitat has little or no turbidity and high sustained invertebrate forage production. Juvenile coho salmon feed primarily on drifting terrestrial insects, much of which are produced in the riparian canopy, and on aquatic invertebrates growing within the interstices of the substrate and in leaf litter in pools. Juvenile coho salmon prefer well shaded pools at least 1 m deep with dense overhead cover; abundant submerged cover composed of undercut banks, logs, roots, and other woody debris; and preferred water temperatures of 12-15° celsius (C) (Brett 1952, Bell 1973, Reiser and Bjornn 1979, McMahon 1983), but not exceeding 22-25°C

(Brungs and Jones 1977) for extended time periods. Growth is slowed considerably at 18°C and ceases at 20°C (Stein *et al.* 1972, Bell 1973).

In the spring, as yearlings, juvenile coho salmon undergo a physiological process, or smoltification, which prepares them for living in the marine environment. They begin to migrate downstream to the ocean during late March and early April; emigration usually peaks in mid-May, if conditions are favorable. Emigration timing is correlated with peak upwelling currents along the coast. Entry into the ocean at this time facilitates more growth and, therefore, greater marine survival (Holtby *et al.* 1990).

2. Steelhead

General reviews for steelhead in California document much variation in life history (Shapovalov and Taft 1954, Barnhart 1986, Busby *et al.* 1996, McEwan 2001). Juvenile steelhead live 1 to 4 years in freshwater before smolting and emigrating, then spend 1 to 4 years maturing in the ocean. Steelhead spawn at 2 to 8 years, and may spawn 1 to 4 times over their life. Although variation occurs, in coastal California, steelhead usually live in freshwater for 2 years, then spend 1 or 2 years in ocean before returning to their natal stream to spawn. Steelhead exhibit much variation in migration timing too. Steelhead can be divided into two reproductive ecotypes, based upon their state of sexual maturity at the time of river immigration and the duration of their spawning migration: stream maturing and ocean maturing. Stream maturing steelhead enter freshwater in a sexually immature condition and require several months to mature and spawn; whereas, ocean maturing steelhead enter freshwater with well developed gonads and spawn shortly after river entry. These two reproductive ecotypes are more commonly referred to by their season of freshwater entry (*i.e.*, summer [stream maturing] and winter steelhead [ocean maturing]). Summer steelhead typically immigrate between May and October and spawn in January and February; winter steelhead typically immigrate between November and April spawning soon after reaching the spawning grounds. Only winter steelhead are found in the Navarro and Russian River.

Survival to emergence of steelhead embryos is inversely related to the proportion of fine sediment in the spawning gravels. However, steelhead are slightly more tolerant than other salmonids, with significant reductions in survival when fines of less than 6.4 millimeters (mm) comprise 20-25 percent of the substrate. Fry typically emerge from the gravel two to three weeks after hatching (Barnhart 1986). Upon emerging from the gravel, fry rear in edgewater habitats and move gradually into pools and riffles as they grow larger. Older fry establish territories which they defend. Cover is an important habitat component for juvenile steelhead, both as a velocity refuge and as a means of avoiding predation (Shirvell 1990, Meehan and Bjornn 1991). Steelhead, however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. In winter, juvenile steelhead become inactive and hide in available cover, including gravel or woody debris. Rearing steelhead juveniles prefer water temperatures of 7.2-14.4°C and have an

upper lethal limit of 23.9°C (Barnhart 1986, Bjornn and Reiser 1991). They can survive in water up to 27°C with saturated dissolved oxygen conditions and a plentiful food supply. Fluctuating diurnal water temperatures also aid in survivability of salmonids (Busby *et al.* 1996).

Steelhead emigration timing is similar to coho salmon (Fukushima and Lesh 1998). In Waddell Creek, Shapovalov and Taft (1954) found steelhead juveniles migrating downstream at all times of the year, with the most juvenile steelhead emigrating during spring and summer.

B. Status of Species and Critical Habitat

In this opinion, NOAA Fisheries assesses the status of each species by examining four types of information, all of which help us understand a population's ability to survive. These population viability parameters are: abundance, population growth rate, spatial structure, and diversity (McElhaney *et al.* 2000). While there is insufficient information to evaluate these population viability parameters in a quantitative sense, NOAA Fisheries has used existing information to determine the general condition of each population and factors responsible for the current status of each ESU.

1. CCC Coho Salmon

A comprehensive review of estimates of historic abundance, decline, and present status of coho salmon in California is provided by Brown *et al.* (1994). They estimated that coho salmon annual spawning population in California ranged between 200,000 and 500,000 fish in the 1940s, which declined to about 100,000 fish by the 1960s, followed by a further decline to about 31,000 fish by 1991. Brown *et al.* (1994) concluded that the California coho salmon population had declined more than 94 percent since the 1940s, with the greatest decline occurring since the 1960s. More recent population estimates vary from approximately 600 to 5,500 adults (Brown *et al.* 1994). Recent NOAA Fisheries status reviews (NOAA Fisheries 2001, NOAA Fisheries 2003a) indicate that the CCC coho salmon ESU is likely continuing to decline in number.

CCC coho salmon have also experienced acute range restriction and fragmentation. Adams *et al.* (1999) found that in the mid 1990s coho salmon were present in 51 percent (98 of 191) of the streams where they were historically present, and documented an additional 23 streams, within the CCC coho salmon ESU, in which coho salmon were found for which there were no historical records.

Recent genetic research in progress by both the NOAA Fisheries Southwest Fisheries Science Center and the Bodega Marine Laboratory, has documented a reduction in genetic diversity within subpopulations of the ESU (Daniel Logan, NOAA Fisheries, personal communication, 2003). The influence of hatchery fish on wild stocks has also contributed to the lack of diversity through outbreeding depression[2] and disease.

[2]Outbreeding depression is the loss of genetic and behavioral diversity in a population through the

Available information suggests that CCC coho salmon abundance is very low, and the ESU is not able to produce enough offspring to maintain itself (population growth rates are negative). CCC coho salmon have experienced range constriction, fragmentation, and a loss genetic diversity. Many subpopulations that may have acted to support the species' overall numbers and geographic distribution, have likely been lost. The extant subpopulations of CCC coho salmon may not have enough fish to survive additional natural and human caused environmental change. While the amount of data supporting these conclusions is not extensive, NOAA Fisheries is unaware of information that suggests a more positive assessment of the condition of the ESU and its critical habitat. Recent status reviews for CCC coho salmon conclude that this ESU is presently in danger of extinction (NOAA Fisheries 2001, NOAA Fisheries 2003a), and on June 14, 2004 NOAA Fisheries proposed to change the ESA designation of this ESU to endangered (69 FR 33102).

2. NC Steelhead

Based on the limited data available (dam counts of portions of stocks in several rivers), NOAA Fisheries' initial status review of NC steelhead (Busby *et al.* 1996) determined that population abundance was very low relative to historical estimates (1930s and 1960s dam counts), and recent trends were downward in most stocks. Overall, population numbers are severely reduced from pre-1960s levels, when approximately 198,000 adult steelhead migrated upstream to spawn in the major rivers of this ESU (Busby *et al.* 1996, 65 FR 36074). Updated status reviews reach the same conclusion, and noted the poor amount of data available, especially for winter run steelhead (NOAA Fisheries 1997a, Adams 2000, NOAA Fisheries 2003a). The information available suggests that the population growth rate is negative.

Comprehensive geographic distribution information is not available for this ESU, but steelhead are considered to remain widely distributed (NOAA Fisheries 1997a). It is known that dams on the Mad River and Eel River block large amounts of habitat historically used by NC steelhead (Busby *et al.* 1996). Hatchery practices in this ESU have exposed the wild population to genetic introgression and the potential for deleterious interactions between native stock and introduced steelhead. Historical hatchery practices at the Mad River hatchery are of particular concern, and included out-planting of non-native Mad River hatchery fish to other streams in the ESU and the production of non-native summer steelhead (65 FR 36074).

The conclusion of the most recent status review (NOAA Fisheries 2003a) echoes that of previous reviews. Abundance and productivity in this ESU are of most concern, relative to NC steelhead

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introduction of parental genomes that are not well adapted to local environments. Less native genetic material is passed to subsequent generations when native fish hybridize with hatchery fish instead of propagating with other purely native salmon.

spatial structure (distribution on the landscape) and diversity (level of genetic introgression). The lack of data available also remains a risk because of uncertainty regarding the condition of some stream populations. Recently, NOAA Fisheries evaluated the listing status of NC steelhead and proposed maintaining the threatened listing determination (69 FR 33102).

3. CCC Steelhead

While there are no specific estimates of abundance at the population scale, CCC steelhead numbers are substantially reduced from historical levels. A total of 94,000 adult steelhead were estimated to spawn in the rivers of this ESU in the mid-1960s, including 50,000 fish in the Russian River and 19,000 fish in the San Lorenzo River (Busby *et al.* 1996). Recent estimates for the Russian River are on the order of 4,000 fish (NOAA Fisheries 1997b). Abundance estimates for smaller coastal streams in the ESU indicate low but stable levels with recent estimates for several streams (Lagunitas Creek, Waddell Creek, Scott Creek, San Vincente Creek, Soquel Creek, and Aptos Creek) of individual run sizes of 500 fish or less (62 FR 43937).

Overall, the abundance of the CCC steelhead ESU has declined precipitously, from an estimated 94,000 returning adults in the 1960s to estimates less than 5,350 in recent times (Busby *et al.*1996; NOAA Fisheries 1997b). These numbers indicate over a 94 percent decline in the population of steelhead spawning in the ESU. Absent information indicating a recent upward trend in numbers ESU wide, NOAA Fisheries assumes that the overall population growth rate may continue to be negative. For more detailed information on the population trend of CCC steelhead, see: Busby *et al.* 1996, NOAA Fisheries 1997b, and NOAA Fisheries 2003a.

CCC steelhead have maintained a wide distribution throughout the ESU. Presence/absence data show that in a subset of streams sampled in the CCC region, most contain steelhead (NOAA Fisheries 1997b). Of streams in the ESU for which there is current presence/absence data on steelhead, 218 of 264 streams currently support some juveniles. Species with broad distributions are more likely to survive environmental fluctuations and stochastic events, even if they suffer local extirpation (Pimm *et al.* 1988). Many streams in and around the San Francisco Bay region, however, no longer support steelhead. The interbasin transfer of hatchery steelhead has persisted in various locations and at various times within the CCC steelhead ESU (NOAA Fisheries 1997b). This has likely affected the genetic composition of existing stocks. Although some genetic research is being done on CCC steelhead, little information is available to assess the diversity of the species.

While CCC steelhead have experienced significant declines in abundance, and long-term population trends suggest a negative growth rate, they have maintained a wide distribution throughout the ESU. This suggests that, while there are significant threats to the population, they possess a resilience that is likely to slow their decline. A recent status review concludes that steelhead in the CCC steelhead ESU remain "likely to become endangered in the foreseeable future" (NOAA Fisheries 2003a). In June 2004, NOAA Fisheries evaluated the listing status of CCC steelhead and proposed maintaining the threatened listing determination (69 FR 33102).

4. Coho Salmon Critical Habitat

Critical habitat is defined in section 3(5)(A) of the Endangered Species Act (ESA) as "(I) the specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species . . . upon a determination by the Secretary of Commerce (Secretary) that such areas are essential for the conservation of the species" (see 16 U.S.C. 1532(5)(A)). The term 'conservation', as defined in section 3(3) of the ESA, means ". . . to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary" (see 16 U.S.C. 1532(3)). Therefore, critical habitat is the geographic area and habitat functions necessary for the recovery of the species.

The condition of CCC coho salmon critical habitat, specifically its ability to provide for their conservation, has been degraded from conditions known to support viable salmonid populations. NOAA Fisheries has determined that present depressed population conditions are, in part, the result of the following human-induced factors affecting critical habitat[3]: logging, agricultural and mining activities, urbanization, stream channelization, dams, wetland loss, and water withdrawals, including unscreened diversions for irrigation. Impacts of concern include alteration of stream bank and channel morphology, alteration of water temperatures, loss of spawning and rearing habitat, fragmentation of habitat, loss of downstream recruitment of spawning gravels and large woody debris, degradation of water quality, removal of riparian vegetation resulting in increased stream bank erosion, increases in erosion entry to streams from upland areas, loss of shade (higher water temperatures) and loss of nutrient inputs (Weitkamp *et al.* 1995, CDFG 2004. 61 FR 56138). Depletion and storage of natural river and stream flows have drastically altered natural hydrologic cycles in many of the streams in the ESU. Alteration of flows results in migration delays, loss of suitable habitat due to dewatering and blockage; stranding of fish from rapid flow fluctuations; entrainment of juveniles into poorly screened or unscreened diversions, and increased water temperatures harmful to salmonids (61 FR 56138).

C. Status of the Species in the Navarro and Russian River Watersheds

1. CCC Coho Salmon

The present distribution of coho salmon within the Navarro River and Russian River watersheds is substantially less than that recorded historically (Weitkamp *et al.* 1995; CDFG 2002; CDFG 2004). Fourteen of the 19 Navarro River watershed streams listed by Brown and Moyle (1991)

[3]Other factors, such as over fishing and artificial propagation have also contributed to the current population status of these species. All these human induced factors have exacerbated the adverse effects of natural environmental variability from such factors as drought and poor ocean conditions.

as historical coho salmon streams were surveyed in 2001. Coho salmon were observed in only six of those streams: mainstem Navarro River, Flynn Creek, South Branch of the North Fork, North Branch of the North Fork, Little North Fork, and John Smith Creek. Coho salmon populations are now restricted to the western portion of the Navarro River watershed. The risk of extinction for coho salmon populations from the Navarro River is high (CDFG 2004; Figure 6-26). Coho salmon are present in the Russian River at very low levels, population distribution appears restricted to the westernmost portions of the watershed, and all populations have missing year-classes (Weitkamp *et al.* 1995; CDFG 2004). The most upstream collections of coho salmon from the Russian River watershed have been from Maacama Creek which enters the Russian River near Healdsburg. The risk of extinction for coho salmon from the Russian River is high (CDFG 2004; Figure 6-26). In response, the CDFG and NOAA Fisheries have started a captive breeding program for Russian River coho salmon.

2. NC Steelhead

Steelhead, while less abundant than historically, are distributed in many streams of the Navarro River watershed (Mendocino County Water Agency *et al.* 1998, unpublished CDFG stream surveys).

3. CCC Steelhead

Steelhead are found throughout the Russian River basin, though at reduced abundance (Busby *et al.* 1996). The Russian River has the highest steelhead productivity within the CCC steelhead ESU (62 FR 43937).

D. Status of Coho Salmon Critical Habitat in the Navarro and Russian River

Forestry, urban and rural residential development, and agricultural activities likely contribute to excessive sedimentation, low woody debris abundance and recruitment, elevated water temperature, chemical toxicity, and atypical stream hydrology throughout the Navarro River and Russian River watersheds (California Regional Water Quality Control Board 2001; www.epa.gov). Also, there are some in-channel gravel mining operations in the Russian River watershed. The effects of land-use activities are exacerbated by natural erosive geology, poorly consolidated sediments, and the mountainous and rugged terrain. Many rivers in northern California, including the Navarro and Russian rivers, naturally carry high loads of sediment during winter storm events -- some of the highest sediment discharge volumes versus watershed area within the United States (Kelsey 1977). Brown and Moyle (1991) reported that logging and mining in combination with naturally erosive geology have led to significant aggradation of up to 10 feet in some areas of Austin Creek - a lower Russian River tributary. Increased sedimentation affects spawning gravels, pool formation, and rearing habitat throughout both watersheds and are likely limiting production and recovery of coho salmon in the action area.

The Navarro River and Russian River have many anthropogenic migration barriers which deny coho salmon access to potential habitat, affect sediment transport, and affect water flow and temperature (Mendocino County Water Agency *et al.* 1998, CDFG 2004, unpublished CDFG stream surveys). Two large dams are on Russian River tributaries blocking access to anadromous fish habitat: Coyote Valley Dam and Warm Springs Dam. Steiner Environmental Consulting (1996) cites unpublished data from the California State Water Resources Control Board which state that there are over 500 small dams on the Russian River and its tributaries. These dams have a variety of functions including residential, commercial, and agricultural water supply; flood and/or debris control, and recreation. The US Army Corps of Engineers (1982) concluded that the loss of tributary habitat was the primary factor limiting the recovery of the anadromous fishery in the Russian River.

Besides creating migration barriers, improperly designed or maintained culverts can be a significant source of sediment to a stream (Furniss *et al.* 1991). Road-related erosion is responsible for about 60 percent of the total sediment production (Mendocino County Water Agency *et al.* 1998). Stream crossings and ditch relief culverts are the most common sources of road-related potential erosion in the Navarro River watershed (www.krisweb.com). Over 45,000 m^3 of potential road-related erosion in the Navarro River watershed from stream crossings and ditch relief culverts alone. Stream crossing failures present the greatest risk of episodic, catastrophic erosion potential. NOAA Fisheries assumes that culvert conditions and erosion potential for the Russian River watershed are similar to those in the Navarro River watershed.

The Navarro River is included on the 2002 Clean Water Act section 303(d) list of water quality limited segments. The pollution factors for the Navarro River are sedimentation and temperature. Forestry, agriculture, residence and land development, and nonpoint sources are listed as the potential sources for these factors. The Russian River is included on the 2002 Clean Water Act section 303(d) list of water quality limited segments. The pollution factors for the Russian River are sedimentation, temperature, and pathogens. Forestry, agriculture, dams with flow regulation, urban and land development, and nonpoint sources are listed as the potential sources for these factors. Lake Sonoma, a reservoir impounded by Warm Springs Dam, is included on the section 303(d) list because of elevated levels of mercury associated with historic mining. The Laguna de Santa Rosa is limited by dissolved oxygen, nitrogen, and phosphorus. The US Environmental Protection Agency has approved Total Maximum Daily Load (TMDL) guidelines for sediment and temperature for the Navarro River, however, there are no approved TMDLs for the Russian River watershed (www.epa.gov).

During the past two years NOAA Fisheries has completed several ESA consultations within the Navarro River and Russian River watersheds. Among other consultations, NOAA Fisheries has consulted with CalTrans on bank stabilization and culvert replacement projects, with the National Resources Conservation Service for a coordinated permit program covering bank stabilization, culvert repair, road rehabilitation, and invasive vegetation management projects for agricultural landowners, and with the US Army Corps of Engineers for a nationwide permit for stream and riparian restoration activities. NOAA Fisheries anticipates that these projects will

improve the habitat conditions for coho salmon by reducing sediment sources and improving riparian vegetation.

IV. ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the status of the species, its habitat, and the ecosystem in the action area. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area; the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation; and the impact of State or private actions which are contemporaneous with the consultation in process (50 CFR §402.02).

The action area is located within the Navarro and Russian River watersheds. Edwards Creek is a small tributary of the Russian River entering the mainstem near the town of Cloverdale; all other project sites are within the Navarro River watershed. Precipitation in the Navarro River watershed and Cloverdale area is approximately 100 cm of precipitation per year, with most occurring between December 15 and March 31 (CDFG 2004). Most of the land use in the Navarro River and Edwards Creek watersheds is forestry (70%), in both commercial and small private holdings. The second dominant type of land use is rangeland (25%), followed by agricultural and rural development (5%). The Clow Creek and Graveyard Creek sites are within the Anderson Valley - a broad alluvial valley within the Navarro River watershed. Slopes on the east side of the valley are dominated by woodlands of various oaks (*Quercus* spp.). Slopes to the west are a mixture of Douglas Fir (*Pseudotsuga menziesii*) and oaks. Historically, the valley itself contained grasslands and oak woodlands. The Lost Creek and John Hiatt Creek sites are in constrained, forested portions of the Navarro River watershed, and the Edwards Creek site is in a constrained, forested, upland portion of the Russian River watershed. Riparian tree species at all five sites include species typical of inland coast ranges: red alder (*Alnus rubra*), various willows (*Salix* spp.), big-leaf maple (*Acer macrophyllum*), and California laurel (*Umbellularia californica*).

A. Status of Listed Species/Critical Habitat in the Action Area

NOAA Fisheries searched many sources (Weitkamp *et al.* 1995, Mendocino County Water Agency *et al.* 1998, CDFG 2002, CDFG 2004, unpublished CDFG stream surveys) and found no fisheries survey information for Clow, Graveyard, Lost, or John Hiatt Creeks. Currently, coho salmon populations are restricted to the western portion of the Navarro River watershed in streams entering the Navarro River approximately 15 stream km west of the westernmost project site, Clow Creek. Although NOAA Fisheries found no documentation of coho salmon from these four project site streams, the distance from documented sites is small and NOAA Fisheries is not aware of any complete barriers to migration between streams with coho salmon and the project site streams; therefore, NOAA Fisheries will assume that coho salmon have access to

these project sites. NOAA Fisheries staff observed steelhead at Clow Creek during a September 15, 2004, site visit and assumes that steelhead can access the other Navarro River projects sites, as steelhead are well distributed throughout the Navarro River watershed.

NOAA Fisheries found no documentation of coho salmon from Edwards Creek (Weitkamp *et al.* 1995, CDFG 2002, CDFG 2004, unpublished CDFG stream surveys). The closest documented collection of coho salmon from the Russian River watershed is from Maacama Creek, approximately 50 stream km from the Edwards Creek site. Although coho salmon probably could access the Edwards Creek site, given the small and declining populations of coho salmon in the Russian River watershed, and the distance from a potential source stock, NOAA Fisheries assumes that the likelihood of coho salmon being at the Edwards Creek site is small. Steelhead are found in low densities in Edwards Creek (unpublished CDFG stream surveys).

B. Salmonid Habitat/Critical Habitat Within the Action Area

The stream channels at the project sites are shallow with few pools, reduced surface flow in the summers and fall, and provide limited habitat for juvenile salmonids during that low flow period. Some instream cover is likely provided by large cobble. Instream large woody debris appears mostly lacking in the action area. Overwinter and outmigration habitat conditions are also poor because the channel lacks habitat complexity and velocity refuge. Based on current channel conditions, NOAA Fisheries believes that CCC coho salmon critical habitat within the action area is degraded from properly functioning condition due to lack of riparian and instream cover, excessive loading of fine sediment, and reduced surface flow. The CDFG has ranked the restoration potential for coho salmon populations throughout California by determining whether or not potential habitat exists in the watershed. The Navarro River and Russian River have a moderately high potential for restoration and management (CDFG 2004, Figure 6-28).

C. Factors Affecting Species Environment Within the Action Area

All of the existing culverts, with the exception of those at the Edwards Creek site, are barriers to migration. The culvert at the Clow Creek site is not properly sized and exacerbates sediment loading by accelerating water velocity. All of the streams become intermittent in some or most years at the project locations, reducing rearing habitat and migration corridors. Most sites have well developed riparian corridors within the action area. All of the sites are near rural residential and agricultural development; land uses which contribute to erosion, chemical toxicity, and atypical hydrology to the creeks. Anderson Valley Way crosses Graveyard Creek downstream of the project site; this crossing may be a barrier to fish migration.

V. EFFECTS OF THE PROPOSED ACTION

The purpose of this section is to identify the direct and indirect effects of the proposed action on threatened CCC steelhead, threatened CCC coho salmon, and on designated critical habitat for CCC coho salmon. Data to quantitatively determine the precise effects of the proposed action on steelhead, coho salmon, and coho salmon critical habitat, are limited or not available; the assessment of effects therefore focuses mostly on qualitative identification. This approach was based on a review of ecological literature concerning the effects of loss and alteration of habitat elements important to salmonids, including water, substrate, food, and adjacent riparian areas; the primary constituent elements of proposed critical habitat that will be affected. This information was then compared to the likely effects associated with the proposed project.

The project is anticipated to take three consecutive construction seasons to complete, beginning in 2007. Construction activities within the creek channel will be limited annually to June 15 through October 31. The work window begin date of June 15 is likely to avoid effects to salmonid smolts since emigration occurs prior to June 15. The work window end date of October 31 will avoid the immigration period for adult salmonids. Based on available data, NOAA Fisheries anticipates that a small number of juvenile salmonids will be within the action area during project implementation.

As noted above in the *Description of the Proposed Action*, CalTrans determined that its actions are not likely to adversely affect ESA-listed salmonids at 44 construction sites. These projects will be in places not likely utilized by salmonids during the proposed construction window. Even if ESA-listed salmonids use these 44 sites outside of the proposed construction window, these projects are small in scope and will be completed during the driest time of year. CalTrans has proposed BMPs to minimize project-related sedimentation at individual sites to a negligible level. These 44 sites are widely distributed throughout the Navarro River and Russian River watersheds and not concentrated in any one subwatershed. Also, the 44 projects will not be completed in a single year. Therefore, CalTrans does not anticipate additive or synergistic effects related to sedimentation or this project. NOAA Fisheries concurs with CalTrans determination related to those 44 projects. The remainder of this effects analysis is dedicated to the five sites described in section II A of this opinion.

A. Fish Relocation Activities

If water is present at the proposed sites during construction, then the project work site will be dewatered. Before the project site is dewatered, qualified biologists will capture and relocate fish away from the project work site to avoid direct mortality and minimize the possible impact of take of listed species. Fish in the immediate project area will be captured by seine, dip net and/or electrofisher, and then transported and released to a suitable instream location. Data to precisely quantify the amount of fish that will be relocated prior to implementation of each individual construction project are not available. However, NOAA Fisheries can narrow the life stage to which effects are anticipated. Fish relocation activities will occur during the summer low-flow

period after emigrating smolts have left and before adults have immigrated to the proposed project sites. Therefore, the listed salmonids that will be captured during relocation activities will be young of the year (YOY), although there is a potential of one or two year old steelhead being present.

Fish relocation activities pose a risk of injury or mortality to rearing juvenile salmonids. Any fish collecting gear, whether passive (Hubert 1983, Hubert 1996) or active (Hayes 1983, Hayes *et al.* 1996) has some associated risk to fish, including stress, disease transmission, injury, or death. The amount of unintentional injury and mortality attributable to fish capture varies widely depending on the method used, the ambient conditions, and the expertise and experience of the field crew. NOAA Fisheries anticipates that mortality rates for juvenile coho salmon and steelhead are similar. The effects of seining and dipnetting on juvenile salmonids include stress, scale loss, physical damage, suffocation, and desiccation. Electrofishing can kill juvenile salmonids, and researchers have found serious sublethal effects including spinal injuries (Reynolds 1996, Nielsen 1998). The long-term effects of electrofishing on salmonids are not well understood. Although chronic effects may occur, it is assumed that most impacts from electrofishing occur at the time of sampling. Since fish relocation activities will be conducted by qualified fisheries biologists following both CDFG and NOAA Fisheries electrofishing guidelines, direct effects to and mortality of juvenile salmonids during capture will be minimized. Data from two years of similar salmonid relocation activities in Humboldt County indicate that average mortality rate is below one percent (Collins 2004).

Although sites selected for relocating fish should have similar water temperature as the capture site and should have ample habitat, in some instances relocated fish may endure short-term stress from crowding at the relocation sites. Relocated fish may also have to compete with other fish causing increased competition for available resources such as food and habitat. Some of the fish released at the relocation sites may choose not to remain in these areas and may move either upstream or downstream to areas that have more habitat and a lower density of fish. As each fish moves, competition remains either localized to a small area or quickly diminishes as fish disperse. Also, the migrating fish may enter some underseeded habitat. NOAA Fisheries cannot accurately estimate the number of fish affected by competition, but does not believe this impact will cascade through the watershed populations of these species based on the small area that will likely be affected and the small number of salmonids likely relocated.

B. Dewatering

NOAA Fisheries anticipates temporary changes in stream flow within and downstream of project sites during dewatering activities. These fluctuations in flow are anticipated to be small, gradual, and short-term. Stream flow in the vicinity of each project site should be the same as free-flowing conditions except during dewatering and at the dewatered reach where stream flow is bypassed. Stream flow diversion and project work area dewatering are expected to cause temporary loss, alteration, and reduction of aquatic habitat. NOAA Fisheries anticipates that only a small reach of stream at each project site will be dewatered for in-channel construction

activities, as the great majority of the total area dewatered is within the existing culverts – habitat not currently utilized by salmonids. With the exception of the Clow Creek site, the coffer dams will be placed both 15 m upstream and downstream beyond the limit of the proposed facilities. At Clow Creek, 35 m downstream of the existing channel will be dewatered. The longest area dewatered is the Graveyard Creek site: 108.1 m, however, 71.1 m of that distance is the length of the existing culvert. Stream flow diversions could harm individual rearing juvenile coho salmon and steelhead by concentrating or stranding them in residual wetted areas) before they are relocated (Cushman 1985). Rearing juvenile salmonids could be killed or injured if crushed during diversion activities, though direct mortality is expected to be minimal due to relocation efforts prior to installation of the diversion. Juvenile salmonids that avoid capture in the project work area will die during dewatering activities.

Benthic (*i.e.*, bottom dwelling) aquatic macroinvertebrates within the project site may be killed or their abundance reduced when creek habitat is dewatered (Cushman 1985). However, effects to aquatic macroinvertebrates resulting from stream flow diversions and dewatering will be temporary because construction activities will be relatively short-lived, and rapid recolonization (about one to two months) of disturbed areas by macroinvertebrates is expected following rewatering (Cushman 1985, Thomas 1985, Harvey 1986). In addition, the effect of macroinvertebrate loss on juvenile salmonids is likely to be negligible because food from upstream sources (via drift) would be available downstream of the dewatered areas since stream flows will be maintained around the project work site and food sources derived from the riparian zone will not be effected by the project. Based on the foregoing, the loss of aquatic macroinvertebrates as a result of dewatering activities is not expected to adversely effect ESA-listed salmonids.

C. Increased Mobilization of Sediment within the Stream Channel

Culvert construction and road building activities may cause temporary increases in turbidity (reviewed in Furniss *et al.* 1991, Reeves *et al.* 1991, and Spence *et al.* 1996). NOAA Fisheries anticipates that short-term increases in turbidity will occur during proposed dewatering activities, construction and removal of coffer dams, construction and removal of a work pad at one site, and construction and decommissioning of temporary roads. Sediment may affect salmonids by a variety of mechanisms. Excessive fine sediment can interfere with development and emergence of salmonids (reviewed by Reiser and Bjornn 1979 and Chapman 1988). High concentrations of suspended sediment can disrupt normal feeding behavior and efficiency (Cordone and Kelly 1961; Bjornn *et al.* 1977, Berg and Northcote 1985), reduce growth rates (Crouse *et al.* 1981), and increase plasma cortisol levels (Servizi and Martens 1992). High turbidity concentrations can reduce dissolved oxygen in the water column, result in reduced respiratory functions, reduce tolerance to diseases, and can also cause fish mortality (Sigler *et al.* 1984, Berg and Northcote 1985, Gregory and Northcote 1993, Velagic 1995, Waters 1995). Even small pulses of turbid water will cause salmonids to disperse from established territories (Waters 1995), which can displace fish into less suitable habitat and/or increase competition and predation, decreasing

chances of survival. Increased sediment deposition can fill pools and reduce the amount of cover available to fish, decreasing the survival of juveniles (Alexander and Hansen 1986).

Much of the research discussed in the previous paragraph focused on turbidity levels higher than those likely to result from the proposed construction activities. Recent monitoring of newly replaced culverts within Humboldt County generally detailed temporary increases in turbidity following winter storm events, the measured turbidity was generally less than the turbidity threshold commonly cited as beginning to cause minor behavioral changes (Henley *et al.* 2000), and always less than turbidity levels necessary to injure or kill salmonids. CalTrans proposes to minimize the effects of these activities by following CalTrans approved BMPs, using no imported material, decommissioning the roads after completion of the construction project, minimizing the loss of native riparian vegetation, and replanting any disturbed soils with native vegetation. NOAA Fisheries expects some limited behavioral effects, such as temporarily vacating preferred habitat or temporarily reduced feeding efficiency, to be the most likely results from implementation of the proposed action. These behavioral changes are not likely to reduce the survival chances of individual salmonids.

D. Toxic Chemicals

Equipment refueling, fluid leakage, and maintenance activities within and near the stream channel pose some risk of contamination and potential take. NOAA Fisheries anticipates that CalTrans and its contractors will maintain any and all fuel storage and refueling sites in upland locations well away from the stream channel; that vehicles and construction equipment be in good working condition, showing no signs of fuel or oil leaks, and that any and all servicing of equipment be conducted in an upland location. CalTrans may use bentonite as a lubricant if culvert jacking is used at the Clow Creek site and accidental release of bentonite may occur. Bentonite is a potentially lethal irritant to fish. Sigler *et al.* (1984) reported that steelhead and coho salmon show reduced growth rates or increased emigration rates when exposed to 125 to 175 mg/l bentonite. In addition to toxic chemicals associated with construction equipment, water that comes into contact with wet cement during construction can adversely affect water quality and cause harm and potential take of listed salmonids. NOAA Fisheries does not anticipate any localized or appreciable water quality degradation from toxic chemicals or take of ESA-listed salmonids associated with the proposed projects, as the stream will be dewatered near the construction sites giving CalTrans and its contractors ample opportunity to attend to any spill.

E. Sound

CalTrans proposes placing fourteen 30 cm by 30 cm steel piles at the Clow Creek site. Ten of the piles will be driven vertically in the temporary work pad to provide support of the trenchless construction equipment required at that site. Four additional piles will be driven directly above the culvert outlet to construct a landing for a crane to place new culvert segments into the trenchless installation equipment. The piles will be driven into dewatered portions of the stream or the existing road prism. No piles will be driven nearer than 15 m to the downstream

cofferdam. All fourteen piles would be removed after the construction is completed. CalTrans has not determined which method of placement will be used for the new culvert on Clow Creek, though will use either a jacking or ramming technique, and both methods will create sound over ambient levels.

Pile driving, culvert jacking, and hydraulic ramming cause high sound pressure levels and may affect fish. The degree to which an individual fish exposed to sound will be affected is dependent on a number of variables, including, but not limited to: species and size of the fish, size and type of hammer used, size and material of the pile, distance from the source, peak sound pressure and frequency, depth of the water around the pile, bottom substrate composition and texture, and effectiveness of any sound attenuation technology (reviewed in NOAA Fisheries 2003b). Depending on these factors, effects on fish can range from immediate mortality to a startle response. CalTrans has not identified the specific methodology to be used for driving piles at the Clow Creek site. CalTrans has concluded that since the piles at the Clow Creek site are being driven upland or in a dewatered channel and since the downstream cofferdam would be approximate 27 m from the sound source, the sediment should substantially attenuate the energy to which the fishes would be subjected, and, therefore, not lead to trauma or mortality of listed salmonids. CalTrans offered information from the Noyo Bridge construction project, where 30 cm by 30 cm steel piles were driven in earth 23 m from open water and generated 174 peak decibels (dB_{peak}) and 165 root mean square decibels (dB_{RMS}) once the sound reached water. Caltrans anticipates similar sound levels at the Clow Creek site.

NOAA Fisheries (2003b) reviewed pile driving effects for fish and concluded that underwater sound levels between 150 dB_{RMS} and 190 dB_{peak} in Carquinez Strait are expected to cause stress, agitation, and behavioral changes. Underwater sound pressure levels greater than 190 dB_{peak} are expected to cause direct permanent injury or mortality of salmonids. In Carquinez Strait, salmonids exposed to pile driving may respond by avoiding the area of greatest sound levels by swimming away from the sound source. However, Clow Creek may be intermittent during the proposed construction window blocking emigration opportunities for salmonids exposed to pile driving. Therefore, if salmonids are present and trapped in residual pools in Clow Creek directly adjacent to the coffer dam; they would likely experience adverse impacts, including injury. NOAA Fisheries concludes that the number of fish affected, if any are present, will likely be less than 10 given the poor habitat conditions near this work site.

F. Additional Effects (Benefits of Each Project)

Watershed recommendations for the Navarro River include developing and implementing sediment reduction plans (Mendocino County Water Agency *et al.* 1998, CDFG 2004). Appropriately designed culverts, as those proposed by CalTrans, will reduce road-related erosion - an integral part of a sediment reduction plan. The culverts are deteriorating and have reached the end of their maximum useful life. If the culverts are not replaced further deterioration will occur and complete failure of the structures is possible. Failed culverts may lead the roadways to fail causing increased sediment loading to the streams.

The existing culverts at the five proposed sites prevent ESA-listed salmonids from accessing historic spawning and rearing habitat located upstream of the structures. At Graveyard Creek, Lost Creek, and John Hiatt Creek sites, CalTrans proposes to install permanent weirs to improve passage of salmonids; the weirs will create step pools below the culverts and ease migration of salmonids. Although these weirs will be constructed in areas designated as critical habitat for CCC coho salmon, the current condition of the habitat at those sites is poor. The resulting step pools will improve salmonid rearing habitat at the sites and allow access to currently unavailable habitat upstream of the sites. Installing instream habitat structures and improving fish passage are recommended in Navarro River watershed plans (Mendocino County Water Agency *et al.* 1998, CDFG 2004). Reintroducing listed salmonids into previously unavailable upstream habitat will likely increase reproductive success, increasing the populations of salmonids that inhabit these streams.

G. Interdependent and Interrelated Actions

NOAA Fisheries does not anticipate any interdependent or interrelated actions associated with the proposed action.

VI. CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. NOAA Fisheries is not aware of any additional actions that would cause cumulative effects beyond those that are ongoing, including rural and agricultural development, and have been analyzed in the Environmental Baseline section of this biological opinion.

VII. INTEGRATION AND SYNTHESIS OF EFFECTS

Habitat conditions for anadromous salmonids within the action area, including critical habitat for CCC coho salmon, are generally poor. Spawning habitat is not present in the action area and given the timing of the proposed project, the project will not effect spawning behavior. Rearing habitat within the action area is marginal, primarily due to intermittent flow in many summers, high sediment loading, and elevated stream temperatures. The existing culverts are complete barriers to migration. Overwinter and outmigration habitat conditions are also poor because the channel lacks habitat complexity and velocity refuge. Without improvement, the action area provides relatively little useable habitat for the NC steelhead, CCC steelhead, and CCC coho salmon populations. In the action area during the proposed construction time, NC steelhead and CCC steelhead are likely uncommon, and CCC coho salmon are likely rare. All construction activities will occur during the summer low-flow period after emigrating smolts have left and

before adults have immigrated to the proposed project sites; therefore, only rearing juvenile salmonids will be exposed to any potential negative effects of the project.

The replacement and retrofitting of the culverts will directly affect ESA-listed salmonids and their habitat. The proposed construction actions are, for the most part, intended to fix chronic watershed problems that are presently, and will likely continue, degrading valuable aquatic habitat. Nevertheless, inherent within the proposed practices are risks to ESA-listed salmonids. Most of the take associated with the proposed activities is anticipated to be non-lethal, however, a very small number of rearing juvenile (mostly YOY) salmonids may be injured or die.

NOAA Fisheries expects that the likelihood that juvenile salmonids will be killed as a result of stranding during site dewatering activities is very low. Water (hence fish) may not be present all years at each site. The area affected during dewatering at each site is small, and low numbers of juvenile salmonids are expected to be present within each project site due to relocation activities and degraded habitat. Fish relocation activities are expected to minimize individual project impacts to juvenile salmonids by removing them from construction sites where they would have experienced high rates of injury and mortality. Fish relocation activities are anticipated to only affect a small number of rearing juvenile salmonids within a small stream reach at and near the construction site and relocation release site(s). Rearing juvenile salmonids present in the immediate project work areas will be subject to disturbance, capture, relocation, and related short-term effects. Those, if any, directly downstream of the Clow Creek site are likely to be adversely affected by sound waves from pile driving. Less than 10 juvenile fish may be harmed by exposure to sound waves at that site.

With the proposed impact minimization measures, the effects of the project are expected to result in minimal adverse affects to threatened NC steelhead, CCC steelhead, and CCC coho salmon. The one time loss of a small number of salmonids from the action area is not expected to appreciably reduce the number, distribution, or reproduction of NC steelhead, CCC steelhead, and CCC coho salmon in the Navarro River or Russian River watersheds in future years. Few salmonids are expected within the action area and they likely make up a small proportion of salmonids from their respective streams and watersheds. Due to the relatively large number of juveniles produced by each spawning pair, salmonids spawning in these streams and watersheds in future years are likely to produce enough juveniles to replace the few that will be lost at the project sites. NOAA Fisheries anticipates that the proposed project will improve the survival chances of the salmonids using streams in the action area in the following ways: (1) restored migration to areas formerly used by anadromous salmonids, but cut off by the original placement of the culverts; (2) improved and increased rearing habitat by virtue of the planned weirs; and (3) reduction of sediment input from improved culvert sizing and design. Completion of this project as proposed will likely increase reproductive success and ultimately salmonid populations in these streams in the Navarro and Russian rivers watersheds. In consideration of the above, the proposed project is not anticipated to appreciably reduce the likelihood of the survival and recovery of the salmonid populations in the action area or the survival and recovery of the NC steelhead, CCC steelhead, and CCC coho salmon ESUs.

Although coho salmon have not been documented from the action area, the action area is included as habitat designated as critical for their survival and recovery of CCC coho salmon. Impacts to critical habitat designated for coho salmon include a short term loss of habitat from sedimentation or dewatering that is not expected to cause a long term loss in the essential features of critical habitat. Because the effects are short-term, and flow will resume at the completion of construction, adverse effects will not rise to a level which will appreciable diminish the value of critical habitat for conservation of the CCC coho salmon ESU. In the future, the restoration of passage at these culverts will improve the value of critical habitat in the action area.

VIII. CONCLUSION

After reviewing the best available scientific and commercial data, the current status of the species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is NOAA Fisheries' biological opinion that the proposed summer dam project is not likely to jeopardize the continued existence of threatened NC steelhead, CCC steelhead, or CCC coho salmon, or result in the destruction or adverse modification of CCC coho salmon critical habitat.

IX. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by NOAA Fisheries as an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are nondiscretionary, and must be undertaken by the FHWA, CalTrans, and their designees for the exemption in section 7(o)(2) to apply. The FHWA and CalTrans have a continuing duty to regulate the activity covered by this incidental take statement. If the FHWA and CalTrans: (1) fail to assume and implement the terms and conditions, or (2) fail to require any designee to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to any permit, grant document, or contract, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the FHWA and CalTrans must report the progress of the action and its impact on the species to NOAA Fisheries as specified in the incidental take statement (50 CFR §402.14(i)(3)).

A. Amount or Extent of Take

The replacement and retrofitting of five culverts under SR 128 and the installation of fishway weirs is expected to result in minimal incidental take of threatened CCC coho salmon, NC steelhead, and CCC steelhead. Fish in the vicinity of the project could be adversely affected by the project construction activities. Juvenile salmonids that are displaced due to the diversion may suffer an increase risk of competition and predation.

The number of ESA-listed salmonids that may be incidentally taken during project activities cannot be accurately quantified due to: (1) the unknown number of fish that may be present; (2) the unknown number of fish that may be stranded; and (3) the level of harm or mortality that might occur when juvenile fish are displaced to other habitat areas of the stream. In instances where NOAA Fisheries cannot quantify the amount of incidental take, surrogates such as the extent of habitat affected or modified by the proposed action are used.

Therefore, take is quantified as: All fish present in the action area between June 15 and October 31 (during the years that the project occurs) may be captured and/or harassed by relocation activities. Based on the low mortality rates for relocation efforts and the small number of salmonids present in the action area, NOAA Fisheries anticipates no more than 3 juvenile salmonids will be harmed or killed during relocation efforts. NOAA Fisheries expects that the number of juvenile salmonids that will be killed as a result of stranding during dewatering activities will be less than those killed during relocation. This is due to the small area affected, the relocation efforts and the low numbers of juvenile salmonids expected to be present within the action area. If listed salmonids are present directly adjacent to the cofferdams on Clow Creek, no more than 10 will be harmed by sound waves from pile driving.

B. Effect of the Take

In the accompanying opinion, NOAA Fisheries determined that this level of anticipated take is not likely to result in jeopardy to the species.

C. Reasonable and Prudent Measures

NOAA Fisheries believes the following reasonable and prudent measures are necessary and appropriate to minimize take of CCC coho salmon, NC steelhead, and CCC steelhead:

1. Undertake measures to ensure that harm and mortality to listed salmonids resulting from fish relocation and dewatering activities is low.

2. Undertake measures to minimize harm to listed salmonids resulting from culvert replacement activities and other instream construction work.

3. Undertake measures to assure that adverse effects to water quality are minimized.

4. Prepare and submit an annual report to document effects of construction and relocation activities and performance.

D. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the FHWA, CalTrans, and their designees must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

1. The following terms and conditions implement Reasonable and Prudent Measure 1 undertaken to ensure that harm and mortality to listed salmonids resulting from fish relocation and dewatering activities is low:

   a. The FHWA and CalTrans shall retain a qualified biologist with expertise in the areas of anadromous salmonid biology, including handling, collecting, and relocating salmonids; salmonid/habitat relationships; and biological monitoring of salmonids. The FHWA and CalTrans shall ensure that all biologists working on this project be qualified to conduct fish collections in a manner which minimizes all potential risks to ESA-listed salmonids. Electrofishing, if used, shall be performed by a qualified biologist and conducted according to the *NOAA Fisheries Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act*, June 2000.

   b. The biologist shall monitor the construction site during placement and removal of channel diversions and cofferdams to ensure that any adverse effects to salmonids are minimized. The biologist shall be on site during all dewatering events to ensure that all ESA-listed salmonids are captured, handled, and relocated safely. The biologist shall notify NOAA Fisheries biologist Daniel Logan at (707) 575-6053 or dan.logan@noaa.gov one week prior to capture activities in order to provide an opportunity for NOAA Fisheries staff to observe the activities.

   c. ESA-listed fish shall be handled with extreme care and kept in water to the maximum extent possible during rescue activities. All captured fish shall be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream and fish shall not be removed from this water except when released. To avoid predation the biologist shall have at least two containers and segregate young-of-year fish from larger age-classes and other potential aquatic predators. Captured salmonids will be relocated, as soon as possible, to a suitable instream location in which suitable habitat condition are present to allow for adequate survival of transported fish and fish already present.

   d. If any salmonids are found dead or injured, the biologist shall contact NOAA Fisheries biologist Daniel Logan by phone immediately at (707) 575-6053 or the

NOAA Fisheries Santa Rosa Area Office at (707) 575-6050. The purpose of the contact is to review the activities resulting in take and to determine if additional protective measures are required. All salmonid mortalities shall be retained, placed in an appropriately-sized sealable plastic bag, labeled with the date and location of collection, fork length, and be frozen as soon as possible. Frozen samples shall be retained by the biologist until specific instructions are provided by NOAA Fisheries. The biologist may not transfer biological samples to anyone other than NOAA Fisheries Santa Rosa Area Office without obtaining prior written approval from the Santa Rosa Area Office, Supervisor of the Protected Resources Division. Any such transfer will be subject to such conditions as NOAA Fisheries deems appropriate.

2. The following terms and conditions implement Reasonable and Prudent Measure 2 undertaken to minimize harm to listed salmonids resulting from culvert replacement and retrofitting activities.

   a. The FHWA or CalTrans shall notify the NOAA Fisheries Santa Rosa Area Office, by letter stating the project commencement date, at least fourteen days prior to implementation. The letter shall be sent to the NOAA Fisheries Santa Rosa Area Office, Attention: Supervisor of Protected Resources Division 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528.

   b. The FHWA or CalTrans shall allow any NOAA Fisheries employee(s) or any other person(s) designated by NOAA Fisheries, to accompany field personnel to visit the construction sites during activities provided for in this opinion.

   c. The FHWA or CalTrans shall conduct a worker education program prior to construction activities on the importance of protecting salmonids and their habitat and the project measures to do so.

   d. A biologist shall monitor inchannel activities and performance of sediment control or detention devices for the purpose of identifying and reconciling any condition that could adversely affect salmonids or their habitat. The FHWA or CalTrans and their contractors, upon notification from the biologist, shall halt the work activity causing the condition affecting salmonids and recommend measures for avoiding the condition. Work can resume when NOAA Fisheries agrees that the proposed measures are appropriate for avoiding the condition.

   e. Prior to commencement of work FHWA or CalTrans shall submit the final engineering design for the boulder weir habitat enhancement structures and culvert retrofit structures related to fish passage to NOAA Fisheries for evaluation and approval prior to implementation. The designs should be sent to the NOAA Fisheries Santa Rosa Area Office, Attention: Supervisor of Protected Resources Division, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528.

f. For revegetation activities the standard for success is 80 percent survival of plantings or 80 percent ground cover for broadcast planting of seed after a period of three years.

g. The FHWA and CalTrans shall ensure that a hydroacoustic monitoring program is implemented at the Clow Creek site if, during the actual construction period, there is some wetted channel downstream of the downstream cofferdam. The hydroacoustic monitoring plan shall include measurements of underwater sound levels, both peak decibels and root mean square decibels, at several locations in the wetted channel of Clow Creek downstream of the downstream cofferdam.

h. If during the first day of pile driving activities residual pools are left in Clow Creek downstream of the downstream cofferdam, a biologist must observe those residual pools for evidence of adverse responses by salmonids to the pile driving activities. That biologist shall rescue and relocate any salmonids from those which appear to expressing an adverse response to pile driving.

i. Once construction is finished for each construction season, all project introduced material (pipe, gravel, false work, filter fabric, demolition debris, etc.) must be removed, leaving the creek as it was before construction. Excess materials will be disposed of at an approved disposal site.

3. The following terms and conditions implement Reasonable and Prudent Measure 3 taken to assure that adverse effects to water quality are minimized.

a. Erosion control and sediment detention devices shall be incorporated into the project and implemented at the time of the project action. These devices shall be in place during the project action, and after if necessary, for the purpose of minimizing fine sediment and sediment/water slurry input to flowing water. The devices shall be placed at all locations where the likelihood of sediment input exists.

b. Sediment shall be removed from sediment controls once it has reached one-third of the exposed height of the control. Whenever straw bales are used, they shall be staked and dug into the ground 12 cm. Catch basins shall be maintained so that no more than 15 cm of sediment depth accumulates within traps or sumps.

c. Contractors must have a supply of erosion control materials onsite to facilitate a quick response to unanticipated storm events or emergencies.

d. Bentonite shall be prevented from entering the stream channel. Any bentonite that does enter the stream during construction shall be immediately removed in a manner that has minimal impact to the streambed and water quality.

e. Water that comes in contact with wet concrete and has a pH greater than 9.0 must not be allowed to enter the ground or stream but shall be either: (1) pumped to a separate, lined basin, and then pumped to a truck or upland for disposal or treatment (not within the bank to bank of any waterway); or (2) pumped directly to a truck for disposal at a site that is not within the top of bank to top of bank of any waterway.

f. Construction equipment used within the creek channel will be checked each day prior to work within the creek channel (top of bank to top of bank) and if necessary action will be taken to prevent fluid leaks. If leaks occur during work in the channel (top of bank to top of bank), FHWA, CalTrans, or their contractor will contain the spill and remove the affected soils.

4. The following term and condition implements Reasonable and Prudent Measure 4 of submitting a report annually to document status of construction and relocation activities and performance.

a. The US Army Corps of Engineers and SCVWD shall provide a written report to NOAA Fisheries by January 15 following completion of each construction season. The report shall be submitted to the NOAA Fisheries Santa Rosa Area Office Attention: Supervisor of Protected Resources Division, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528. The report shall contain, at a minimum, the following information:

Construction related activities – The report shall include the dates construction began and was completed; a discussion of any unanticipated effects or unanticipated levels of effects on salmonids, a description of any and all measures taken to minimize those unanticipated effects and a statement as to whether or not the unanticipated effects had any affect on ESA-listed fish; the number of salmonids killed or injured during the project action; and photographs taken before, during, and after the activity from photo reference points.

Revegetation – The report shall include a description of the locations planted or seeded, the area (m^2) revegetated, a plant palette, planting or seeding methods, the efforts taken to ensure success of new plantings, performance or success criteria, and pre- and post-planting color photographs of the revegetated area.

Fish Relocation – The report shall include a description of the location from which fish were removed and the release site including photographs; the date and time of the relocation effort; a description of the equipment and methods used to collect, hold, and transport salmonids; if an electroshocker was used for fish collection, a copy of the logbook must be included; the number of fish relocated by species; the number of fish injured or killed by species and a brief narrative of the circumstances surrounding ESA-listed fish injuries or mortalities; and a description of any problems which may have arisen during the relocation

activities and a statement as to whether or not the activities had any unforeseen effects.

Sound -- The report shall include measurements of underwater sound levels at wetted channel units downstream of the downstream cofferdam on Clow Creek reported in both peak decibels and root mean square decibels; a description of data collection methods, including, at a minimum, the type of pile driving system, pile size and type, hydrophone type, distance to hydrophone, depth of hydrophone; quality assurance and quality control measures taken; a description of the habitat sampled; and the number of fish observed and rescued.

X. REINITIATION NOTICE

This concludes formal consultation on the proposed replacement or retrofitting of five culverts under SR 128 in Mendocino County. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

XI. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitat, or develop additional information.

NOAA Fisheries offers the following Conservation Recommendations:

1. The FHWA and CalTrans should consult with NOAA Fisheries to develop a long range planning approach, perhaps a programmatic approach, which seeks to minimize and avoid the impacts of road maintenance projects on ESA-listed salmonids.

2. The FHWA and CalTrans should identify other culverts under their jurisdiction that currently do not meet the NOAA Fisheries guidelines for salmonid passage, and to

prioritize nonconforming culverts for replacement or retrofitting to meet or exceed the NOAA Fisheries guidelines for salmonid passage.

3. The FHWA and CalTrans should consult with NOAA Fisheries to identify funding sources and collaborative partners to assist with replacing or retrofitting culverts, under the jurisdiction of the FHWA and CalTrans, which do not conform to the NOAA Fisheries guidelines for salmonid passage.

4. Any new stream crossing, under the jurisdiction of the FHWA and CalTrans, should meet or exceed design criteria of the NOAA Fisheries guidelines for salmonid passage.

5. The FHWA and CalTrans should identify and prioritize any maintenance and construction projects which, if implemented, can improve salmonid migration or in-stream environmental conditions.

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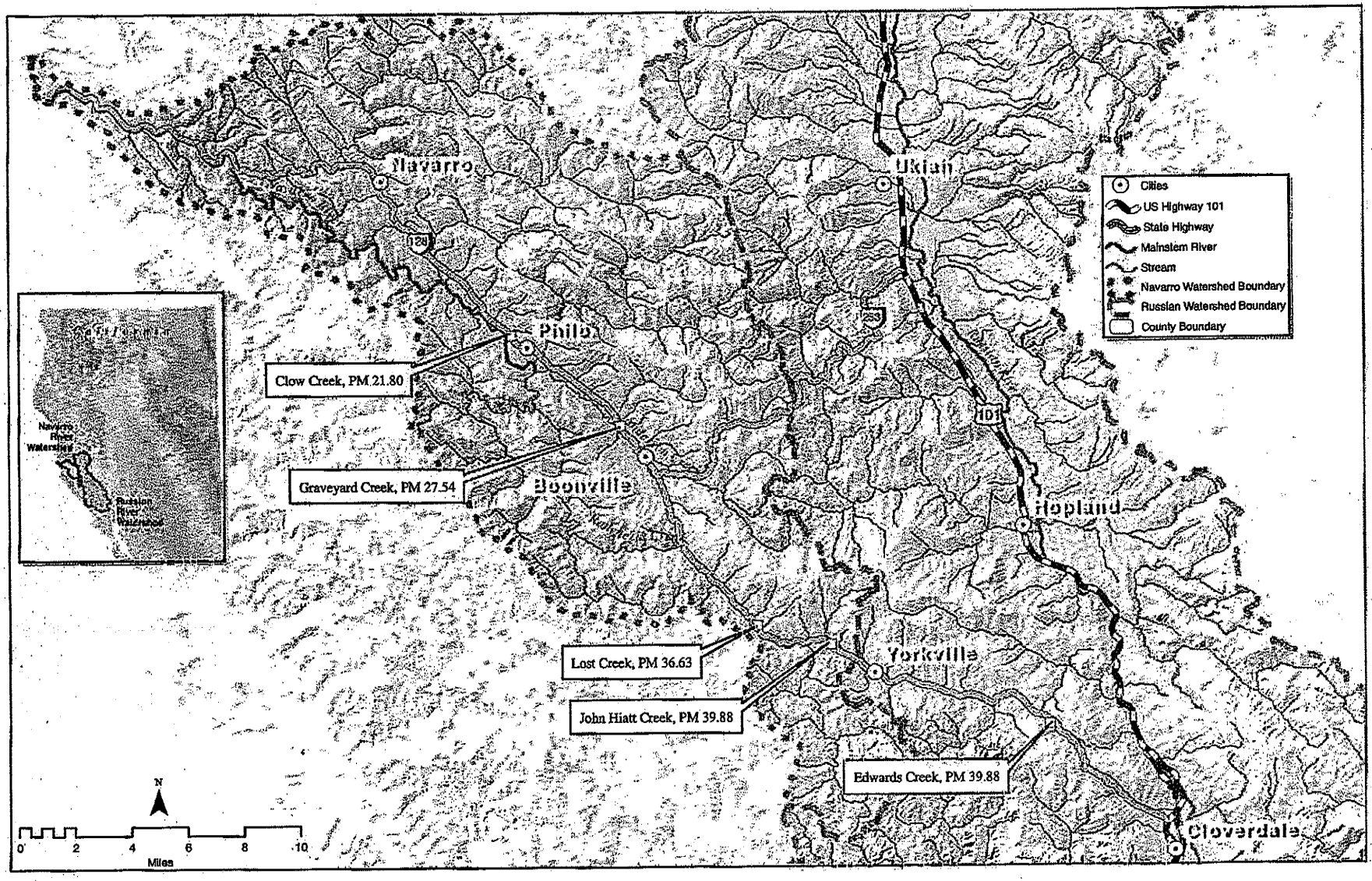

Figure 1. Navarro River watershed showing the location of the five proposed fish passage sites from CalTran's highways 128 and 253 culvert rehabilitation project, in Mendocino County, California. The project sites are identified by name and post mile (PM).

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
650 Capitol Mall, Suite 4-100
Sacramento, CA. 95814

February 23, 2006

IN REPLY REFER TO
HDA-CA
File # 01-MEN-128/253
Document # P53962

Mr. Rodney R. McInnis, Regional Administrator
National Marine Fisheries Service
501 West Ocean Blvd., Suite 4200
Long Beach, CA 90802-4213

Dear Mr. McInnis:

The Federal Highway Administration (FHWA) received a biological opinion (151422SWR2004SR20089) dated January 4, 2005 for work that would entail retrofitting or replacing 274 culverts along State Routes 128 and 253 in Mendocino County. FHWA determined that adverse impacts to salmonids would occur at five project locations and initiated formal Section 7, Endangered Species Act, consultation.

Due to litigation and changes in species' status, we are re-initiating formal consultation on the federally listed Northern California steelhead, Central California Coast steelhead, Central California Coast coho salmon and designated critical habitat for the coho salmon. Informal consultation will be conducted by the California Department of Transportation for all other projects identified in your December 7, 2005 letter. By copy of this letter, we are informing your Arcata Area Office of this re-initiation.

If you have any questions, please contact Lanh Phan, at (916) 498-5046 or e-mail lanh.phan@fhwa.dot.gov or Gary Sweeten, at (916) 498-5128.

Sincerely,

/s/ Larry Vinzant

For
Gene K. Fong
Division Administrator

Enclosure

BUCKLE UP AMERICA

cc: (E-mail w/o Enclosure)
Irma Lagomarsino, NOAA-Fisheries
Jay Norvell, Caltrans
Deborah McKee, Caltrans
Gregg Erickson, Caltrans
Jo Braden, Caltrans
Lee Dong, FHWA
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