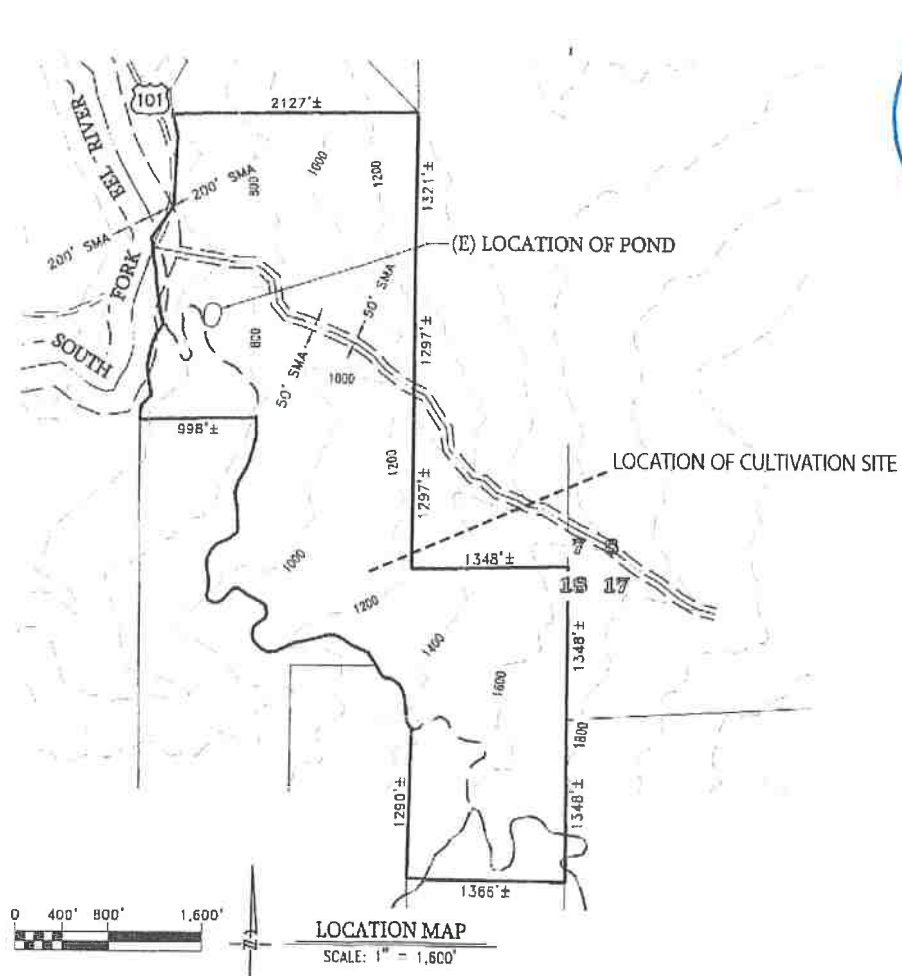


Bob Howard 223-044-010 000 Reed Mountain Road



Prepared for:

State Water Resources Control Board
(SWRCB)

North Coast Regional Water Quality Control
Board (NCRWQCB) Site Assessment
Completed February 20, 2019

Intro/Preface/Statement of Purpose/Objective

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General Site Information

Discharger: Howard, Bob

Land Owner: Howard, Bob

Address: 000 Reed Mountain Rd, Benbow, Ca 95542

GPS: 40.0237, -123.7644

Physical Address: Section 18, T5S, R4E, HB&M, from assessor's parcel map map in Humboldt County.

Parcel Number: 223-044-010

Historic Parcel Numbers: 223-044-003, 223-045-0008, 223-045-001

General Plan Designation: 100% TPZ, Rdwd & Wwd, Improved

Zone: Combining Zones AE-B-5(160); TPZ

Parcel Size: 200 Acres

HUC12 Watershed: Mattole River

Disturbed Area: Less then 1 (one) acre

Cultivation Area and Type: 10,000 sq. ft Outdoor in Greenhouses (2 cycles)

Tier Level: 1

Risk Level: Low

1. Site Characteristics

1.1 General

Mr. Howard, referred to as the applicant, is dedicated to be a good neighbor and minimizing any negative impact to the rural community and natural environment surrounding this parcel. This would include eliminating light pollution, noise pollution, or any other adverse effect to neighbors. The applicant adheres to BMP in protecting the environment and works closely with county and state agencies to keep in compliance and run a safe clean farm. The applicant functions with great regard for the ecosystem in which it operates.

- A. The applicant's plans are to use the natural prime ag soils and only organic amendments to fortify the soil as needed.

- B. Soil samples will be taken and analyzed to ensure proper balance of nutrients are being used.

- C. Branches harvested during fuel reduction are chipped and used in swales, pathways, and remediation buffers to prevent nutrient runoff, reduce soil temperature, store carbon, and promote a healthy soil microbial community;
- D. Soil fertility is closely monitored to prevent excess use of fertilizers;
- E. Only organic products are used in the cultivation of cannabis;
- F. Cultivated soils are cover cropped and mulched in the off season to enhance soil fertility and eliminate runoff; and
- G. The entire site is monitored to identify and correct any potential sources of environmental degradation and maintain a protective riparian buffer. Additionally, we monitor and manage land per the guidelines set forth in a site-specific water resources protection plan designed by Compliant Farms Certified to exceed requirements established by North Coast Regional Water Quality Control Board.

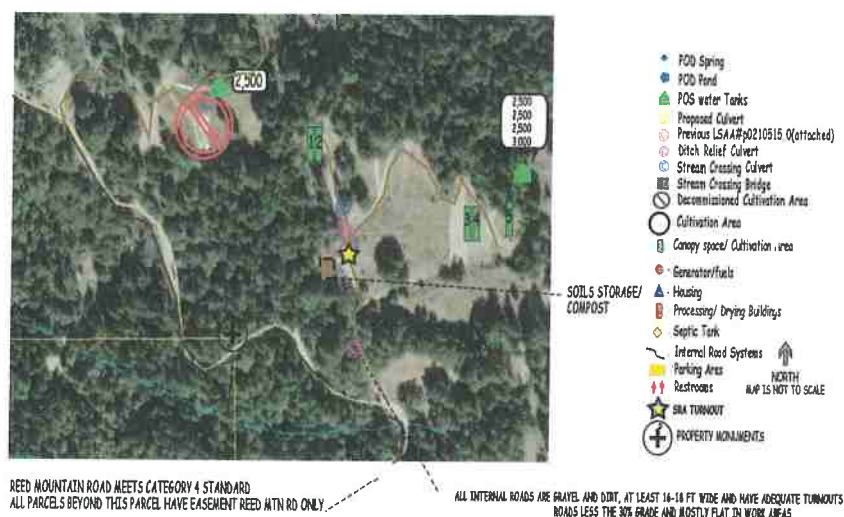


Figure 1. A diagram of the main structural features and active cultivation areas of the property

1.2 Site Overview

The property assessed consists of three historical parcels that were merged into one last year (2018). Pending a Lot Line Adjustment with Humboldt County the parcel will become two. See attached Site Diagram. The forested habitat throughout the property has vegetation consisting of successional Douglas-Fir, with Pacific Madrone, Tanoak and old growth redwoods in most southern corner of property. Slopes on the ownership average 15-25%. The property is located in Section 18, T5S, R4E, HB&M from the Quad map in Humboldt County. This property is less than 1 mile from Hwy 101 and the cultivation site is 1.7 miles from Hwy 101. The cultivation is site accessed via private road off Benbow Dr belonging to the applicant. There are multiple unnamed Class II and Class III Watercourses that are located on the property and these unnamed watercourses drain into the South Fork of the Eel River.

1.2.1 Access Roads

The site is located on Reed Mountain, West of the south fork of the Eel River near Benbow. Reed Mountain Rd is gravel and dirt and is shared with neighbors and a locked gate. Personal driveway is shared with no additional neighbors. Driveways come directly into cultivation sites with plenty of parking for up to 10 vehicles. Driveway is maintained with annual additions of gravel, grading, and liming of the trees.

The entire road segment is being upgraded and developed to be equivalent of a road category four standard by permit holders who must address road evaluation standards. The applicant is part of the road association. Attached is a road evaluation plan from PWA. Attachment A

Roads are and will be maintained as appropriate (with adequate surfacing and drainage features) to avoid developing surface ruts, gullies, or surface erosion that results in sediment delivery to nearby soils and surface waters. The internal roads are maintained clear of debris and are enhanced with rock armor as necessary. Stockpiled construction materials are stored in a location and manner so as to prevent their transport to receiving waters.

1.2.2 Stream Crossings

There are seven culverts on this site and two bridges. Culvert shall be sized to pass the expected 100- year peak streamflow. The culverts were installed and modified in 2003 and 2007 under supervision of DWF and PWA, see attachment A. The cultivation site includes two stream crossing culverts that are not included in the report in Attachment C. These culverts are included in the Lake and Streambed Notification for Mr. Howard. The first culvert SC-1 is a set of culverts

that are 18" inches in diameter. The culverts act to move the water from a seasonal class III tributary under the driveway segments - see attached photos. The second culvert SC-2 is an 18' culvert which moves the water that springs up about 50 ft north of the road and form as a seasonal class III tributary.

1.3 Electricity

The greenhouses will use solar power for ventilation fans. No other power used at cultivation site. Power for fans, power tools, surge protectors, cannabis trimming machine and all electrical supplies and equipment are on solar system with backup generator that is tied to the caretaker's residence. There are 6 (four) 200 watt solar panels and 4 (four) L-16 marine deep-cycle batteries with a 2,500kw inverter. All power for entire property on this system. Generator usage is dependent on people in household, weather and month of the year. Solar system provides enough power from Feb- Oct with generator supplement from Nov-Jan. When generator backup is requiring a 2,000-watt Honda generator is utilized.

2. Cultivation Plan

2.1 Grow Areas

This project will consist of 5 flowering cannabis greenhouses on one site. The total pre-existing flowering canopy cultivation for this parcel is 9,375 sq. ft. The footprint of the gardens is as they were in 2013. All cannabis in gardens grown outdoors in greenhouses. All cannabis is harvested and dried on site, in the greenhouses it is grown in. Greenhouses 1 and 2 (see Site Diagram) are 3,840 sq. ft, 1,920 sq. ft each.

Greenhouse 3 and 4 are a total of 3,920 sq. ft, 1,960 sq. ft each.

Greenhouse 5 is 1,600 sq. ft.

Cultivation Site	Area ¹ (ft ²)	Adjoining Hillslopes (% Grade)	Distance to nearest Class III Watercourse (ft.)
1	1,920	15	108
2	1,920	15	108
3	1,960	25	105
4	1,960	25	105
5	1,600	25-30	135

Figure 2: Area refers to the total land disturbance area. The total cannabis canopy area may vary

Black plastic is used to propagate two (2) harvests per year from greenhouses and one (1) harvest per year from open air. All black out plastic used as many seasons as possible and repaired instead of replaced for as long as possible. There are companion plants, native grasses and indigenous plants that grow in the garden and around the area to also help control any type of run off. There are no signs of wastewater runoff or erosion in this garden. Hay is also spread around the area and on the topsoil. The water line as well as manifolds and fittings are checked almost daily for leak or cracks.

Immature plants will be propagated from seed or purchased from a licensed nursery. When

needed a section of the greenhouses will be used for seedling and immature plants. An additional 900 sq. ft greenhouse will be built seasonally for second cultivation cycle immature plants. Only minor supplemental light is used, 22w regular light bulbs. This greenhouse will be put at caretaker's residence and solar system is used for lights.

2.2 Harvesting

The applicant and the caretaker will conduct all cultivation, processing, and maintenance and requires no outside employment. The applicant will implement and exercise the following processing practices on site:

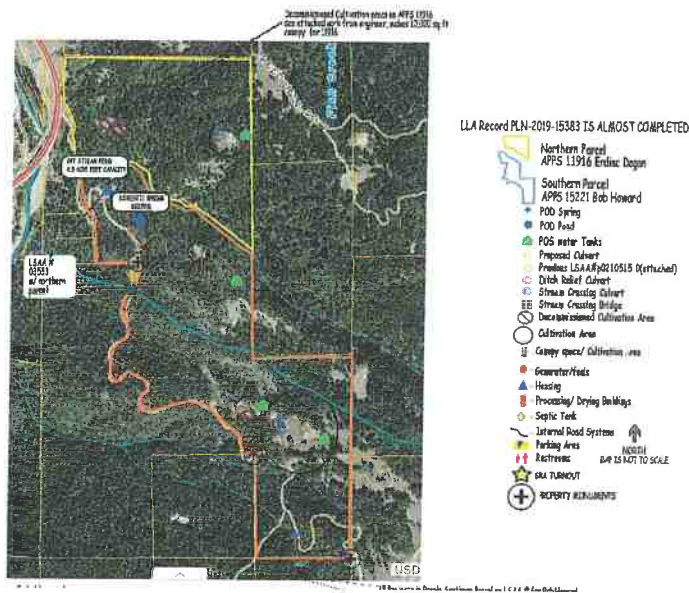


Figure 3. Google Earth image overlaid with relevant features on the parcel.

- A. All work services and equipment will be maintained in a clean and sanitary condition.
- B. Prevention against contamination, mold, and mildew growth on processed cannabis.
- C. When processing cannabis, the applicant will use personal protective gear (PPE), such as facemasks and gloves, and PPE will be in good operable condition.
- D. Employees/Workers will wash hands appropriately when handling cannabis and will wear gloves.
- E. Drying of the harvested cannabis will occur in the processing shed or in the greenhouses.
- F. Adequate ventilation and lighting will be provided.
- G. Processing will be done utilizing hand shears in an area provided specifically for this type of processing.
- H. Processed cannabis is then weighed, packaged, and labeled. The packaged cannabis will then be distributed to licensed dispensaries.

2.3 Monthly Cultivation Site Activities

Monthly Cultivation Site Activities

Month	Activities
January	Finish processing of fall harvest, trimming and storage. Plan new year. Mow cover crop. Check roads for issues/fix. Check water lines, tanks and all equipment for repairs or damages. Make plan for repairs.
February	Check roads for issues/fix. Check water lines, tanks and all equipment for repairs or damages. Make plan for repairs.
March	Check roads for issues/fix. Check water lines, tanks and all equipment for repairs or damages. Make plan for repairs.
April	Start seeds in small propagation greenhouse, start amending sites when weather permits. Greenhouse fixes. Site maintenance. Check roads for issues/fix. Check water lines, tanks and all equipment for repairs or damages. Make plan for repairs.
May	Start cultivation areas within greenhouse zones. Assisted light added to small plants to keep in vegetative space at caretaker's area. All greenhouse plants switched into flower using a blackout cover mid-late May. Turn beds, fix/ replace and clean drip emitters, check timers. Possibly plant long term plants late May. Double check all water systems for leaks and clogs. Put out sound sensors for rodents. Check roads for issues/fix. Check water lines, tanks and all equipment for repairs or damages. Make plan for repairs.
June	All assisted light ends in temporary immature plant greenhouse Plant long term plants. Hay put over each trench for water retention. Use re mesh for supports as well as bamboo stakes which are cleaned with bleach before each use. Bamboo reused for multiple years. Pests are dealt with as they arise with oils that are approved for cannabis. Check roads for issues/fix. Check water lines, tanks and all equipment for repairs or damages. Make plan for repairs.
July	Harvest greenhouse mid-month, replant with new clones from a permitted nursery or additional plants from propagation greenhouse on site. Treat plants with preventive measures if necessary. Harvested flowers to hang in greenhouse then to be cured and machine trimmed according to paragraphs above. Check roads for issues/fix. Check water lines, tanks and all equipment for repairs or damages. Make plan for repairs.
August	Finish processing July's harvest. Monitor water supply, check lines and all areas for insect/ animal disturbance. Check roads for issues/fix. Check water and

	feeding tanks and all equipment for repairs or damages. Make plan for repairs.
September	Prepare for Harvest. Bleach drying shed. Prepare lines and drying spaces. Clean all supplies and purchase new items needed. Start harvesting early strains of long term if applicable. Harvest greenhouse mid-September when possible. Harvest, cure and trim as outlined above Check roads for issues/fix. Check water lines, tanks and all equipment for repairs or damages. Make plan for repairs.
October	Harvest all long-term cannabis and late greenhouses. Process as outlined above. Pull all root-balls, pack hay and cover crop seeds on beds. Pull drip system. Check all equipment and tools for leaks and damages before storing for winter. Store all supplies possible, clean-up site.
November	Winterize water system, greenhouse and sheds. Clean up drying rooms remove all lines and debris. Continue processing cannabis as outlined above.
December	Finish processing cannabis. Prep all water and water storage system for shut down. Clean all garden implements. Put all left over supplies away. s. Tree removal if necessary, driveway fixing another farm/garden maintenance. Check roads for issues/fix. Check water lines, tanks and all equipment for repairs or damages. Make plan for repairs.

3. Water

3.1 Source and System

Water for cultivation comes exclusively from off stream rain catchment only pond. See Attachment B Pond Grading and Building Plans. Water is moved from the pond to POU using a solar powered pump. Once water reaches its point of use, water is moved by gravity to the cannabis cultivation areas. If something goes wrong with solar pumps water is carried by truck with water tank to the cannabis cultivation areas. The caretaker's residence has a domestic spring S027931.

3.1.1 Storage

This property currently has 13,000 gallons of hard tank storage.

3.2 Use

Overall the amount of water used by the Cannabis Gardens is 228,270 gallons per year, this is an estimate, to the best of the applicant's ability. The domestic use water is an estimate, to which I based my estimate on around 80 gallons a day per person for the caretaker's residence.

Maximum of water stored on-site at any time is 2,500 gallons for domestic and 13,000 gallons for cultivation.

January	February	March	April	May	June	
0	0	2,250	15,975	23,015	31,950	
July	August	September	October	November	December	Total
33,015	31,950	33,015	15,975	0	0	228,270

Figure 5: Estimated water use for cannabis, in gallons. Total annual water use is estimated to be 166,975 gallons



Figure 4. Topographical map indicating where the watercourses and water storage tanks on site are located in proximity to other structures on site.

3.3 Conservation Methods Employed

The applicant recognizes water conservation as one of the most important water management techniques. The applicant does this by implementing drip irrigation as well as metering water use. The applicant has a water usage log that tracks water usage and also can detect leaks in the

water system. The soil contains cocoa fibers to help hold moisture and reduce water usage. An electric pump will be used to provide water pressure to the greenhouses.

3.4 System Maintenance

The entire water system will be inspected weekly for leaks and for places that may need maintenance. Any component in the system observed to not be operating as efficiently as possible will be repaired or replaced. A general observation of above ground pipes will take place daily to ensure there is no leak.

4. Erosion and Sedimentation

4.1 Cultivation

This cultivation site is located on flat, legacy logging decks from Eel River Sawmills, with minimal erosion probability. Bob Howard will maintain ground cover of grass or wood chips to eliminate any exposed soil.

4.1.1 Disturbed Areas

The disturbed area is less than one acre and held to the same standard as the rest of the cultivation site.

4.1.2 Remediation Measures

The cultivation site has proper setbacks from both property lines and water courses. The applicant has met the required 30 ft setbacks from property lines. Natural vegetation is in place between the cultivation site and property lines. No schools, bus stops, places of worship, public parks, or tribal cultural resources are within 600 ft of cultivation site.

All Cultivation Areas are outside of the preferred riparian buffer zones. Greenhouse 1 and 2 are 108 ft away from a Class III watercourse. Greenhouse 3 and 4 are 105ft from a Class III watercourse. Greenhouse 5 is 150ft from a Class III watercourse. Although all areas are outside of the preferred riparian zone, mitigation actions have been recommended to further prevent sediment and run-off from becoming hydrologically connected.

4.1.3 Soil/Spoils Management

The applicant uses permaculture techniques which greatly reduces the need for chemical additives to the soil. The additives and fertilizers used are organic and every precaution is made to ensure zero runoff for protection of nearby watershed and habitat.

A. The applicant uses permaculture techniques such as mulching and cover crops, which greatly reduce the need for chemical additives to the soil. The additives and fertilizers used are organic and every precaution is made to ensure zero runoff for protection of nearby watershed and habitat.

B. Used soil is contained in an area where it can be recycled for future use. Mulching and cannabis waste products are added to this used soil to enhance composting and rejuvenation of the soil. Cover cops will be used in the off season to also rejuvenate the soil in the beds of the greenhouses reducing the need for new soil.

No spoils were noted on the property. If spoiling material is required, such as from road grading, the discharger shall follow the Best Management Practices (BMPs) in Appendix 10.1 or the Order, under Spoil Management. Spoil sites shall be located outside any standard width riparian area (50' for Class III and 100' for Class III) and shall be stabilized and contained as per the BMPs.

4.1.4. Maintenance

Wood chips are used around the cultivation area to eliminate groundwater runoff. Additionally, any bare soils are mulched and seeded to protect the soil surface from erosion and promote infiltration of rainwater. All culverts are maintained regularly. Roads and site up keep are a main priority for the applicant.

4.2 Roads

Roads are being classified as "permanent" (being used year-round) and "seasonal" (being used primarily during summer months), and "trail" (being rarely used for occasional access to features on the property). This property has approximately 4 miles of road with grades ranging from 0-20%.

4.2.1 Maintenance

The permanent road is used to access the year around use residence and an agricultural storage structure. The permanent road was well rocked with appropriate and adequately spaced drainage structures.

No spoils were noted on the property. If spoiling material is required, such as from road grading, the discharger shall follow the BMPs in Appendix 10.1 or the Order, under Spoil Management. Spoil sites shall be located outside any standard width riparian area (50' for Class III and 100' for Class III) and shall be stabilized and contained as per the BMPs

5. Fertilizers, Herbicides and Pest Management

5.1 Fertilizers

All fertilizers qualify under Clean Green Certificate Program - *Non-Liquid Amendments* - Stutzman's chicken manure, Biochar, Peruvian Seabird Guano, Earthworm Castings, Bat Guano, Organic Steer Manure, Omri listed Compost, and Diatomaceous Earth.

Spray

- a. 4 gallons of Synergy compost tea, which contains beneficial nematodes, bacteria, fungi, and anthropoids.
- b. 2 gallons (stored on site) central coast green cleaner
- c. 1 gallon (stored on site) of Them x70 natural wetting agent derived from yucca plant
- d. 1 gallon (stored on site) of Safergro pest out natural oil insecticide
- e. 1 gallon (stored on site) of Azatrol organic botanical insecticide derived from neem seed
- f. All spraying of plants for any type of pest control, mildew/mold control or foliage feeding is done when winds are at 0 and sprayed directly onto plants without over spray.

5.1.1 Storage

Pesticides and agricultural chemicals (fungicide and rodenticide) are stored in a secure location under roofed structure with secondary containment, the shed located on site plan next to caretaker residence. Pesticides and agricultural chemicals are stored in an orderly fashion on shelves and on the floor with original labels per manufacturers recommendations. The area is neat, orderly, and includes a table with measuring devices for calculating and mixing chemicals. Each supplement is properly labeled and used per direction by manufacturer. Great care is taken in the handling and application of these supplements. PPE is available and used during application. Instructions for use are posted and adhered to for maximized results. Wild River Farms reserves the right to increase or decrease nutrient use for optimum plant growth.

Fertilizers, potting soils, compost, and other soils and soil amendments are stored on the property in a manner in which they will not enter or be transported into surface waters and

so that nutrients or other pollutants will not be leached into groundwater. All fertilizer and nutrient containers will be recycled at an appropriate facility.

5.1.2 Use and Application

Fertilizers and soil amendments are applied and used per the manufacturer's guidelines. Cultivation areas are currently maintained so as to prevent nutrients from leaving the site during the growing season and post-harvest. PPE is available and used during application.

5.3 Pest Management

This Pest Management Plan (PMP) was prepared to be in compliance with California Department of Food and Agriculture (CDFA) requirements for CalCannabis cultivation licensing. This plan describes various pest management options that The Applicant will employ depending on conditions and circumstances. All pesticides and practices used will comply with California Department of Pesticide Regulation (DPR) and the Humboldt County Agricultural Commissioners (CAC) enforcement the use and sale of pesticides under Divisions 6 and 7 of the California Food and Agricultural Code (FAC), and Title 3 of the California Code of Regulations (CCR).

To reduce the environmental impact of the cannabis cultivation, the applicant will utilize non-chemical pest control methods whenever possible.

5.3.1 a. Biological/Physical

The applicant utilizes crop isolation, cultivations beds with optimum plant density, vegetative stripping, and spacing as a means to manage pests. A buffer around the cultivation beds is used as further means of isolation from the surrounding environment. Pest repellent companion plant species are also used in the vicinity such as marigolds, red Amaranthus, dill, cilantro, basil, chrysanthemum, and rosemary. The applicant performs routine ongoing maintenance activities for management of pests including, pruning, defoliation, thinning and topping. Irrigation and drainage is designed to eliminate standing water and runoff/pooling. Sanitation facilities are designed and located to reduce pest attraction. Additional maintenance activities include crop residue destruction, maintenance of clean cultivation bed borders, and weed control. The timing of harvesting is also used to reduce exposure to powdery mildew infestations. Prevention and management of pests achieved through companion planting of non-invasive plants, nematodes, biodynamic farm preparations, diatomaceous earth, organic rosemary and thyme spray, ladybugs, Safer Soap

Sulfur Spray 3-1 and visual inspection with hand removal of infested plants.

Pest or Disease	Physical/Mechanical Practices	Biological Practices
Spider Mites	Keep dust down by housing off plants (if dust is a problem)	Release predatory mites
Broad Mites	Inspect plants; disinfest or dispose of infested plants	Release predatory mites and six-spotted thrips
Russet Mites		Release predatory mites
Whiteflies	Hang up yellow sticky cards, Use reflective plastic mulch	
Thrips	Hang up yellow or blue sticky cards	
Aphids	Hang up yellow sticky cards (alates), Hose off plants	
Leafminers	Remove older infested leaves	Release Diglyphus parasitoids
Cutworms	Use pheromone traps to detect adults. Remove weeds, which serve as a reservoir for cutworms and other noctuids	
Flea Beetles	Use reflective mulches Plant trap crops (e.g., radish or Chinese mustard)	

5.3.1 b. Chemical

The following table contains a list of all of the chemicals will be used for pest management. The active ingredients are exempt from residue tolerance requirements and either exempt from

registration requirements or registered for a use broad enough to include use on cannabis.

Pest or Disease	Pesticide Active Ingredient	Pesticide
Mites, powdery mildew, leafhoppers, aphids, whiteflies, moth larvae	Soybean Oil (39%), Sodium Lauryl Sulfate (19%), Citric Acid, and Isopropyl Alcohol	Green Cleaner Spidermite Miticide
Mites, powdery mildew, leafhoppers, aphids, whiteflies, moth larvae	Soy Oil, Peppermint Essential Oil, Citric Acid, Plant Based Surfactant (Soap), Alcohol, Sodium Citrate, and Water	Lost Coast Plant Therapy
Mites, powdery mildew, botrytis and other pests, and fungal/mildew	Thyme Oil 14%, Clove Oil 10%, Garlic Oil 9%, Peppermint Oil 4%, Corn Oil 3%, Geraniol 3%, Citric Acid 2%, Rosemary Oil 2%, 53% Filtered Water, Soap, Isopropyl Alcohol, and Vinegar	Trifecta Crop Control

5.3.2 Storage

Pesticides and agricultural chemicals (nutrients) are stored in a secure location under a roofed structure. Pesticides and agricultural chemicals are stored in an orderly fashion on shelves and on the floor with original labels per manufacturers recommendations. The area is neat, orderly, and includes a table with measuring devices for calculating and mixing chemicals.

5.3.3 Rodent Control

Rodent control is limited to hardware cloth that lines the beds, noise activators, Tanglefoot Brand coating paste, and cayenne/cinnamon spray. Rodenticide supplies are stored in a secure location under a roofed structure. Rodenticide supplies are stored in the shed in an orderly fashion on shelves and on the floor with original labels per manufacturers recommendations

5.3.4 Fungicides

Mold and mildew pathogens controlled with sulfur, Actinovate, Safer Brand Garden Fungicide and visual inspection with removal of infected vegetative matter. Fungicides and other cannabis preventive and treatment supplies are stored in the shed, in an orderly fashion on shelves and on the floor with original labels per manufacturers recommendations.

6. Petroleum, Gas and Oil

6.1 Use

Items onsite which utilize petroleum products include a generator, weed whacker, lawn mower.

6.2 Storage

Gasoline, oil and oil/gasoline mix used for generator, weed whacker, lawn mower and other garden supplies are stored in shed located on site plan next to caretaker residence. This building has concrete flooring and a plastic covering for secondary containment of possible spills and leaks. All used oils are disposed of properly. Gasoline for generators stored in approved canisters in generator shed area with secondary containment. Propane is used for house appliances and water heater.

6.3 Maintenance of Items Requiring Petroleum, Gas or Oil

Equipment maintenance and services (e.g., changing oil, antifreeze, etc.) is done onsite.

7. Waste

7.1 Cultivation Waste

The spent growth medium is composted and recycled onsite.

No cultivation-related wastes including, but not limited to, empty soil/soil amendment/fertilizer/pesticide bags and containers, empty plant pots or containers, dead or harvested plant waste, and spent growth medium, are stored at locations where they can enter or be blown into surface waters, or in a manner that could result in residues and pollutants within such materials to migrate or leach into surface water or groundwaters.

7.2 Trash

There will be minimal plastic that will be recycled at Eel River Resource Recovery (ERRR) in Redway, CA. There is a designated and secured area for storage of recycling and solid waste within covered containers that are stored outside the mother-in-law unit. Any garbage accumulated onsite will be hauled to the ERRR once a week; any recycling will be hauled once a month. Wild River Farms will self-haul this waste to the ERRR.

7.3 Domestic Wastewater

Wastewater is handled with an Onsite wastewater system in the form of a septic tank and leach field. Septic has been perk tested, designed and engineered by PWA. Report can be added if needed. Septic tank for grey and black water. Septic Tank is 10 ft from residence and is installed according to design schematic and parameters Leach field behind septic.

This septic tank collects waste from kitchen sink, shower and bathroom sinks, toilet in caretaker's residence and in processing shop that has one bathroom and one sink. This shop bathroom is for use by the seasonal workers or independent contractors. Waste tanks are serviced as necessary and checked once a year.

7.4 Hazardous Materials

The following is a list of cultivation/production machinery that may be present on site: Trim Machine (potentially), Dehumidifiers, Fans & Pick-up truck.

No compressed gases are stored onsite. There is a cleaning agent, rubbing alcohol, that is stored onsite in a 1-liter container and within a secondary container to prevent leakage or spillage.

8. Monitoring and Future Plans

Remediation/Cleanup/Restoration:

General Recommendations

1. Existing or newly installed road surface drainage structures such as water bars, rolling dips, ditch relief culvers, and intentionally in/out-sloped segments of road shall be maintained to ensure continued function of capturing and draining surface runoff.
2. Frequent use of un-surfaced roads should be avoided, particularly when road surfaces are soft/saturated.
3. All culverts should be inspected regularly during the winter months to check for plugging, blockage, or other issues.
4. Water use shall be designed and metered such that water used for the irrigation of cannabis will be recorded. Water use for the irrigation of cannabis is to be recorded monthly for annual reporting.

Fertilizer, soil amendments, and pesticide use to be recorded in such a manner that cumulative annual totals are recorded for annual reporting (See Appendix sec. 10.2 for example)

10. Appendix

10.1 Best Practical Treatment or Control Measures

10.2 Log Book Information/Examples

Other measures to be implemented

Description BMP procedure

- List of record keeping, monitoring, and other measures needed for compliance.
- Install flow meters for Install flow meters water use and record water use weekly.
- Use log pages and provide additional documentation as needed.
- Record water use.
- Read flow meters weekly and record irrigation use by water source.
- Use log pages provide additional documentation as needed.
- Wet weather road inspection.
- Inspect road during wet weather annually.
- Observe water and sediment discharge.
- Document observations apply corrective measures to prevent erosion as needed based on observations.
- Pre and post season inspection conduct self- assessment twice annually.
- Use log pages provide additional documentation as needed.
- Keep chemical storage and use logs
- List chemicals stored onsite and information about quantities used and frequency applied.
- Record annual fertilizer and amendment use.

[illegible]

Person Reporting: _____

☐ Yes ☐ No All stockpiles, soil amendments, pesticides, and fertilizers have remained properly stored and/or contained and have not discharged from their storage/containment facility(ies).

☐ Yes ☐ No Implemented erosion and sediment controls have remained in place and functioning throughout the winter wet weather period, preventing sediment and turbid stormwater from discharging to surface water bodies.

☐ Yes ☐ No All access roads appear to be in good condition and drainage structures have been effective in preventing road surface and fill material from discharging to any surface water bodies.

☐ Yes ☐ No Watercourse crossing structures remain functioning throughout the winter wet weather period and there is no evidence of crossings being plugged, overtopped, and/or discharging sediment or fill material. Comments:

☐ Yes ☐ No All water containment structures/ponds/dams have remained effective and in good condition.

24

Post-Season Self-Assessment (to be completed by October 15th each year)

Person Reporting: _____

Date: _____

☐ Yes ☐ N/A

All stockpiles, soil amendments, pesticides, and fertilizers have been properly stored and/or protected per Best Management Practices (BMPs).

Comments

☐ Yes ☐ N/A

Erosion and sediment controls have been properly installed and are functioning, and all areas of exposed soil have been stabilized in preparation for the winter wet weather period. Comments

☐ Yes ☐ N/A

Drainage structures (waterbars/rolling dips) have been installed and are functioning on all access roads, and all access roads intended for use during the winter wet weather period have been weatherproofed.

Comments

☐ Yes ☐ N/A

Watercourse crossing structures have been correctly installed/maintained, all fill material/exposed soil has been stabilized, and are free of debris that could plug crossings over the winter wet weather period.

Comments

☐ Yes ☐ N/A

All trash/refuse has been cleaned up where it cannot pass into or be transported into any water body and empty/used containers have been properly disposed per manufacturer's instructions. Comments

☐ Yes ☐ N/A

All water containment/storage ponds/dams have been inspected and appear to be in good, stable condition. Comments

Chemical/Pesticide/Herbicide Inventory

List all chemicals that you have in storage. When any new pesticides, herbicides, or chemicals are brought onto the property enter the product information in this form.

Name of Product Pest/Herb/Other Quantity (gal/lbs.) Date Recorded

Chemical/Pesticide/Herbicide Application Log

Anytime a pesticide, herbicide, or any other chemical is applied to the cannabis it will be recorded on this form.

<u>Name of Product</u>	<u>Quantity</u>	<u>Units</u>	<u>Date Applied</u>	<u>Notes</u>
------------------------	-----------------	--------------	---------------------	--------------

Soil Amendments and Fertilizer Log

Anytime an amendment or fertilizer is used in soil building, top dressing, foliar spray, or any other application - fill out this log. An example entry is provided.

Name of Product Quantity Units (gal/lbs./etc.) Date Applied N-P-K Ratio

Ex. Age Old Bloom 1 Gal 8/15/17 5-10-5

Water Usage Log

Every week record the water used for cultivation using water meters. Fill out the annual total usage on the backside of this form at the end of the year. To calculate annual total, subtract the first meter reading of the year from the last reading of the year. An example entry is provided.

Water Source Meter# Quantity Units (gal/cf) Date Recorded

Ex. Groundwater Well #1 19021 gal 05/01/17

10.3 Emergency Contact Information

Wild River Farms shall visibly post and maintain an emergency contacts list which will include at a minimum:

1. Managerial and property owner contact(s):
 - a. Property Owner/Manager: **Name and Emergency Phone Number**
2. Emergency responder contact(s):
 - a. EMERGENCY CALL 911
 - i. Site Address: **Needed**
 - b. Nonemergency Sheriff: (707) 445-7251
3. Hazardous Material/Poison control contact(s):
 - a. EMERGENCY CALL 911
 - i. Site Address: **Needed**
 - b. Poison Control Centers 1-800-222-1222
 - c. Humboldt County HazMat: (707)445-6215
 - d. Humboldt County Ag Dept: (707)441-5260

4. Hazardous Material

5. Emergency Plan

- a. **Fire**
- b. **Earthquake**
- c. **Evacuation Other**
- d. **Security Threat**

water system. The soil contains cocoa fibers to help hold moisture and reduce water usage. An electric pump will be used to provide water pressure to the greenhouses.

3.4 System Maintenance

The entire water system will be inspected weekly for leaks and for places that may need maintenance. Any component in the system observed to not be operating as efficiently as possible will be repaired or replaced. A general observation of above ground pipes will take place daily to ensure there is no leak.

4. Erosion and Sedimentation

4.1 Cultivation

This cultivation site is located on flat, legacy logging decks from Eel River Sawmills, with minimal erosion probability. Bob Howard will maintain ground cover of grass or wood chips to eliminate any exposed soil.

4.1.1 Disturbed Areas

The disturbed area is less than one acre and held to the same standard as the rest of the cultivation site.

4.1.2 Remediation Measures

4.1.3 Soil/Spoils Management

The applicant uses permaculture techniques which greatly reduces the need for chemical additives to the soil. The additives and fertilizers used are organic and every precaution is made to ensure zero runoff for protection of nearby watershed and habitat.

A. The applicant uses permaculture techniques such as mulching and cover crops, which greatly reduce the need for chemical additives to the soil. The additives and fertilizers used are organic and every precaution is made to ensure zero runoff for protection of nearby watershed and habitat.

B. Used soil is contained in an area where it can be recycled for future use. Mulching and cannabis waste products are added to this used soil to enhance composting and rejuvenation of the soil. Cover crops will be used in the off season to also rejuvenate the soil in the beds of the greenhouses reducing the need for new soil.

No spoils were noted on the property. If spoiling material is required, such as from road grading, the discharger shall follow the Best Management Practices (BMPs) in Appendix 10.1 or the Order, under Spoil Management. Spoil sites shall be located outside any standard width riparian area (50' for Class III and 100' for Class III) and shall be stabilized and contained as per the BMPs.

4.1.4. Maintenance

Wood chips are used around the cultivation area to eliminate groundwater runoff. Additionally, any bare soils are mulched and seeded to protect the soil surface from erosion and promote infiltration of rainwater. All culverts are maintained regularly. Roads and site up keep are a main priority for the applicant.

4.2 Roads

Roads are being classified as "permanent" (being used year-round) and "seasonal" (being used primarily during summer months), and "trail" (being rarely used for occasional access to features on the property). This property has approximately 4 miles of road with grades ranging from 0-20%.

4.2.1 Maintenance

The permanent road is used to access the year around use residence and an agricultural storage structure. The permanent road was well rocked with appropriate and adequately spaced drainage structures.

No spoils were noted on the property. If spoiling material is required, such as from road grading, the discharger shall follow the BMPs in Appendix 10.1 or the Order, under Spoil Management. Spoil sites shall be located outside any standard width riparian area (50' for Class III and 100' for Class III) and shall be stabilized and contained as per the BMPs

5. Fertilizers, Herbicides and Pest Management

5.1 Fertilizers

All fertilizers qualify under Clean Green Certificate Program - *Non-Liquid Amendments* - Stutzman's chicken manure, Biochar, Peruvian Seabird Guano, Earthworm Castings, Bat Guano, Organic Steer Manure, Omri listed Compost, and Diatomaceous Earth.

Spray

- a. 4 gallons of Synergy compost tea, which contains beneficial nematodes, bacteria, fungi, and anthropoids.
- b. 2 gallons (stored on site) central coast green cleaner
- c. 1 gallon (stored on site) of Them x70 natural wetting agent derived from yucca plant
- d. 1 gallon (stored on site) of Safergro pest out natural oil insecticide
- e. 1 gallon (stored on site) of Azatrol organic botanical insecticide derived from neem seed
- f. All spraying of plants for any type of pest control, mildew/mold control or foliage feeding is done when winds are at 0 and sprayed directly onto plants without over spray.

5.1.1 Storage

Pesticides and agricultural chemicals (fungicide and rodenticide) are stored in a secure location under roofed structure with secondary containment, the shed located on site plan next to caretaker residence. Pesticides and agricultural chemicals are stored in an orderly fashion on shelves and on the floor with original labels per manufacturers recommendations. The area is neat, orderly, and includes a table with measuring devices for calculating and mixing chemicals. Each supplement is properly labeled and used per direction by manufacturer. Great care is taken in the handling and application of these supplements. PPE is available and used during application. Instructions for use are posted and adhered to for maximized results. Wild River Farms reserves the right to increase or decrease nutrient use for optimum plant growth.

Fertilizers, potting soils, compost, and other soils and soil amendments are stored on the property in a manner in which they will not enter or be transported into surface waters and

so that nutrients or other pollutants will not be leached into groundwater. All fertilizer and nutrient containers will be recycled at an appropriate facility.

5.1.2 Use and Application

Fertilizers and soil amendments are applied and used per the manufacturer's guidelines. Cultivation areas are currently maintained so as to prevent nutrients from leaving the site during the growing season and post-harvest. PPE is available and used during application.

5.3 Pest Management

This Pest Management Plan (PMP) was prepared to be in compliance with California Department of Food and Agriculture (CDFA) requirements for CalCannabis cultivation licensing. This plan describes various pest management options that The Applicant will employ depending on conditions and circumstances. All pesticides and practices used will comply with California Department of Pesticide Regulation (DPR) and the Humboldt County Agricultural Commissioners (CAC) enforcement the use and sale of pesticides under Divisions 6 and 7 of the California Food and Agricultural Code (FAC), and Title 3 of the California Code of Regulations (CCR).

To reduce the environmental impact of the cannabis cultivation, the applicant will utilize non-chemical pest control methods whenever possible.

5.3.1 a. Biological/Physical

The applicant utilizes crop isolation, cultivations beds with optimum plant density, vegetative stripping, and spacing as a means to manage pests. A buffer around the cultivation beds is used as further means of isolation from the surrounding environment. Pest repellent companion plant species are also used in the vicinity such as marigolds, red Amaranthus, dill, cilantro, basil, chrysanthemum, and rosemary. The applicant performs routine ongoing maintenance activities for management of pests including, pruning, defoliation, thinning and topping. Irrigation and drainage is designed to eliminate standing water and runoff/pooling. Sanitation facilities are designed and located to reduce pest attraction. Additional maintenance activities include crop residue destruction, maintenance of clean cultivation bed borders, and weed control. The timing of harvesting is also used to reduce exposure to powdery mildew infestations. Prevention and management of pests achieved through companion planting of non-invasive plants, nematodes, biodynamic farm preparations, diatomaceous earth, organic rosemary and thyme spray, ladybugs, Safer Soap

Sulfur Spray 3-1 and visual inspection with hand removal of infested plants.

Pest or Disease	Physical/Mechanical Practices	Biological Practices
Spider Mites	Keep dust down by housing off plants (if dust is a problem)	Release predatory mites
Broad Mites	Inspect plants; disinfest or dispose of infested plants	Release predatory mites and six-spotted thrips
Russet Mites		Release predatory mites
Whiteflies	Hang up yellow sticky cards, Use reflective plastic mulch	
Thrips	Hang up yellow or blue sticky cards	
Aphids	Hang up yellow sticky cards (alates), Hose off plants	
Leafminers	Remove older infested leaves	Release Diglyphus parasitoids
Cutworms	Use pheromone traps to detect adults. Remove weeds, which serve as a reservoir for cutworms and other noctuids	
Flea Beetles	Use reflective mulches Plant trap crops (e.g., radish or Chinese mustard)	

5.3.1 b. Chemical

The following table contains a list of all of the chemicals will be used for pest management. The active ingredients are exempt from residue tolerance requirements and either exempt from

registration requirements or registered for a use broad enough to include use on cannabis.

Pest or Disease	Pesticide Active Ingredient	Pesticide
Mites, powdery mildew, leafhoppers, aphids, whiteflies, moth larvae	Soybean Oil (39%), Sodium Lauryl Sulfate (19%), Citric Acid, and Isopropyl Alcohol	Green Cleaner Spidermite Miticide
Mites, powdery mildew, leafhoppers, aphids, whiteflies, moth larvae	Soy Oil, Peppermint Essential Oil, Citric Acid, Plant Based Surfactant (Soap), Alcohol, Sodium Citrate, and Water	Lost Coast Plant Therapy
Mites, powdery mildew, botrytis and other pests, and fungal/mildew	Thyme Oil 14%, Clove Oil 10%, Garlic Oil 9%, Peppermint Oil 4%, Corn Oil 3%, Geraniol 3%, Citric Acid 2%, Rosemary Oil 2%, 53% Filtered Water, Soap, Isopropyl Alcohol, and Vinegar	Trifecta Crop Control

5.3.2 Storage

Pesticides and agricultural chemicals (nutrients) are stored in a secure location under a roofed structure. Pesticides and agricultural chemicals are stored in an orderly fashion on shelves and on the floor with original labels per manufacturers recommendations. The area is neat, orderly, and includes a table with measuring devices for calculating and mixing chemicals.

5.3.3 Rodent Control

Rodent control is limited to hardware cloth that lines the beds, noise activators, Tanglefoot Brand coating paste, and cayenne/cinnamon spray. Rodenticide supplies are stored in a secure location under a roofed structure. Rodenticide supplies are stored in the shed in an orderly fashion on shelves and on the floor with original labels per manufacturers recommendations

5.3.4 Fungicides

Mold and mildew pathogens controlled with sulfur, Actinovate, Safer Brand Garden Fungicide and visual inspection with removal of infected vegetative matter. Fungicides and other cannabis preventive and treatment supplies are stored in the shed, in an orderly fashion on shelves and on the floor with original labels per manufacturers recommendations.

6. Petroleum, Gas and Oil

6.1 Use

Items onsite which utilize petroleum products include a generator, weed whacker, lawn mower.

6.2 Storage

Gasoline, oil and oil/gasoline mix used for generator, weed whacker, lawn mower and other garden supplies are stored in shed located on site plan next to caretaker residence. This building has concrete flooring and a plastic covering for secondary containment of possible spills and leaks. All used oils are disposed of properly. Gasoline for generators stored in approved canisters in generator shed area with secondary containment. Propane is used for house appliances and water heater.

6.3 Maintenance of Items Requiring Petroleum, Gas or Oil

Equipment maintenance and services (e.g., changing oil, antifreeze, etc.) is done onsite.

7. Waste

7.1 Cultivation Waste

The spent growth medium is composted and recycled onsite.

No cultivation-related wastes including, but not limited to, empty soil/soil amendment/fertilizer/pesticide bags and containers, empty plant pots or containers, dead or harvested plant waste, and spent growth medium, are stored at locations where they can enter or be blown into surface waters, or in a manner that could result in residues and pollutants within such materials to migrate or leach into surface water or groundwaters.

7.2 Trash

There will be minimal plastic that will be recycled at Eel River Resource Recovery (ERRR) in Redway, CA. There is a designated and secured area for storage of recycling and solid waste within covered containers that are stored outside the mother-in-law unit. Any garbage accumulated onsite will be hauled to the ERRR once a week; any recycling will be hauled once a month. Wild River Farms will self-haul this waste to the ERRR.

7.3 Domestic Wastewater

Wastewater is handled with an Onsite wastewater system in the form of a septic tank and leach field. Septic has been perk tested, designed and engineered by PWA. Report can be added if needed. Septic tank for grey and black water. Septic Tank is 10 ft from residence and is installed according to design schematic and parameters Leach field behind septic.

This septic tank collects waste from kitchen sink, shower and bathroom sinks, toilet in caretaker's residence and in processing shop that has one bathroom and one sink. This shop bathroom is for use by the seasonal workers or independent contractors. Waste tanks are serviced as necessary and checked once a year.

7.4 Hazardous Materials

The following is a list of cultivation/production machinery that may be present on site: Trim Machine (potentially), Dehumidifiers, Fans & Pick-up truck.

No compressed gases are stored onsite. There is a cleaning agent, rubbing alcohol, that is stored onsite in a 1-liter container and within a secondary container to prevent leakage or spillage.

8. Monitoring and Future Plans

Remediation/Cleanup/Restoration:

General Recommendations

1. Existing or newly installed road surface drainage structures such as water bars, rolling dips, ditch relief culvers, and intentionally in/out-sloped segments of road shall be maintained to ensure continued function of capturing and draining surface runoff.
2. Frequent use of un-surfaced roads should be avoided, particularly when road surfaces are soft/saturated.
3. All culverts should be inspected regularly during the winter months to check for plugging, blockage, or other issues.
4. Water use shall be designed and metered such that water used for the irrigation of cannabis will be recorded. Water use for the irrigation of cannabis is to be recorded monthly for annual reporting.

Fertilizer, soil amendments, and pesticide use to be recorded in such a manner that cumulative annual totals are recorded for annual reporting (See Appendix sec. 10.2 for example)

10. Appendix

10.1 Best Practical Treatment or Control Measures

10.2 Log Book Information/Examples

Other measures to be implemented

Description BMP procedure

- List of record keeping, monitoring, and other measures needed for compliance.
- Install flow meters for Install flow meters water use and record water use weekly.
- Use log pages and provide additional documentation as needed.
- Record water use.
- Read flow meters weekly and record irrigation use by water source.
- Use log pages provide additional documentation as needed.
- Wet weather road inspection.
- Inspect road during wet weather annually.
- Observe water and sediment discharge.
- Document observations apply corrective measures to prevent erosion as needed based on observations.
- Pre and post season inspection conduct self- assessment twice annually.
- Use log pages provide additional documentation as needed.
- Keep chemical storage and use logs
- List chemicals stored onsite and information about quantities used and frequency applied.
- Record annual fertilizer and amendment use.

[illegible]

Person Reporting: _____

☐ Yes ☐ No All stockpiles, soil amendments, pesticides, and fertilizers have remained properly stored and/or contained and have not discharged from their storage/containment facility(ies).

☐ Yes ☐ No Implemented erosion and sediment controls have remained in place and functioning throughout the winter wet weather period, preventing sediment and turbid stormwater from discharging to surface water bodies.

☐ Yes ☐ No All access roads appear to be in good condition and drainage structures have been effective in preventing road surface and fill material from discharging to any surface water bodies.

☐ Yes ☐ No Watercourse crossing structures remain functioning throughout the winter wet weather period and there is no evidence of crossings being plugged, overtopped, and/or discharging sediment or fill material. Comments:

Comments:

Post-Season Self-Assessment (to be completed by October 15th each year)

Person Reporting: _____

Date: _____

☐ Yes ☐ N/A

All stockpiles, soil amendments, pesticides, and fertilizers have been properly stored and/or protected per Best Management Practices (BMPs).

Comments

☐ Yes ☐ N/A

Erosion and sediment controls have been properly installed and are functioning, and all areas of exposed soil have been stabilized in preparation for the winter wet weather period. Comments

☐ Yes ☐ N/A

Drainage structures (waterbars/rolling dips) have been installed and are functioning on all access roads, and all access roads intended for use during the winter wet weather period have been weatherproofed.

Comments

☐ Yes ☐ N/A

Watercourse crossing structures have been correctly installed/maintained, all fill material/exposed soil has been stabilized, and are free of debris that could plug crossings over the winter wet weather period.

Comments

☐ Yes ☐ N/A

All trash/refuse has been cleaned up where it cannot pass into or be transported into any water body and empty/used containers have been properly disposed per manufacturer's instructions. Comments

☐ Yes ☐ N/A

All water containment/storage ponds/dams have been inspected and appear to be in good, stable condition. Comments

Chemical/Pesticide/Herbicide Inventory

List all chemicals that you have in storage. When any new pesticides, herbicides, or chemicals are brought onto the property enter the product information in this form.

Name of Product Pest/Herb/Other Quantity (gal/lbs.) Date Recorded

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<u>Name of Product</u>	<u>Quantity</u>	<u>Units</u>	<u>Date Applied</u>	<u>Notes</u>
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Soil Amendments and Fertilizer Log

Anytime an amendment or fertilizer is used in soil building, top dressing, foliar spray, or any other application - fill out this log. An example entry is provided.

Name of Product Quantity Units (gal/lbs./etc.) Date Applied N-P-K Ratio

Ex. Age Old Bloom 1 Gal 8/15/17 5-10-5

Water Usage Log

Every week record the water used for cultivation using water meters. Fill out the annual total usage on the backside of this form at the end of the year. To calculate annual total, subtract the first meter reading of the year from the last reading of the year. An example entry is provided.

Water Source Meter# Quantity Units (gal/cf) Date Recorded

Ex. Groundwater Well #1 19021 gal 05/01/17

10.3 Emergency Contact Information

Wild River Farms shall visibly post and maintain an emergency contacts list which will include at a minimum:

1. Managerial and property owner contact(s):
 - a. Property Owner/Manager: **Name and Emergency Phone Number**
2. Emergency responder contact(s):
 - a. EMERGENCY CALL 911
 - i. Site Address: **Needed**
 - b. Nonemergency Sheriff: (707) 445-7251
3. Hazardous Material/Poison control contact(s):
 - a. EMERGENCY CALL 911
 - i. Site Address: **Needed**
 - b. Poison Control Centers 1-800-222-1222
 - c. Humboldt County HazMat: (707)445-6215
 - d. Humboldt County Ag Dept: (707)441-5260

4. Hazardous Material

5. Emergency Plan

- a. Fire**
- b. Earthquake**
- c. Evacuation Other**
- d. Security Threat**

ATTACHMENT A

Watershed Restoration Implementation Project

Pacific Watershed Associates Documentation for the Roads

Bob Howard

Site Management Plan



PACIFIC WATERSHED ASSOCIATES INC.

P.O. Box 4433 • Arcata, CA 95518-4433
Phone 707-839-5130 • Fax 707-839-8168
www.pacificwatershed.com

October 31, 2018

Humboldt County Building and Planning Department
3015 H Street
Eureka, California 95501

Re: Information that relates to road improvements on Reed Mountain Road, Bendbow, Humboldt County, California.

This letter serves to provide you with information pertaining to the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG) grant funded road improvement projects implemented on roads under ownership of Bob Howard in 2003 under the Reed Mountain Watershed Restoration Project.

An upland sediment source assessment of Reed Mountain Road was conducted by Pacific Watershed Associates (PWA) in 2001. The assessment outcome included a prioritized action plan to storm proof all sediment source sites and reduce road related sediment delivery to the South Fork Eel River Watershed (Figure 1). The objective of the implementation project was to protect and improve salmonid habitat by reducing road related erosion by storm proofing all potential sediment source locations including the road surface. A total of 147 sites were implemented within the plan, 22 of which are located within the ownership of Bob Howard (See Figure 2 and As-Built Road Logs). The plan was implemented with 2002 grant funds from CDFG (Contract #P0210515) and USFWS (Agreement #113313J151). All treated sites (stream crossings, ditch relief culverts, gullies, and landslides) were designed and constructed according to the standards provided in the "Handbook for Forest and Rural Roads," (Weaver and Hagans, 1994), and the California Salmonid Stream Habitat Manual, Part II (Reynolds and Flosi, 1994). Stream crossings were re-constructed to accommodate 100-year stream flows and associated debris. Methods for determining the 100-year design discharge include either the Rational Method, USGS Magnitude or Frequency Method, or Flow Transference Method. Additionally, photo points were established at all work sites where before and after photos were taken. These photo points provide an opportunity for long-term effectiveness monitoring. CDFG contract manager, Allan Renger and USFWS contract manager, Paula Golightly, conducted a final field inspection of the project area in 2005 and concluded that all project sites are functioning well as designed and implemented and no sediment delivery was observed.

If you have any further questions, or would like additional detail on the scope of the project work, please contact me at 707-839-5130.

Sincerely,
PACIFIC WATERSHED ASSOCIATES INC.

Courtney Sundberg

Courtney Sundberg, Staff Geologist
courtneys@pacificwatershed.com



**Final Report:
2003 - 2005 East Branch South Fork Eel River/Reed Mountain
Watershed Restoration Implementation Project**

**CDFG State Contract #P0210515
USFWS Agreement #113313J151
HCRCD Agreement ID: SFE #26
CA Adaptive Watershed Improvement Contract #ADWI –NO-11**

prepared for

**California Department of Fish and Game,
United States Fish and Wildlife Service,
Humboldt County Resource Conservation District
&
Reed Mountain Road Association Landowners**

by

**Pacific Watershed Associates, Inc.
Arcata, California
(707) 839-5130
January 2006**

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Appendices:

- A. Tables Showing Proposed Versus Actual Treatments, by Road
- B. "As Built" Road Log
- C. Conceptual Treatment Diagrams
- D. Selected Before, During & After Photo Point Photographs
- E. Before and After Photographs on Compact Disc



FINAL REPORT:
2003 - 2005 EAST BRANCH SOUTH FORK EEL RIVER/REED
MOUNTAIN WATERSHED RESTORATION
IMPLEMENTATION PROJECT

INTRODUCTION

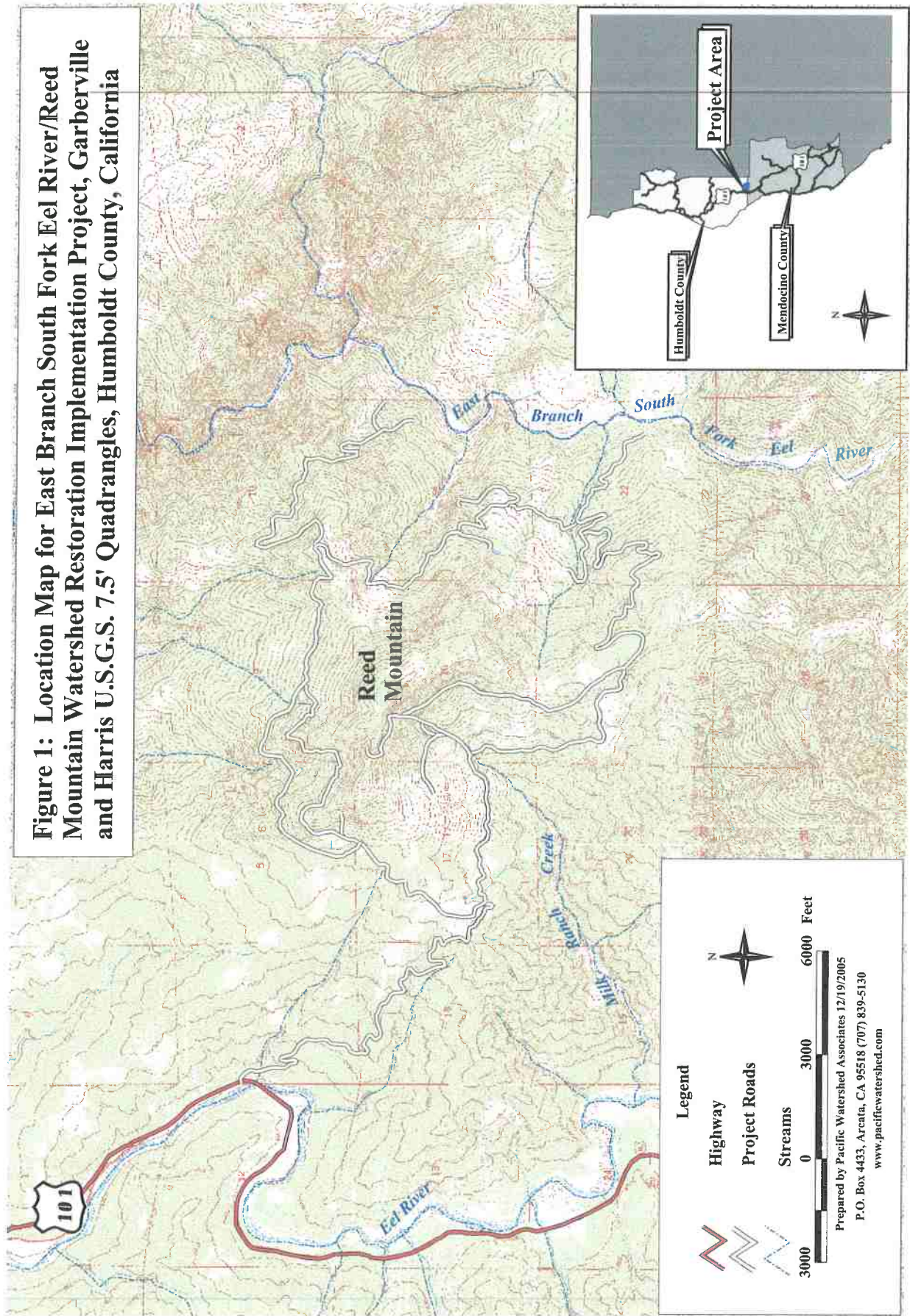
The East Branch is the largest tributary of the South Fork Eel River with approximately 21 miles of anadromous channel and 68 miles of blue line tributaries, according to the USGS 7.5 minute quadrangle maps. The East Branch drains a watershed of approximately 77 square miles. Elevations range from 400 feet at the mouth of the East Branch to 3,100 feet in the headwaters. Douglas fir, oak woodlands and meadows dominate the vegetation and the area was logged extensively in the 1960s and 1970s, with additional selective logging occurring in the 1980s, 1990s and early 2000s. The project area consists of approximately 10,000 acres on Reed Mountain, which is a mix of privately owned parcels, consisting of timberland, ranch land and rural residences (Figure 1).

According to a 1993 habitat survey of Class I stream channels by California Department of Fish and Game (CDFG), steelhead were observed throughout the watershed, with a larger number of fish found in the upper reaches where water temperatures are lower. Local residents identified adult Chinook salmon and steelhead spawning approximately 11 miles from the mouth in the winter of 1999.

In 1993 CDFG produced a stream inventory report, which indicated the East Branch South Fork Eel River is heavily aggraded with fine sediment. The 1993 habitat inventory report recommended installing in-stream structures to increase the amount and complexity of pool habitat in the East Branch South Fork Eel River, improve both summer and winter salmonid habitat. As recommended, fish structures were installed in August and September 2001. Extensive riparian planting also occurred in April 2002 (Scott Downie, CDFG, personal communication, May 2002).

The landowners on Reed Mountain have shown great concern over the possible negative effects that the current road system has had on salmonid populations in the East Branch South Fork Eel River and to tributaries in the project area, such as Milk Ranch Creek, a steelhead bearing tributary stream within the study area (Figure 1). Over the past three years, landowners have

Figure 1: Location Map for East Branch South Fork Eel River/Reed Mountain Watershed Restoration Implementation Project, Garberville and Harris U.S.G.S. 7.5' Quadrangles, Humboldt County, California



Legend

Highway

Project Roads

Streams

0 3000 6000 Feet

Prepared by Pacific Watershed Associates 12/19/2005
P.O. Box 4433, Arcata, CA 95518 (707) 839-5130
www.pacificwatershed.com

replaced two failing bridges and many undersized and/or improperly designed culverts throughout the road system that had washed out in the past and were contributing sediment to the South Fork Eel River. The Reed Mountain Road Association (RMRA), Eel River Sawmills, East Branch Watershed Association and other landowners have cooperated in the planning and assessment efforts, as well as the planning of the restoration implementation project described in this report.

BACKGROUND

Road systems are widely recognized throughout the region as one of the most significant sources of accelerated sediment production and delivery to stream channels. In the tributaries to the East Branch South Fork Eel River, as elsewhere in the Eel River watershed, the disturbance and degradation of stream channels caused by excessive anthropogenic sediment input is one of the most significant factors negatively affecting salmonid populations. In addition, persistent inputs of fine sediments from road systems is also thought to be a potentially important factor impacting anadromous fish habitat.

An assessment of future upland erosion sources was conducted by Pacific Watershed Associates (PWA) personnel during the spring and summer of 2001. Funding was provided by a 2000 CDFG Fisheries Restoration Grant (contract #P9985051). The sediment source assessment results included both a prioritized treatment plan, as well as a cost estimate to implement the plan. The Reed Mountain restoration and sediment control plan was then implemented with funding from a 2002 CDFG Restoration Grant (contract #P0210515), as well as grant funds from United States Fish and Wildlife Service (USFWS Agreement #113313J151). The project consisted of storm-proofing 28 miles of road and treating 141 sites of future sediment delivery. In 2005, PWA and the RMRA submitted requests and received an additional \$19,622 from the Humboldt County Resource Conservation District (HCRCD) (Agreement #SFE #26) and \$24,260 from the CA Adaptive Watershed Improvement Fund (contract #ADWI-NO11). The additional funds were needed to complete proposed work at 17 untreated stream crossings, to treat 11 newly identified sites and to treat 3 additional miles of road identified during the layout phase of the project (Table 1).

This project was particularly challenging because the roads have very high year-around use and traverse very weak, erodible soils in active earthflow terrain (Franciscan Melange). In addition,

Table 1. Funding sources and amount spent, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.	
Funding source	\$ Amount spent
Reed Mountain Road Association (RMRA)	65,000
California Department of Fish and Game (CDFG)	394,137
United States Fish and Wildlife Service (USFWS)	65,000
California Department of Fish and Game – Adaptive Management	24,260
Humboldt County Resource Conservation District (HCRCD)	19,622
Pacific Watershed Associates (PWA) and "other" Reed Mountain landowners	13,730
Total	581,749

throughout much of the year the hillslopes and cutbanks exhibit high volumes of emergent groundwater which further compromises road strength. These factors coupled with very steep road grades (15% to >20%) required the application of larger volumes of road rock than had been budgeted to maintain a safe and stable road bed. The final project, completed in 2005, is the largest comprehensive subdivision erosion control and erosion prevention implementation project in the entire Eel River watershed.

LOCATION

The project is located in Humboldt County on the United States Geological Survey (USGS) Garberville and Harris, California 7.5' quadrangle maps. The latitude of the project area is 40° 02' 50" and the longitude is 123° 45' 00". The project area is in Township 5S, Range 3E, Sections 7, 8, 9, 10, 16, 17, 18, 19, 20, 21, 22, and 115,. The project area is accessed from Highway 101, about 5 miles south of Benbow, California, off Benbow Drive.

The attached location map (Figure 1) and site-specific project map (Figure 2) depict the exact locations of the implementation project as well as the specific sites that have been treated for erosion control and erosion prevention along 31.8 miles of inventoried road.

PROJECT OBJECTIVES

The objective of this implementation project was to protect and improve salmonid habitat through controlling and preventing road-related erosion within the streamside riparian zones and upland areas in the watershed. This project was accomplished through the application of cost-effective erosion control and erosion prevention work on roads and road segments identified as treatment sites as part of the comprehensive erosion control and erosion prevention planning project completed in November, 2001. Specifically, the objectives of this project were to "storm proof" (upgrade or decommission) all existing and potential sites of erosion and sediment delivery (stream crossings, gullies and potential landslides) along participating landowner's road segments. The project also implemented recommended road drainage treatments (installing rolling dips, ditch relief culverts, changing road shape, etc.) along road reaches that were hydrologically-connected and could thereby deliver fine sediment to stream channels.

The implementation of erosion control and erosion prevention work is perhaps the most important step to protecting and restoring watersheds and their anadromous fisheries (especially where sediment input is a limiting or potentially limiting factor to fisheries production, as is thought to be the case for the project area). Unlike many road improvement and restoration activities, road decommissioning, erosion prevention and "storm-proofing" has an immediate benefit on the streams and aquatic habitat of the basin. It helps ensure that the biological productivity of the watershed's streams is not impacted by future human-caused erosion, and that future storm runoff can cleanse the streams of past accumulated coarse and fine sediment, rather than introducing and depositing additional sediment. The road upgrading work completed on this project is a significant step toward the realization of long term salmonid habitat protection and improvements in channel habitat condition in a portion of the South Fork Eel River.

PROJECT DESCRIPTION

A total of 147 sites were treated within the Reed Mountain project area. Table 2 describes the

Figure 2: 2003-2005 Site Map for East Branch South Fork Eel River/ Reed Mountain Watershed Restoration Implementation Project, Humboldt County, California

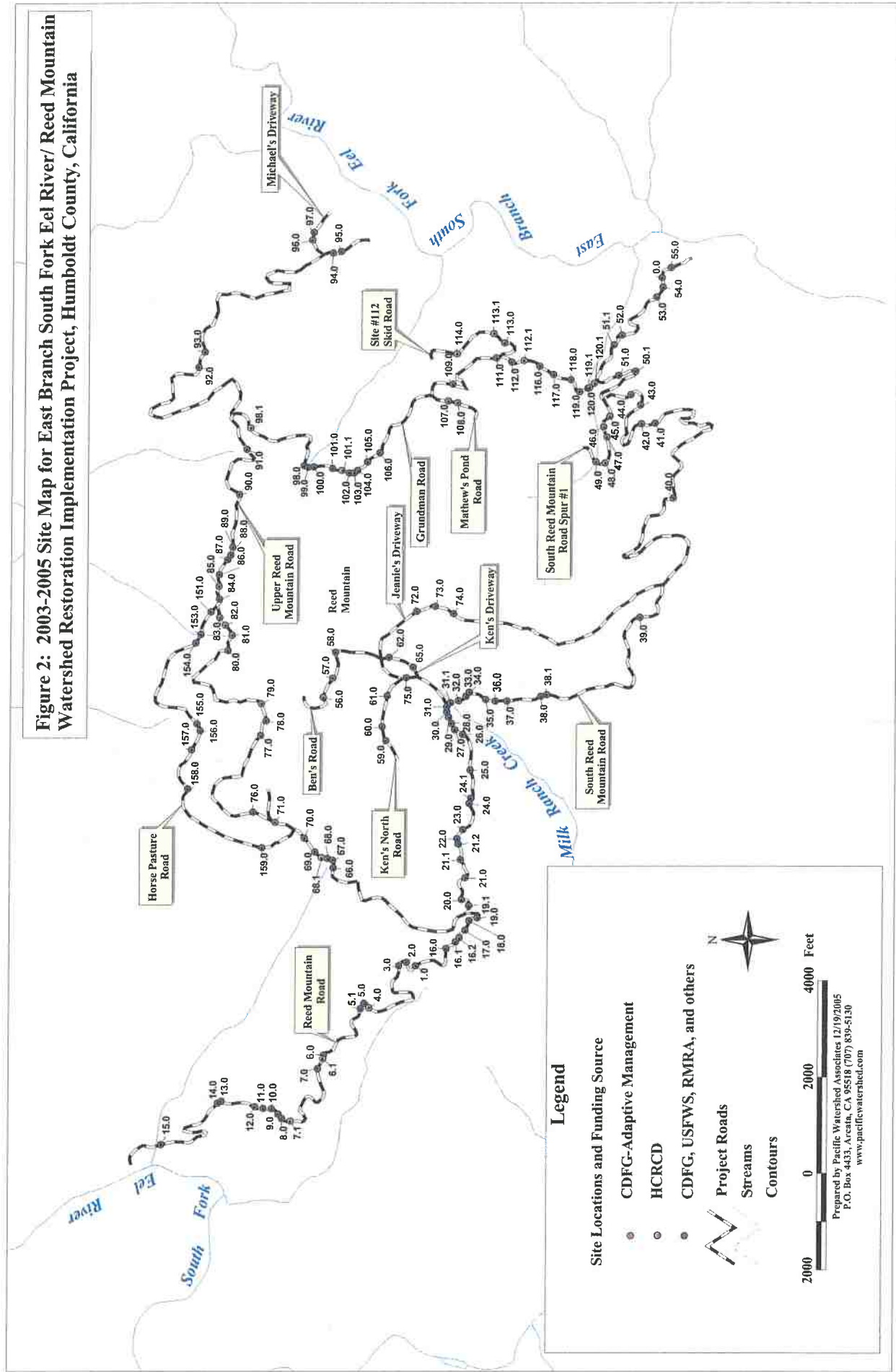


Table 2. Sites and miles treated by funding sources, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Funding Source	Number of sites and Site #'s	Site types	Sediment Savings (yds³)¹	Miles of Road Treated
Landowner contribution (RMRA and others), California Department of Fish and Game, United States Fish and Wildlife Service, Pacific Watershed Associates	119 (site #: 1, 2, 3, 5, 5.1, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 16.1, 16.2, 17, 18, 19, 19.1, 20, 21, 21.1, 21.2, 22, 23, 24, 24.1, 25, 26, 27, 28, 29, 30, 31, 31.1, 32, 33, 34, 35, 36, 37, 38, 38.1, 39, 40, 41, 42, 43, 44, 50.1, 51, 51.1, 52, 53, 54, 55, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 72, 73, 74, 75, 76, 77, 78, 80, 84, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 109, 111, 112, 116, 117, 118, 119, 120, 121, 123, 151, 153, 154, 155, 156, 157, 158, 159)	92 stream crossings, 2 landslides, 25 other	22,086	28.80
California Department of Fish and Game -- Adaptive Management	11 (site #: 4, 6.1, 7.1, 68.1, 98.1, 101.1, 112.1, 113.1, 114, 119.1, 120.1)	5 stream crossings, 1 landslide, 5 other	1,096	2.00
Humboldt County Resource Conservation District	17 (site #: 45, 46, 47, 48, 49, 56, 57, 71, 79, 81, 82, 83, 85, 96, 107, 108, 113)	17 stream crossings	1,487	1.04
TOTALS	147 sites	114 stream crossings, 3 landslides, 30 other	24,669	31.84

¹ Sediment savings is the combined sediment savings at the sites and from the treated road length. Sediment savings from the treated road lengths assumes 25' wide road prism and cutbank contributing area, and 0.2' of road/cutbank lowering over a decade.

site type, number of sites, site numbers, miles of treated road, and estimated sediment savings by various funding sources. Funding from CDFG and USFWS, RMRA, and PWA treated 119 sites. They included 92 stream crossings, 2 landslides, and 25 "other" sites with a sediment savings of approximately 22,086 yds³ along 28.8 miles of road. Funds from CDFG Adaptive Management treated 11 sites including 5 stream crossings, 1 landslide and 5 "other" sites with a sediment savings of approximately 1,096 yds³ over 2 miles of treated road. The HCRCF funds treated 17 stream crossings with a sediment savings of approximately 1,487 yds³ along an additional 1 mile of road. The total sediment savings for the entire project is estimated at 24,669 yds³, and 31.84 miles of road was "storm-proofed".

The project has: 1) lowered the risk of culvert failure, fill erosion and subsequent sediment delivery at 114 stream crossing, 2) improved road bed drainage by disconnecting the road bed from stream crossings or gullies along 31.8 miles of road (through the construction of rolling dips, berm removal, outsloping the road, etc.), and 3) reduced sediment delivery by treating 30 separate "other" site locations, mostly ditch relief culverts, along the roads (Tables 2 and 3, Figure 2).

Table 3. Site classification and sediment delivery for all treated sites, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Site type	Number of sites or road miles treated	Sediment savings (yds ³)	Stream crossings w/ a diversion potential (#)	Streams currently diverted (#)	Stream culverts likely to plug (plug potential rating = high or moderate)
Stream crossing	114	9,640	77	24	32
Landslides	3	268	NA	NA	NA
Other	30	839	NA	NA	NA
Total (all sites)	147	10,747	77	24	32
Persistent surface erosion ¹	14.1 miles	13,922	NA	NA	NA
Totals	147	24,669	77	24	32

¹ Assumes 25' wide road prism and cutbank contributing area, and 0.2' of road/cutbank surface lowering over one decade.

During the spring of 2003, numerous meetings were held with the Reed Mountain Road Association landowners to finalize all the proposed road treatments. All proposed work sites and reaches of road to be treated were re-evaluated and re-flagged in the field (Tables 2 and 3, Appendix A). Treatment prescriptions for all sites were finalized, including the list of needed culverts, road or rip-rap sized rock, seed and mulch. For road reaches, the specific locations where road shapes were to be changed from insloped to outsloped, where berms were to be removed or the location of proposed rolling dips were flagged in the field. A "Road Log" was developed that described all proposed work items, by mile post, along with explanations of subtle differences in treatment prescriptions or construction details (Appendix B).

At the same time, specific technical specifications were developed, along with typical construction drawings for each major category of work item (Appendix C). Once PWA completed the Road Log, local landowners and proposed contractors were encouraged to review the site specific recommendations in order to make any final revisions prior to the beginning of implementation work.

PROJECT IMPLEMENTATION

Benbow Construction of Benbow, California was chosen as the local equipment operator to complete the proposed work in the project area. The contractor used an excavator, a dozer tractor, a backhoe, a loader, dump trucks, water trucks and a motor grader to treat all the recommended sites and road reaches, as well as a portable rock crusher to crush rip-rap and road rock for the project. The equipment worked in various combinations depending on whether a stream crossing or road reach was being treated.

The required culverts for the project were ordered in September 2003 and culverts for the 2003 work began arriving in October and were then distributed to each site. From June 2004 through August 2004 the remaining culverts were delivered. There were several complications getting the culverts delivered to the job site by the vendor. Consequently, additional unbudgeted heavy equipment time was expended distributing the culverts to the individual treatment sites. Of the

twelve truckloads of culvert delivered, two got stuck, one was driven by the dump truck driver, two truckloads were unloaded and reloaded onto smaller trailers, and seven trucks had to be towed by the grader up the steep roads.

All heavy equipment work, associated grass seeding, and straw mulching occurred over three work seasons. From October through December 2003 the first 2.6 miles of the main road from Highway 101 toward Reed Mountain was treated (Appendix A-1, Figure 2). From May through October 2004 the roads contouring around Reed Mountain were treated skipping any sites that were too wet to work until after July (Appendix A-2 through A-6, Figure 2). All the remaining sites were treated from May through July 2005.

The CDFG-USFWS funded plan called for 28.8 miles of road to be upgraded or "storm-proofed" (Appendix A). When finalizing treatment prescriptions and developing the "Road Log", minor alterations to the original treatment plan were made. This is a common occurrence in rural subdivisions where it becomes necessary to accommodate specific landowner needs in designing road treatments and due to changes in site conditions at several sites since the plan was originally developed in 2001. A total of 31.8 miles of road were actually treated. Table 4 summarizes the total number of proposed treatment types versus the actual "as built" numbers (Appendices A and B).

One hundred fourteen (114) stream crossings were re-constructed to accommodate the 100-year flood discharge. This included installing or replacing culverts at 95 stream crossings, and removing failing culverts and installing armored fill crossings at 4 stream crossings. Sixty-nine (69) of the newly culverted stream crossings had critical dips installed on the down road hinge line to prevent stream diversions in the event a culvert does plug with sediment or debris. At several of the stream crossing sites channel sediment stored above the culvert inlet was excavated and endhauled to a suitable spoil disposal site. This generally involved using the excavated material to fill inboard ditches, re-build stream crossing fills, or depositing the material on the road bed to change road shapes and improve road drainage.

Road bed drainage improvements consisted of constructing 335 rolling dips along the Reed Mountain roads at 150 to 500 foot spacings, installing 31 new ditch relief culverts and outslowing over 14,000 feet of previously insloped road bed. Approximately 4,890 yds³ of road and rip-rap sized rock was used in completing the project. Rip-rap was used to buttress the fill slope at 62 newly constructed stream crossings, and road rock was applied to the road bed at all stream crossing sites, ditch relief culvert sites, rolling dip locations and outslowed/insloped road reaches.

MONITORING

Before the project commenced, photo point stations were established for many of the project work sites. These photo points were used to document the work sites before, during and after the restoration activities. Examples of selected "before" and "after" photo points have been included in Appendix D depicting re-constructed stream crossings, rolling dips and outslowed roads in the Reed Mountain project area. Additional before and after photographs of most treated sites are

Table 4. Proposed versus Installed Treatments, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Treatment Type	Proposed No.	Installed No.
Install critical dip	71	69
Install steam crossing culvert	24	29
Replace steam crossing culvert	67	66
Install downspout	4	4
Install wet crossing	2	4
Install trash rack	4	9
Clean culvert	5	9
Outslope road and retain ditch	400'	5,249'
Outslope road and remove ditch	7,195'	8,983'
Inslope road	100'	175'
Install rolling dip	300	335
Install cross road drain	9	11
Remove berm	26,216'	5,969'
Install ditch relief culvert	38	31
Clean/cut ditch	75'	821'
Remove ditch	490'	0
Road rock	244 yds ³	1,091 yds ³
Rip rap	3,017 yds ³	3,802 yds ³

included on a compact disc (Appendix E). These photo points will provide an opportunity for long-term effectiveness monitoring in the future.

Significant and high intensity rainfall occurred in the project area during the winters of 2003, 2004, and 2005. Several newly re-constructed stream crossing fillslopes have shown minor settling, and a few road surface locations have become saturated due to emergent groundwater; but overall the project area has responded very well. All 114 newly installed stream culverts and armored fill crossings have functioned well through the storms. There is no sediment delivery occurring at the outlets of the newly installed ditch relief culverts. Fortunately, local landowners are watching sites carefully and are expediting hand labor treatments, as necessary, to maintain road drainage at crossings and road drainage sites.

It should be noted that the condition of the subdivision road network prior to implementing this project was very poor. Many locations along the road network became saturated, muddy or washed out annually. It is also likely that the December 2005 high intensity rainfall events would have washed out multiple crossings in the subdivision, making the roads impassible and delivering large quantities of sediment to the East Branch and South Fork Eel River.

BUDGET

Table 5 itemizes total costs associated with the East Branch South Fork Eel River/Reed Mountain Watershed Restoration Implementation Project. The original proposal submitted to CDFG requested \$394,137 from CDFG with cost share match of \$65,000 from USFWS and \$65,000 from the RMRA for a total cost share of \$130,000 or 25% of the total costs to complete the project. In order to accommodate cost increases for heavy equipment and materials,

especially culverts, and required increases in road rock volumes, additional funding was requested and received from several sources. The HCRCD contributed \$19,622, the CDFG-Adaptive Management Program contributed \$24,260, and an additional \$13,730 was contributed by additional landowners on Reed Mountain and PWA. The total cost of the entire project was \$581,749 (Table 5).

CONCLUSIONS

The expected benefit of completing erosion control and erosion prevention work lies in the reduction of long term sediment delivery to the East Branch and South Fork Eel River. The purpose of this project was to permanently reduce the amount of sediment that could erode and be delivered to streams in the watershed. By storm-proofing 31.8 miles of former logging/ranch roads on Reed Mountain, an estimated 24,045 yds³ of sediment was prevented from being delivered to streams within the watershed over the next decade. The total cost for the project was \$581,749, for a cost effectiveness value of \$24.19/yds³ saved from entering stream channels (see Table 5 for the final budget summary breakdown).

The CDFG contract manager, Allan Renger, and the USFWS contract manager, Paula Golightly, conducted several field inspections during the three year project. A final inspection of the project area was conducted on September 12, 2005, and all parties associated with the project were pleased with the results.

Appendix A

Proposed versus Actual Treatment Tables by Road Name

East Branch South Fork Eel River/Reed Mountain Watershed Implementation Project

Humboldt County, California.

A-1. Proposed versus installed treatments for Reed Mountain Road, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Treatment Type	Proposed No.	Installed No.
Install critical dip	9	11
Install steam crossing culvert	3	3
Replace steam crossing culvert	8	8
Install trash rack	0	3
Clean culvert	1	1
Outslope road and retain ditch	0	1,247'
Outslope road and remove ditch	1,575	7,735'
Install rolling dip	63	49
Remove berm	6,715	0
Install ditch relief culvert	14	9

A-2. Proposed versus installed treatments for Upper Reed Mountain Road, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Treatment Type	Proposed No.	Installed No.
Install critical dip	11	12
Install steam crossing culvert	4	4
Replace steam crossing culvert	13	15
Install trash rack	0	2
Clean culvert	1	5
Outslope road and retain ditch	0	2,402'
Outslope road and remove ditch	2,900'	0
Inslope road	100'	0
Install rolling dip	97	106
Remove berm	9,560'	1,970'
Install ditch relief culvert	6	3
Clean/cut ditch	0	150'
Remove ditch	490'	0

A-3. Proposed versus installed treatments for South Reed Mountain Road, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Treatment Type	Proposed No.	Installed No.
Install critical dip	25	28
Install steam crossing culvert	6	6
Replace steam crossing culvert	24	27
Install downspout	3	1
Install trash rack	4	2
Clean culvert	0	1
Outslope road and retain ditch	400'	328'
Outslope road and remove ditch	1,110'	0
Install rolling dip	68	81
Remove berm	4,340'	2,192'
Install ditch relief culvert	15	0
Clean/cut ditch	75'	249'

A-4. Proposed versus installed treatments for Star's Road, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Treatment Type	Proposed No.	Installed No.
Install critical dip	0	1
Replace steam crossing culvert	0	1
Install ditch relief culvert	0	3

A-5. Proposed versus installed treatments for Horse Pasture Road, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Treatment Type	Proposed No.	Installed No.
Install critical dip	6	5
Install steam crossing culvert	5	5
Install downspout	0	1
Install trash rack	0	1
Outslope road and retain ditch	0	1,272'
Install rolling dip	6	20
Remove berm	0	1,272'
Clean/cut ditch	0	106'

A-6. Proposed versus installed treatments for Grundman Road, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Treatment Type	Proposed No.	Installed No.
Install critical dip	6	5
Install steam crossing culvert	4	6
Replace steam crossing culvert	8	8
Install downspout	8	0
Install trash rack	0	1
Clean culvert	0	1
Outslope road and remove ditch	1,510'	1,126
Install rolling dip	44	44
Remove berm	4,290'	535'
Install ditch relief culvert	1	4
Clean/cut ditch	0	111'

A-7. Proposed versus installed treatments for South Reed Mountain Spur 1, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Treatment Type	Proposed No.	Installed No.
Install critical dip	1	0
Install steam crossing culvert	1	2
Replace steam crossing culvert	1	1
Install downspout	0	2
Install wet crossing	1	0
Install rolling dip	0	8
Install cross road drain	6	10

A-8. Proposed versus installed treatments for Ken's Road, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Treatment Type	Proposed No.	Installed No.
Install critical dip	4	1
Install steam crossing culvert	1	2
Replace steam crossing culvert	3	4
Install rolling dip	4	6
Remove berm	100'	0
Install ditch relief culvert	0	2

A-9. Proposed versus installed treatments for Ben's Road, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Treatment Type	Proposed No.	Installed No.
Install critical dip	1	2
Replace steam crossing culvert	3	2
Install rolling dip	2	0
Remove berm	80	0
Install ditch relief culvert	1	0

A-10. Proposed versus installed treatments for Jeanie's Road, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Treatment Type	Proposed No.	Installed No.
Install critical dip	3	1
Replace steam crossing culvert	5	3
Outslope road and remove ditch	100'	122'
Inslope road	0	175'
Install rolling dip	13	7
Remove berm	130'	0
Install ditch relief culvert	1	4
Clean/cut ditch	0	205'

A-11. Proposed versus installed treatments for Michael's Road, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Treatment Type	Proposed No.	Installed No.
Install critical dip	2	1
Clean culvert	2	1
Install rolling dip	1	5
Install ditch relief culvert	0	1

A-12. Proposed versus installed treatments for Mathew's Pond Road, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Treatment Type	Proposed No.	Installed No.
Install critical dip	2	1
Install steam crossing culvert	1	1
Replace steam crossing culvert	1	1

A-13. Proposed versus installed treatments for Site #112 Spur Road, East Branch South Fork Eel River/Reed Mountain, Humboldt County, California.

Treatment Type	Proposed No.	Installed No.
Install critical dip	1	1
Replace steam crossing culvert	1	1
Install wet crossing	0	1
Install rolling dip	2	9
Install cross road drain	3	1

Appendix B

As Built Road Log

East Branch South Fork Eel River/Reed Mountain Watershed Implementation Project

Humboldt County, California.

Road Log of "As Built" Treatments for Reed Mountain Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.0			Start at intersection with old highway.		
0.092			End of pavement.		
0.124			Gate.		
0.153	15		Center of flat car bridge. No treatment at bridge.		
0.177		Start OSR-FD #1	Start outslope road by pulling fill onto road bed to outslope the road and fill the ditch.		130 yds ³ road rock (from start to end OSR-FD #1)
0.177		RD #1	Install a rolling dip that drains road and ditch to outboard side of road.		
0.219		RD #2	Install a rolling dip to drain road and ditch into swale at outboard edge.		
0.261		RD #3	Install a rolling dip to drain road and ditch.		
0.298		RD #4	Install a rolling dip to drain road and ditch.		
0.331		RD #5	Install a rolling dip to drain road and ditch.		
0.382		RD #6	Install a rolling dip to drain road and ditch. Make sure dip captures any flow from small gully on hillslope.		
0.426		RD #7	Install a rolling dip to drain road and ditch.		
0.453		End OSR-FD# 1	End outslope road by pulling fill onto road bed to outslope the road and fill the ditch.		
0.539		RD #9	Install a rolling dip to drain road and ditch.		15 yds ³ road rock
0.579		RD #10	Install a rolling dip to drain road only.		15 yds ³ road rock
0.625		RD #11	Install a rolling dip to drain road and ditch.		15 yds ³ road rock
0.654	14		Spring and small gully on hillslope. Install 18" x 40' plastic ditch relief culvert. Clean ditch for 50' above culvert.	18" x 40' PVC	15 yds ³ road rock
0.663	13	CD #1	Culverted 18" stream crossing with a big gully below the outlet. Excavate from TOP (just above ditch) to BOT. Install 30" x 80' CMP at base of fill. Install a critical dip at the right hinge line. Can use any spoils to help fill old gully. Place 15 yds ³ of 0.5-1.5' mixed diameter rip-rap below the critical dip. Clean ditch to DRC. Install berm at OBR.	30" x 60' CMP, 2 bands	15 yds ³ of 0.5-1.5' diameter mixed rip-rap & 20 yds ³ of road rock

Road Log of "As Built" Treatments for Reed Mountain Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.679			Gully down hillslope and small class III stream diverted to the ditch. No treatment. Leave diverted to ditch and crossing at site #13.		
0.682		RD #12	Install rolling dip to drain road only.		15 yds ³ road rock
0.724	12	CD #2	Diverted fill crossing. Excavate from TOP to BOT. Install 24" x 60' plastic culvert at the base of the fill. Excavate a 4' wide channel bottom with side slopes layed back to 2:1 above new inlet. Install a critical dip to the right hinge line.	24" x 60' PVC	15 yds ³ of 0.5-1.5' diameter mixed rip-rap & 20 yds ³ road rock
0.746	11	CD #3	Culverted 18" stream crossing. Excavate from TOP to BOT. Install 24" x 60' plastic culvert at the base of the fill. Excavate 4" wide channel bottom with side slopes layed back to 2:1 from the TOP to new inlet. Armor lower 1/2 of fillslope with 15 yds ³ of 0.5'-2' diameter mixed rip rap. Re-use existing rip-rap. Install a critical dip to the right hinge line.	24" x 60' PVC	15 yds ³ of 0.5-2.0' diameter mixed rip-rap & 20 yds ³ road rock
0.783	10		Center of flat car bridge. No treatment.		
0.812	9		18" ditch relief culvert. Clean culvert inlet.		
0.812		Start OSR-KD #1	Start outslope road by removing berm and pulling onto the road and keep the ditch.		31 yds ³ road rock (from start to end OSR-KD #1)
0.841		RD #13	Install a rolling dip to drain road and ditch.		
0.852	8	CD #4	Culverted 18" stream crossing. Excavate from TOP to BOT. Install 24" x 40' plastic culvert at the base of the fill. Lay back right (looking down channel) bank to 1:1 for 20' below BOT. Cross the ditch above the redwood clump, 50' above inlet, to remove 10 yds ³ of fill out of the channel above Redwoods. Install a critical dip at right hinge line.	24" x 40' PVC	
0.879	7.1	CD #5	Small crossing that flows down ditch. Excavate from TOP to BOT. Install 24" x 80' plastic culvert at the base of the fill. Install a critical dip at right hinge.	24" x 80' PVC	15 yds ³ of 0.5-2.0' diameter mixed rip-rap & 20 yds ³ road rock

Road Log of "As Built" Treatments for Reed Mountain Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.879		End OSR-KD #1 & Start OSR-FD #2	End outslope road by removing berm and pulling onto the road and keep the ditch and start outslope road by removing berm and pulling onto the road and fill the ditch.		240 yds ³ road rock (from start to end OSR-FD #2)
0.922		RD #14	Install a rolling dip that drains road only. Really super outslope.		
0.943		RD #15	Install a rolling dip to drain road only.		
1.001		RD #16	Install a rolling dip to drain road only.		
1.046		RD #17	Install a rolling dip that drains road only, toward inside bend of road. Really super outslope road.		
1.129		RD #19	Install a rolling dip to drain road only.		
1.191		RD #20	Install a rolling dip to drain road only.		
1.234		RD #21	Install a rolling dip to drain road only.		
1.272		RD #22	Install a rolling dip to drain road only.		
1.306		RD #23	Install a rolling dip to drain road only.		
1.378		RD #24	Install a rolling dip to drain road only.		
1.390		End OSR-FD #2	End outslope road by removing berm and pulling onto the road and fill the ditch.		
1.395			Rock pit on left.		
1.402	7	RD #26	Install a rolling dip to drain road and ditch. Armor outboard fill face with 15 yds ³ of rip-rap.		15 yds ³ of 0.5-1.5' diameter mixed rip-rap & 15 yds ³ road rock
1.422	6.1		Excavate unstable slope above channel downstream of BOT flag, on right bank 35' x 3' x 10' = 39 yds ³ . Use spoils to help fill ditches.		
1.429	6	CD #6	Culverted 24" stream crossing. Excavate from TOP to BOT. Install 36" x 60' CMP at the base of the fill. Install a single post trash rack 36" above the new inlet. Install a critical dip on right hinge line. Place 20 yds ³ of 0.5-1.5' mixed diameter rip-rap on fillslope below the critical dip.	36" x 60' CMP, 2 bands	20 yds ³ of 0.5-1.5' diameter mixed rip-rap & 20 yds ³ road rock
1.458			Intersection with driveway on right.		

Road Log of "As Built" Treatments for Reed Mountain Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
1.484		Start OSR-FD #3	Start outslope road by removing berm and pulling onto the road and fill the ditch.		23 yds ³ road rock (from start to end OSR-FD #3)
1.520		RD #27	Install a rolling dip to drain road and ditch.		
1.533		End OSR-FD #3	End outslope road by removing berm and pulling onto the road and fill the ditch.		
1.588		RD #28	Install a rolling dip to drain road and ditch.		15 yds ³ road rock
1.652		RD #29	Install a rolling dip to drain road only.		15 yds ³ road rock
1.686		RD #30	Install a rolling dip to drain road into old gully.		15 yds ³ road rock
1.686	5.1		Start excavate unstable fill along right bank of channel with 1:1 side slopes (100' x 10' x 12' = 222 yds ³). Use spoils to fill ditches.		
1.700	5.1		End excavate unstable fill along right bank of channel with 1:1 side slopes (100' x 10' x 12' = 222 yds ³). Use spoils to fill ditches.		
1.712	5	CD #7	Culverted stream crossing with 2 culverts. Excavate from TOP to BOT. Install a 72" x 60" culvert at the base of fill. Install a critical dip at right hinge. Install large I beam trash rack 72" above inlet. Lay back channel side slopes for above the TOP for 40' with 2:1 side slopes. Re-use existing rip-rap and place 10 yds ³ of 0.5-2' mixed diameter rip-rap to fillslope below the critical dip.	72" x 60" CMP, 2 bands Large I-beam trash rack	10 yds ³ of 0.5-2' diameter mixed rip-rap & 20 yds ³ road rock
1.730	4		18" ditch relief culvert, short and high in fill. Install 18" x 40' PVC.	18" x 40' PVC	
1.733		RD #31	Install a rolling dip to drain road only.		15 yds ³ road rock
1.775		Start OSR-FD #4	Start outslope road by pulling fill onto road bed to outslope the road and fill the ditch.		24 yds ³ road rock (from start to end OSR-FD #4)
1.767		RD #32	Install a rolling dip that drains road and ditch.		

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1.825		RD #34	Install a rolling dip to drain road only.		
1.826		End OSR-FD #4 & Start OSR-KD #2	End outslope road by pulling fill onto road bed to outslope the road and fill the ditch and start outslope road by pulling fill onto road bed to outslope the road and keep the ditch.		63 yds ³ road rock (from start to end OSR-KD #2)
1.826			Intersection with downhill driveway on right.		
1.826		DRC #1	Install an 18" x 80' plastic ditch relief culvert to outlet just below driveway on the right.	18" x 80' PVC, 3 bands	
1.855		RD #35	Install a rolling dip to drain road only.		
1.888		DRC #2	Spring/seeping cutbank. Install an 18" x 40' plastic ditch relief culvert.	18" x 40' PVC	
1.888		RD #36	Install a rolling dip that drains road only.		
1.960		RD #37	Install a rolling dip that drains road and ditch.		
1.960		End OSR-KD #2 & Start OSR-FD #5	End outslope road by pulling fill onto road bed to outslope the road and keep the ditch and start outslope road by pulling fill onto road bed to outslope the road and fill the ditch.		104 yds ³ road rock (from start to end OSR-FD #5)
1.960		RD #38	Install a rolling dip that drains road and ditch. Really super outslope on bend.		
1.983		RD #39	Install a rolling dip that drains road and ditch.		
2.024		RD #40	Install a rolling dip that drains road and ditch.		
2.059		RD #41	Install a rolling dip that drains road and ditch.		
2.094		RD #42	Install a rolling dip that drains road and ditch.		
2.121		RD #43	Install a rolling dip that drains road and ditch.		
2.158	3	CD #8	Culverted stream crossing with 8" and 12" culverts. Excavate from top to bottom. Install 24" x 50' plastic culvert at base of fill. Excavate 4' wide channel bottom and lay back side slopes to 2:1 from top to new inlet. Install a critical dip to left hinge line. Install a single post trash rack 24" above new inlet.	24" x 50' PVC	
2.182		End OSR-FD #5	End outslope road by pulling fill onto road bed to outslope the road and fill the ditch.		
2.211	2	CD #9	Culverted 8" stream crossing. Excavate firm top to bottom. Install 24" x 50' plastic culvert at the base of	24" x 50'	15 yds ³ of 0.25-1.0'

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			fill. Install a critical dip to right hinge. Armor lower ½ of fillslope with 15 yds ³ 0.25 - 1.0' diameter mixed rip-rap and inboard fillslope with 5 yds ³ .	PVC	diameter mixed rip-rap & 20 yds ³ road rock
2.224		DRC #3	Install 18" x 40' plastic ditch relief culvert.	18" x 40' PVC	15 yds ³ road rock
2.228		RD #44	Install a rolling dip to drain road only.		15 yds ³ road rock
2.279		RD #45	Install a rolling dip to drain road and ditch.		15 yds ³ road rock
2.325		RD #46	Install a rolling dip to drain road and ditch.		15 yds ³ road rock
2.325		Start OSR-FD #6	Start outslope road by pulling fill onto road bed to outslope the road and fill the ditch.		117 yds ³ road rock (from start to end OSR-FD #6)
2.360		RD #47	Install a rolling dip to drain road and ditch.		
2.397			Hydrologic break.		
2.414			Intersection with downhill driveway on the right.		
2.431		RD #48	Install a rolling dip to drain road and ditch.		
2.466		RD #49	Install a rolling dip to drain road and ditch.		
2.487	16	CD #10	Culverted 18" stream crossing. Armor small 3' headcut above TOP with 1 yd ³ of 0.25-1.0' mixed diameter rip-rap. Excavate from TOP to BOT. Install a 24" x 60' plastic culvert at the base of the fill. Armor lower ½ of the fillslope with 5 yds ³ of 0.5-1.0' mixed diameter rip-rap. Install a critical dip to left hinge line.	24" x 60' PVC	6 yds ³ of 0.5-1.0' mixed diameter rip-rap
2.520		RD #50	Install a rolling dip to drain road and ditch.		
2.537	16.1	CD #11	Small fill crossing. Excavate from TOP to BOT. Install 24" x 60' plastic culvert at the base of fill. Install a critical dip to the left hinge line. Install a single post trash rack 24" above the new culvert inlet.	24" x 60' PVC	
2.575	17		Headwall swale. 18" plugged outlet and too short.	18" x 40' PVC	
2.575		End OSR-FD #6	End outslope road by pulling fill onto road bed to outslope the road and fill the ditch.		

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2.575		Start OSR-KD #3	Start outslope road by pulling fill onto road bed to outslope the road and keep the ditch.		16 yds ³ road rock (from start to end OSR-KD #3)
2.599	18		12" ditch relief culvert. Replace with an 18" x 60' plastic ditch relief culvert.	18" x 60' PVC	
2.610		End OSR-KD #3 & Start OSR-FD #7	End outslope road by pulling fill onto road bed to outslope the road and keep the ditch an start outslope road by pulling fill onto road bed to outslope the road and fill the ditch.		24 yds ³ road rock (from start to end OSR-FD #7)
2.615		RD #52	Install a rolling dip to drain road and ditch.		
2.642		RD #53	Install a rolling dip to drain road and ditch.		
2.661	19		18" ditch relief culvert with large gully at the outlet. Replace with 18" x 30' plastic ditch relief culvert, moving inlet in about 3'.	18" x 40' PVC	
2.661			Intersection with South Reed Mountain Road on right.		

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2.661		End OSR-FD #7 & Start OSR-KD #4	End outslope road by pulling fill onto road bed to outslope the road and fill the ditch an start outslope road by pulling fill onto road bed to outslope the road and keep the ditch.		214 yds ³ road rock (from start to end OSR-KD #4)
2.689		RD #54	Install a rolling dip to drain road only.		
2.726		RD #55	Install a rolling dip to drain road and ditch.		
2.762		RD #56	Install a rolling dip to drain road and ditch.		
2.799		RD #57	Install a rolling dip to drain road only.		

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2.829		RD #58	Install a rolling dip to drain road and ditch.		
2.866		RD #59	Install a rolling dip to drain road only.		
2.898		RD #60	Install a rolling dip to drain road only.		
2.934		RD #61	Install a rolling dip that drains road only.		
		DD #1	End cut ditch for 150', to carry flow past RD #62.		
2.970		RD #62	Install a rolling dip that drains road only.		
		RD #62.1	Install a rolling dip that drains road only, to cut road runoff getting to RD #62 in half.		
2.999		RD #63 & DD #2	Install a rolling dip that drains road only. Start cut ditch for 150', to carry flow past RD #62.		
3.049		RD #64	At downhill spur road. Install a rolling dip that drains road and ditch.		
3.082		RD #65	Install a rolling dip that drains road only.		
3.116		RD #66	Install a rolling dip that drains road only.		
3.116		End OSR-KD#4	End outslope road by pulling fill onto road bed to outslope the road and keep the ditch.		
3.375		RD #72	Install a rolling dip to drain road and ditch.		15 yds ³ road rock
3.426		RD #73	Install a rolling dip to drain road and ditch.		15 yds ³ road rock
3.441			12" ditch relief culvert. No treatment.		
3.446		RD #74	Install a rolling dip to drains road only.		15 yds ³ road rock
3.471		RD #75	Install a rolling dip to drains road and ditch.		15 yds ³ road rock
3.497		RD #76	Install a rolling dip to drains road and ditch.		15 yds ³ road rock
3.536	66	CD #12	Culverted 18" stream crossing. Excavate from TOP to BOT. Install a 24" x 60' plastic culvert at the base of the fill. Excavate from 4' wide channel bottom from TOP to the new inlet, laying back side slopes to 2:1. Install a critical dip to left hinge line.	24" x 60' PVC	15 yds ³ road rock
3.547		RD #77	Install a rolling dip to drains road and ditch.		15 yds ³ road rock
3.579		RD #78	Install a rolling dip to drains road and ditch.		15 yds ³ road rock
3.588			Intersection with uphill driveway on right.		

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3.594	67	CD #13	Culverted 18" stream crossing. Excavate from TOP to BOT. Install a 36" x 70' culvert at the base of the fill. Install a critical dip to the left hinge line.	36" x 70' CMP, 3 bands	20 yds ³ road rock
3.625	68	CD #14	Small fill crossing. Excavate from TOP to BOT. Install 24" x 30' culvert at the base of the fill. Install a critical dip to the left hinge line.	24" x 30' PVC	15 yds ³ road rock
3.649		RD #79	Install a rolling dip to drains road and ditch.		15 yds ³ road rock
3.696		RD #80	Install a rolling dip to drains road and ditch. Install 24" x 30' culvert.	24" x 30' PVC	15 yds ³ road rock
3.728		RD #81	Install a rolling dip to drains road only.		15 yds ³ road rock
3.744	69		15" ditch relief culvert. No treatment.		
3.771	70		18" ditch relief culvert. Clean culvert inlet and outlet.		
3.782			Intersection with downhill driveway on left.		
3.792		RD #82	Install a rolling dip that drains road only.		15 yds ³ road rock
3.826		RD #83	Install a rolling dip that drains road only, toward ditch.		15 yds ³ road rock
3.843	71		24" ditch relief culvert. Inlet and outlet were cleaned.		
3.859			Intersection with uphill driveway on right.		
3.874			Intersection with downhill driveway on left.		
3.923		DRC #4	Install an 18" x 30' plastic ditch relief culvert. Fence at outboard edge of road. Will require landowner's permission.	18" x 30' PVC	15 yds ³ road rock
3.994		RD #84	Install a rolling dip that drains road only. Fence at outboard edge of road. Will require landowner's permission.		15 yds ³ road rock
4.037		RD #85	Install a rolling dip that drains road only. Fence at outboard edge of road. Will require landowner's permission.		15 yds ³ road rock
4.037			12" ditch relief culvert. Clean outlet.		
4.065		RD #86	Install a rolling dip that drains road only.		15 yds ³ road rock
4.071			12" ditch relief culvert. Clean outlet.		
4.111		RD #87	Install a rolling dip to drains road only.		15 yds ³ road rock
4.136			Buried ditch relief culvert. No treatment.		

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4.146		RD #88	Install a rolling dip that drains road and ditch.		15 yds ³ road rock
4.187		RD #89	Install a rolling dip that drains road and ditch.		15 yds ³ road rock
4.219			Intersection with downhill spur on left.		
4.239		RD #90	Install a rolling dip that drains road and ditch.		15 yds ³ road rock
4.280			Intersection with downhill skid on left.		
4.286		RD #91	Install a rolling dip that drains road and ditch.		15 yds ³ road rock
4.345		RD #92	Install a rolling dip that drains road only, at swale.		15 yds ³ road rock
4.389		RD #93	Install a rolling dip that drains road only.		15 yds ³ road rock
4.442		RD #94	Install a rolling dip that drains road only.		15 yds ³ road rock
4.538	77	CD #16	Culverted 12" stream crossing. Excavate from TOP to BOT. Install 24" x 30' plastic culvert at the base of the fill. Install a critical dip at the right hinge line. Install a single post trash rack 24' above the new inlet. Armor the fillslope with 5 yds ³ of 0.5-1.5' diameter mixed rip-rap.	24" x 30' PVC Trash rack	5 yds ³ of 0.5-1.5' diameter mixed rip-rap & 20 yds ³ road rock
4.584		RD #95	Install a rolling dip that drains road and ditch.		15 yds ³ road rock
4.608	78		12" ditch relief culvert. Replace with 18" x 30' plastic ditch relief culvert.	18" x 30' PVC	15 yds ³ road rock
4.629		RD #96	Install a rolling dip that drains road only.		15 yds ³ road rock
4.670		RD #97	Install a rolling dip that drains road only.		15 yds ³ road rock
4.682	79	CD #17	Culverted 24" stream crossing. Excavate from TOP to BOT. Install 30" x 60' culvert at the base of the fill. Install a critical dip to the right hinge line. Armor below critical dip with 10 yds ³ of 0.5-1.5' diameter rip-rap.	30" x 60' CMP, 2 bands	10 yds ³ of 0.5-1.5' diameter mixed rip-rap & 20 yds ³ road rock
4.712		RD #98	Install a rolling dip that drains road only.		15 yds ³ road rock

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4.749		RD #99	Install a rolling dip that drains road only.		15 yds ³ road rock
4.782		RD #100	Install a rolling dip that drains road only.		15 yds ³ road rock
4.822		RD #101	Install a rolling dip that drains road only.		15 yds ³ road rock
4.878		RD #102	Install a rolling dip that drains road only.		15 yds ³ road rock
4.915		RD #103	Install a rolling dip that drains road only..		15 yds ³ road rock
4.959		RD #104	Install a rolling dip that drains road only.		15 yds ³ road rock
5.032		RD #105	Install a rolling dip that drains road only.		15 yds ³ road rock
5.068		RD #106	Install a rolling dip that drains road only.		15 yds ³ road rock
5.107		RD #107	Install a rolling dip that drains road only.		15 yds ³ road rock
5.185	80	CD #18	Culverted 24" stream crossing. Excavate from TOP to BOT. Install 36" x 50' culvert at the base of the fill. Install a critical dip to the right hinge line.	36" x 50' CMP, 2 bands	20 yds ³ road rock
5.226		RD #108	Install a rolling dip that drains road only.		15 yds ³ road rock
5.244	81	CD #19	Culverted 24" stream crossing. Excavate from TOP to BOT. Install 42" x 50' culvert at the base of the fill. Remove log at the BOT. Install a critical dip to the right hinge line. Armor below critical dip with 15 yds ³ of 0.5-1.5' diameter rip-rap.	42" x 50' CMP, 2 bands	15 yds ³ of 0.5-1.5' diameter mixed rip-rap & 20 yds ³ road rock
5.279		RD #109	Install a rolling dip that drains road only.		15 yds ³ road rock
5.292	82	CD #20	Diverted class III stream crossing. Excavate from TOP to BOT. Install 36" x 90' culvert at the base of the fill. Excavate a 4' wide channel bottom from TOP to new inlet, laying back the side slopes to 2:1. Install a critical dip to the right hinge line.	36" x 90' CMP, 4 bands	20 yds ³ road rock
5.344		RD #110	Install a rolling dip that drains road only.		15 yds ³ road rock
5.368	83	CD #21	Culverted 12" stream crossing. Excavate from TOP to	24" x 40'	20 yds ³

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			BOT Install 24" x 40' plastic culvert at the base of the fill. Excavate a 4' wide channel bottom from TOP to new inlet, laying back the side slopes to 2:1. Install a critical dip to the right hinge line.	PVC, 1 band	road rock
5.378			Intersection - Rolling dip up hill to right		15 yds ³ road rock
5.431		RD #243	Install rolling dip to drain road only, spur downhill on left.		15 yds ³ road rock
5.413		RD #243	Install a rolling dip to drain road only.		
5.434	84		Remove plugged 18" ditch relief culvert and create inboard ditch to drain to site # 85. Replace culvert with 30" x 50' culvert. Armor outboard fill with 30 yds ³ 1-2.5' diameter mixed rip-rap.	30" x 50' CMP, 2 bands	30 yds ³ of 1-2.5' diameter mixed rip-rap & 15 yds ³ road rock
5.437	85		Culverted 24" stream crossing. Excavate from TOP (inlet) to BOT (10' below current outlet). Install 30" x 40' CMP at the base of fill.	30" x 40' CMP, 1 band	30 yds ³ of 1-2.5' diameter mixed rip-rap & 15 yds ³ road rock
5.460	86	Start RB-Pull #13	Begin removing berm on outboard edge of road.		
5.497		RD #244	Install a rolling dip to drain road only.		
5.513		End RB-Pull #13	12" DRC. Clean inlet. End removing berm along the outboard edge of fill.		
5.553		RD #245	Install a rolling dip to drain road only.		
5.603	87	Start RB-Pull #14	Culverted 15" stream crossing. Excavate fill between outlet and headcut and lay back banks 2:1. Install 10 yds ³ of 0.5-1.0' diameter rip-rap. Begin removing berm along outboard edge of road.		10 yds ³ of 0.5-1.0' diameter mixed rip-rap
5.614	88		Culverted 12" stream crossing. Excavate from TOP (~5' above inlet) to BOT (~15' below OBR). Install a 30" x 40' CMP at the base of fill.	30" x 40' CMP, 1 band	
5.637	89		4" plastic pipe drains a spring. Install an 18" x 20' DRC to drain the spring.	18" x 20' PVC	
5.655			Intersection with road downhill on left.		

Road Log of "As Built" Treatments for Upper Reed Mountain Road, East Branch South Fork Eel River, Humboldt County, California					
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1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
5.698		RD #246	Install a rolling dip to drain road only.		
5.737			6" DRC with no delivery.		
5.774		End RB-Pull #14	End removing berm along outboard edge of road.		
5.796	90		Culverted 12" stream crossing. Excavate from TOP (inlet) to BOT (just below 2' diameter cut log). Install a 24" x 30' CMP at the base of fill.	24" x 30' PVC	
5.805			Downhill intersection on left.		
5.870		Start RB-Pull #15	Begin removing berm along outboard edge of road. 15" DRC (no treatment).		55 yds ³ road rock
5.869		RD #247	Install a rolling dip to drain road only.		
5.910		RD #248	Install a rolling dip to drain road only.		
5.925			Intersection with driveway uphill on right. Jeremy Hawk's Driveway.		
5.943		RD #249	Install a rolling dip to drain road only.		
5.952		End RB-Pull # 15	End removing berm along outboard edge of road.		
5.983		RD #250	Install a rolling dip to drain road only.		10 yds ³ road rock
6.031		RD #251	Install a rolling dip to drain road only.		10 yds ³ road rock
6.039		Start RB-Pull #16	Begin removing berm along outboard edge of road.		45 yds ³ road rock
6.067		RD #252	Install a rolling dip to drain road only.		
6.083	91	CD#21.1	Small headwaters class III stream crossing has a 15" CMP. Install 10 yds ³ of 0.5-1.0' diameter rip-rap.		10 yds ³ of 0.5-1.0' diameter mixed rip-rap
6.106		End RB-Pull #16	End removing berm along outboard edge of road.		
6.115		RD #253	Install a rolling dip to drain road only.		10 yds ³ road rock
6.181		RD #254	Install a rolling dip to drain low spot in road.		
6.213			Intersection with Grundman Rd. on right.		
6.305		RD #255	Install a rolling dip to drain road only.		

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6.360		RD #256	Install a rolling dip to drain road only.		
6.407		RD #257	Install a rolling dip to drain road only.		
6.446		RD #258	Install a rolling dip to drain road only.		
6.490		RD #259	Install a rolling dip to drain road only.		
6.540		RD #260	Install a rolling dip to drain road only.		
6.592		RD #261	Install a rolling dip to drain road only.		
6.635		RD #262	Install a rolling dip to drain road only.		
6.675		RD #263	Install a rolling dip to drain road only.		
6.719		RD #264	Install a rolling dip to drain road only.		
6.762		RD #265	Install a rolling dip to drain road only.		
6.812		RD #266	Install a rolling dip to drain road only.		
6.828			Gate. Combo 1344.		
6.849		RD #267	Install a rolling dip to drain road only.		
6.908		RD #268	Install a rolling dip to drain road only.		
6.933		RD #269	Install a rolling dip to drain road only.		
6.973		RD #270	Install a rolling dip to drain road only.		
7.002		RD #271	Install a rolling dip to drain road only.		
7.050		RD #272	Install a rolling dip to drain road only.		
7.089		RD #273	Install a rolling dip to drain road only.		
7.117	92		Culverted 24" stream crossing. Excavate from TOP (20' above inlet at 10' tall fir tree) to BOT (below currant downspout, 15" to the right of fir stump). Install a 24" x 50' CMP at the base of fill. Install single post trash rack 24" above inlet.	24" x 50' PVC Trash rack	
7.123		CD #49	Install a critical dip on the right hinge line of site #92.		
7.160		RD #274	Install a rolling dip to drain road and ditch.		
7.207		RD #275	Install a rolling dip to drain road only.		
7.222	93		Diverted class II fill crossing. Excavate from TOP (2' above trash rack) to BOT (at base of fill, 25' below the OBR). Install a 24" x 40' CMP at the base of fill.	24" x 50' PVC	
7.224		CD #50	Install a critical dip on the right hinge line of site #93.		
7.232			12" ditch relief culvert. No treatment.		
7.266		RD #276	Install a rolling dip to drain road only.		
7.309		RD #277	Install a rolling dip to drain road only.		
7.359		RD #278	Install a rolling dip to drain road only.		
7.389		RD #279	Install a rolling dip to drain road only.		

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7.425		RD #280	Install a rolling dip to drain road only.		
7.452		DRC #20	12" ditch relief culvert. Replace with 18" x 30' plastic culvert.	18" x 30' PVC	10 yds ³ road rock
7.480		RD #281	Install a rolling dip to drain road and ditch.		
7.503			4-way intersection; 3 downhill, 1 uphill.		
7.550		RD #282	Install a rolling dip to drain road only.		
7.590		RD #283	Install a rolling dip to drain road only. Leave ditch alone from here to RD # 284.		
7.595			Michael's spring in ditch.		
7.628		RD #284	Install a rolling dip to drain road only.		
7.640			18" DRC. No treat.		
7.642			6" DRC with buried inlet.		
7.679		RD #285	Install a rolling dip to drain road only.		
7.689		DRC #23	Plugged 12" DRC. Clean inlet.		10 yds ³ road rock
7.721			A functioning water bar with a reverse dip.		
7.731			Intersection with driveway downhill on right.		
7.755		RD #286	Install a rolling dip to drain road and ditch		
7.788		RD #287	Install a rolling dip to drain road and ditch		
7.828		RD #288	Install a rolling dip to drain road only.		
7.847			Intersection with Michael's driveway on left.		
7.904		RD #289	Install a rolling dip to drain road and ditch.		
7.944		RD #290	Install a rolling dip to drain road only.		
7.957			15" DRC. No treat.		
7.971			Functioning DRC to left. Skid uphill to right.		
8.031		RD #291	Install a rolling dip to drain road and ditch.		
8.054		RD #292	Install a rolling dip to drain road only.		
		Start ISR# 1	Inslope road and clean ditch to inlet of stream crossing, site #94, 180'.		
8.096	94		Culverted 36" class II stream crossing. Excavate from TOP (top of sediment fan), laying back banks 2:1, to BOT (base of fill). Move road in approximately 8' upon reconstruction. Install a 36" x 50' CMP at the base of fill. Armor outboard fillslope with 30 yds ³ of rip-rap. End ISR to inlet of crossing..	36" x 60' CMP, 2 bands	30 yds ³ of 1-3' diameter mixed rip-rap & 15 yds ³ road rock
8.135		RD #293	Install a rolling dip to drain road only.		

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8.175			Drainage break.		
8.200	95		Landowner (Andrew) wants this site exempt, water source for his property. No treatment.		
8.219		RD #293.1	Install a rolling dip to drain road only just below intersection.		
8.221			Intersection with gated driveway on left.		
8.272			Gate. No trespass sign. End of project.		

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0.0			Intersection with Upper Reed Mountain Road at "forks." Landing on right; culvert stockpile.		
0.034		Start OSR-KD #5	Start outslope road, keeping ditch, just past snag on OBF.		
0.071		RD #111	Install a rolling dip that drains road only.		15 yds ³ road rock
0.096	19.1		12" DRC. Install an 18" x 30' ditch relief culvert with 20' of full-round downspout to base of fill near blue flag.	18" x 30' PVC	20 yds ³ road rock
0.117		RD #112	Install a rolling dip to drain road and ditch.		15 yds ³ road rock
0.160		RD #113 & Start DD #3	Install a rolling dip to drain road only. Rock dip with 15 yds ³ of road rock. Start cleaning ditch for 90' to inlet of crossing.		15 yds ³ road rock
0.175	20	End DD #3 & Start RB-Pull #1	Culverted 24" stream crossing. Excavate from TOP (20' above inlet) to BOT. Install a 24" x 60' long CMP at base of fill. Install a single post trash rack 36" above new inlet. Begin removing berm along outsloped road for 110' (at site #20).	36" x 60' CMP, 2 bands	30 yds ³ 1-3' diameter mixed rip-rap & 20 yds ³ road rock
0.196		End RB-Pull #1	End removing berm along outsloped road for 110'.		

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0.233		RD #114 & DRC #5	Install a rolling dip to drain road only. Install an 18" x 40' ditch relief culvert, just above small rock pit on left.	18" x 40' PVC	20 yds ³ road rock
0.269		DRC #6 & Start RB-Pull #2	Install an 18" x 40' ditch relief culvert, from 2-3' headcut in ditch at corner, to the base of fill. Begin removing berm.	18" x 40' PVC	15 yds ³ road rock
0.294		RD #115	Install a rolling dip to drain road only.		15 yds ³ road rock
0.303	21	End RB-Pull #2	12" ditch relief culvert. End removing berm at ditch relief culvert. Replace existing culvert with an 18" x 40' long ditch relief culvert.	18" x 40' PVC	20 yds ³ road rock
0.352			Large gully on right due to road runoff.		
0.370		RD #116	Install a rolling dip to drain road only just before "3" mile marker on tree.		15 yds ³ road rock
0.411	21.1		Culverted 12" stream crossing. Excavate from TOP (15' above inlet) to BOT (5' above downed, rotting oak tree). Install a 24" x 50' long culvert at the base of the fill.	24" x 50' PVC	20 yds ³ road rock
0.420		CD #23	Install a critical dip to left of site #21.1 making sure that flow cannot divert to the left. Install berm and fill ditch to right to enhance dip.		
0.461		RD #117	Install a rolling dip to drain road only.		15 yds ³ road rock
0.486	21.2		Small 2'x1' stream that is diverted to the left for 300' to site #22. Excavate from TOP (ditch) to BOT (to left of oak). Install a 24" x 50' culvert at base of fill.	24" x 50' PVC	20 yds ³ road rock
0.496		CD #23	Install a critical dip to left hinge of site #21.2.		
0.514		RD #118	Install a rolling dip to drain road and ditch at overturned stump on cutbank. Dip such that road drains onto grassy shoulder. The dip can be shallow and still drain road.		15 yds ³ road rock
0.529		Start RB-Pull #3	Begin removing berm along outsloped section of road for 200'.		
0.540	22		Two streams draining through a 36" culvert. Excavate from TOP (inlet) to BOT. Install a 48" x 60' culvert at base of fill.	48" x 60' CMP, 2 bands	20 yds ³ road rock
0.552		CD #24	Install a critical dip on left hinge of site # 22.		
0.567		End RB-Pull #3,	End removing berm. Install a rolling dip to drain road only. Install an 18" x 40' ditch relief culvert to drain	18" x 40' PVC	20 yds ³ road rock

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		RD #119 & DRC #8	the "wet" ditch to the left of the flags.		
0.601	23		Culverted 30" stream crossing. Excavate from TOP (~20' above current inlet) to BOT (~2' below current outlet). Install a 36" x 40' culvert at base of fill, with an elbow and 20' of full-round downspout.	36" x 40' CMP, 1 15° elbow, 3 bands	10 yds ³ of 1-2' diameter mixed rip-rap & 20 yds ³ road rock
0.605		CD #25	Install a critical dip on left hinge of site # 23.		
0.625		RD #120	Install a rolling dip to drain the road and the ditch ~40' before the driveway.		15 yds ³ road rock
0.633			Downhill driveway on right.		
0.679		DRC #9	12" ditch relief culvert. Replace with an 18" x 30' culvert to base of fill.	18" x 30' PVC	15 yds ³ road rock
0.702		RD #121	Install a rolling dip that drains road only, at the ditch relief culvert. Clean inlet and outlet with a shovel. No delivery.		15 yds ³ road rock
0.727		CD #26	Install a critical dip to the right of CMP site #24.		15 yds ³ road rock
0.732	24		Culverted 24" stream crossing. Excavate from TOP (inlet) to BOT (at base of fill below outlet). Install a 24" x 60' culvert. Re-build armoring steep fillslope with 30 yds ³ of 1.0-2.5' diameter rip-rap.	24" x 60' PVC	30 yds ³ of 1.0-2.5' diameter mixed rip-rap & 20 yds ³ road rock
0.736		Start RB-Pull #4	Begin removing berm to allow water to flow off OBR.		
0.743		CD #27	Install a critical dip on the right hinge line of site #24.1.		
0.747	24.1		A 3' x 1' class III stream is diverted to the right to site #24. Excavate from TOP (ditch) to BOT flag 25' down fillslope. Install a 24" x 50' long culvert with 20' of full-round downspout down to BOT flag. The fillslope will be steep (35 degrees) and will require 30 yd ³ of 1-1.5' diameter rock armor.	24" x 70' PVC	30 yd ³ of 1-1.5' diameter mixed rip-rap & 20 yds ³ road rock
0.769		End RB-	End removing berm along outsloped road.		

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		Pull #4			
0.779		RD #122	Install a rolling dip that drains road and ditch.		15 yds ³ road rock
0.794			Sub-drainage divide (high point in road)		
0.853		DRC #10	Install 18" x 30' ditch relief culvert.	18" x 30' PVC	20 yds ³ road rock
0.900		DD #4 & OSR #2	Low spot in road resulting in a large outboard fillslope gully and cutbank scarps. Install ditch and OSR to site #25.		
0.932	25		Culverted 24" stream crossing. Excavate from TOP (at top of sediment fan, 20' above the inlet) to BOT. Install a 42" x 60' culvert at the base of the fill. Rebuild with 2:1 fillslopes. Install a single post trash rack 42" above the inlet.	42" x 60' CMP, 2 bands	50 yds ³ of 0.5-2.5' diameter mixed rip-rap & 20 yds ³ road rock
0.955		Start RB-Pull #5 & RD#122. 1	Begin removing berm to allow water to flow off OBR. Install rolling dip to drain road only.		
0.970		DRC #11 & DD #5	Install an 18" x 40' ditch relief culvert from the inboard ditch to the base of fill. Define ditch to RD #124 (670').	18" x 40' PVC	15 yds ³ road rock
1.000		End RB-Pull #5	End removing berm along outsloped road.		
1.053		RD #123	Install a rolling dip that drains road and ditch.		15 yds ³ road rock
1.097		RD #124	Install a rolling dip that drains road only.		15 yds ³ road rock
1.134		Start RB-Pull #6	Begin removing berm to allow water to flow off OBR.		
1.144		CD #28	Install a critical dip on the right hinge of site #26.		15 yds ³ road rock
1.148	26		Culverted 18" stream crossing. Excavate from TOP to BOT. Install a 24" x 40' culvert at the base of the fill.	24" x 40' PVC	20 yds ³ road rock
1.170		CD #29	Install a critical dip on the right hinge of site #27.		
1.175	27		Culverted 24" stream crossing. Excavate from TOP to BOT. Install a 36" x 50' culvert at the base of the fill.	36" x 50' CMP, 2	30 yds ³ of 0.5-3'

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			Armor steep fillslope with 30 yds ³ of 0.5-3' mixed diameter rip-rap.	bands	diameter mixed rip-rap & 20 yds ³ road rock
1.195		RD #125	Install a rolling dip that drains.		15 yds ³ road rock
1.202	28		Culverted 6" stream crossing. Excavate from TOP to BOT. Install an 18" x 30' culvert at the base of the fill.	18" x 30' PVC	20 yds ³ road rock
1.257	29	CD #30	Culverted 30" stream crossing. Excavate from TOP to BOT. Install a 42" x 50' culvert at the base of the fill. Install a critical dip on the right hinge of site #29. Armor steep fillslope with 10 yds ³ of 0.5-1.5' mixed diameter rip-rap.	42" x 50' CMP, 2 bands	10 yds ³ of 0.5-1.5' diameter mixed rip-rap & 20 yds ³ road rock
1.274		CD #31	Install a critical dip on the right hinge of site #30.		
1.279	30	CD #31.1	Culverted 24" stream crossing. Excavate from TOP to BOT. Install a 30" x 40' culvert at the base of the fill. Armor steep fillslope with 10 yds ³ of 0.5-1.5' mixed diameter rip-rap.	30" x 40' CMP, 1 band	10 yds ³ of 0.5-1.5' diameter mixed rip-rap & 20 yds ³ road rock
1.289		End RB-Pull #6	End removing berm along outsloped road.		
1.293		CD #32	Install a critical dip on the right hinge of site #31.		
1.297	31		Culverted 48" stream crossing. Excavate from TOP to BOT. Install a 60" x 60' culvert at the base of the fill. Install 5 yds ³ of rip-rap around inlet.	60" x 60' CMP, 2 bands	40 yds ³ road rock
			Uphill intersection with Jeannie and Kenny's drive way on left. Road native and not rocked from here.		
1.336	31.1		Culverted 12" stream crossing. Excavate from TOP to BOT. Install a 24" x 30' culvert at the base of the fill.	24" x 30' PVC	
1.358	32		Culverted 30" stream crossing. Excavate from TOP to BOT. Install a 54" x 60' culvert at the base of the fill.	54" x 60' CMP, 2 bands	30 yds ³ 1-2' diameter mixed rip-rap
1.400		Start RB-Pull #7	Start removing berm to allow water to flow off OBR.		

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1.424	33	CD #32.1	Two small diverted streams with a plugged culvert. Excavate from TOP (confluence of small channels) to BOT (5' below 6' diameter fir in channel). Install a 36" x 60' culvert at the base of the fill. Rebuild crossing with no diversion potential.	36" x 60' CMP, 2 bands	
1.430		End RB-Pull #7	End removing berm along outsloped road.		
1.468	34		Culverted 36" stream crossing. Excavate from TOP (at break in slope 25' above inlet) to BOT (5' above large bay on right bank). Install a 30" x 50' culvert at base of fill. Rebuild crossing with a 30° outboard fillslope. Armor lower 1/4 of outboard fillslope with 20 yds ³ of 1-3' diameter rip-rap.	30" x 60', CMP, 2 bands	20 yds ³ of 1-3' diameter mixed rip-rap
1.472		CD #33	Install a critical dip on the left hinge of site #34.		
1.509		RD #126	Install a rolling dip that drains road and ditch.		
1.550		RD #127	Install a rolling dip that drains road and ditch.		
1.562	35		Culverted 18" stream crossing. Excavate from TOP (inlet) to BOT (bottom of downspout). Install a 24" x 50' culvert at the base of the fill. Armor steep fillslope with 40yds ³ of 1-3' diameter rip-rap. Rebuild crossing with no diversion potential.	24" x 50' PVC	40 yds ³ of 1-3' diameter mixed rip-rap
1.596		RD #128	Install a rolling dip that drains road and spring above. Rock dip with 20 yds ³ of road rock.		20 yds ³ road rock
1.628	36	CD #33.1	Culverted 18" stream crossing. Excavate from TOP (inlet) to BOT (just above large log). Install a 24" x 50' culvert at the base of the fill. Rebuild crossing with no diversion potential.	24" x 50' PVC	20 yds ³ of 1-2' diameter mixed rip-rap
1.643	37	CD #33.2	Culverted 18" stream crossing. Excavate from TOP (inlet) to BOT (old flag). Install a 24" x 50' culvert at the base of the fill. Will need to extend CMP to near old rotting log to rebuild crossing with a stable outboard fillslope.	24" x 50' PVC	
1.663		RD #129	Install a rolling dip that drains road only.		
1.686		DRC #13	Install an 18" x 40' ditch relief culvert that outlets into small swale with ferns below OBR.	18" x 40' PVC	
1.713		RD #130	Install a rolling dip that drains road only.		
1.782		CD #34	Install a critical dip on the right hinge line of site #38.		
1.791	38		Culverted 30" stream crossing. Excavate from TOP (inlet) to BOT (15' from OBR). Install a 36" x 50' culvert at the base of the fill. Install a single post trash	36" x 40' CMP, 2 bands	

Road Log of "As Built" Treatments for South Reed Mountain Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
			rack 36" above the inlet.		
1.824		CD #35	Install a critical dip to the right hinge line of site #38.1. Will have to block ditch so that if flow diverts it will use the critical dip.		
1.829	38.1		Diverted fill crossing. Excavate from TOP (ditch) to BOT (base of 6' diameter fir). Install a 24" x 40' culvert at the base of the fill. Could spoil in the ditch to the right.	24" x 40' PVC	
1.867		RD #131	Install a rolling dip that drains road only.		
1.925		RD #132	Install a rolling dip that drains road and ditch.		
1.955			Uphill, grassy intersection on right.		
1.964		RD #133	Install a rolling dip that drains road and ditch at dip.		
2.000		RD #134	Install a rolling dip that drains road and ditch.		
2.037		RD #135	Install a rolling dip that drains road and ditch.		
2.083		RD #136 & DRC #14	Plugged 12" ditch relief culvert. Install an 18" x 40' long ditch relief culvert. Install a rolling dip that drains road only.	18" x 40' PVC	
2.128		CD #36	Install a critical dip to the left hinge line of site #39 with 10yds ³ of armor below dip.		10 yds ³ of 0.5-2.0' diameter mixed rip-rap
2.133	39		Stream crossing with 2 -12" culverts. Excavate from TOP (5' above inlet) to BOT (to right of madrone 25' below the OBR). Install a 36" x 60' culvert at the base of the fill. Rebuild crossing with 2:1 fillslopes.	36" x 60' CMP, 2 bands	
2.199		DRC #15	Install 18" x 30' DRC at base of fill.	18" x 30' PVC	
2.223		RD #137	Install a rolling dip that drains road only.		
2.262			Landing on right at 5 mile tree.		
2.285		RD #138	Install a rolling dip that drains road and ditch.		
2.322		RD #139	Install a rolling dip that drains road and ditch.		
2.359		RD #140	Install a rolling dip that drains road and ditch.		
2.389		RD #141 & Start RB-Pull #8	Install a rolling dip that drains road and ditch. Start remove berm by pulling fill onto the road and outslope the road.		
2.433		RD #142	Install a rolling dip that drains road and ditch.		

Road Log of "As Built" Treatments for South Reed Mountain Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
2.448		End RB-Pull #8	End remove berm by pulling fill onto the road and outslope the road.		
2.480		RD #143	Install a rolling dip that drains road only.		
2.526		RD #144	Install a rolling dip that drains road only.		
2.587		RD #145	Install a rolling dip that drains road and ditch.		
2.615			9" DRC with no delivery. No treatment.		
2.679			Uphill skid on right.		
2.745		RD #146	12" DRC with no treatment. Install a rolling dip that drains road only. Leave DRC.		
2.801		RD #147	Install a rolling dip that drains road only.		
2.840		RD #148	Install a rolling dip that drains road only.		
2.897		RD #149	Install a rolling dip that drains road only.		
2.921			Uphill skid on left cutbank.		
3.073			Intersection on left.		
3.135			Intersection on right.		
3.186		RD #150	Install a rolling dip that drains road only.		
3.302		RD #151	Install a rolling dip that drains road only.		
3.380		RD #152	Install a rolling dip that drains road only.		
3.485		RD #153	Install a rolling dip that drains road only.		
3.535			Intersection on left. Decommissioned road. Not in project.		
3.578		RD #154	Install a rolling dip that drains road and ditch.		
3.618		RD #155	Install a rolling dip that drains road and ditch.		
3.713		RD #156	Install a rolling dip that drains road and ditch.		
3.804		RD #157	Install a rolling dip that drains road and ditch.		
3.944		RD #158	Install a rolling dip that drains road only, just above rocky spot in roadbed.		
3.972	40		Culverted 24" stream crossing. Excavate from TOP (20' above inlet, before ferns) to BOT (end of armor). Install 36" x 50' culvert at the base of the fill. Re-use rip-rap to armor steep fillslope.	36" x 50' CMP, 2 bands	
3.979		CD #36	Rebuild critical dip on right hinge line.		
4.208			Large waterbar. Could create dip instead.		
4.279		RD #159	Install rolling dip to drain road only.		
4.350			Low spot. Uphill, grassy skid on right.		
4.398			Grassy, downhill intersection on right; not in project		

Road Log of "As Built" Treatments for South Reed Mountain Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
			area.		
4.526		RD #160	Water bar. Install rolling dip to drain road only.		
4.583		RD #161	Install rolling dip to drain road only.		
4.685		RD #162	Install rolling dip to drain road only.		
4.772		RD #163	Install rolling dip to drain road only.		
4.914	41		Culverted 8" stream crossing. Excavate from TOP (just above inlet below headcut) to BOT ((just above fallen fir). Install 24" x 50' culvert at the base of the fill.	24" x 50' PVC	20 yds ³ of 0.5-1.5' diameter mixed rip-rap
4.923		CD #37	Install a critical dip on left hinge line of site #41.		
4.962	42		Culverted 8" stream crossing. Excavate from TOP (approximately 7' above inlet) to BOT (base of plunge approximately 15' below OBR). Install 24" x 50' culvert at the base of the fill. Armor lower portion of outboard fillslope with 30yds ³ of 1-3' diameter rip-rap. Use some of this armor below the outlet of the critical dip.	24" x 50' PVC	30 yds ³ of 1-3' diameter mixed rip-rap
4.970		CD #38	Install a critical dip to left hinge of site #42.		
5.188		RD #164	Install a rolling dip below corner to drain thru-cut above.		
5.272		RD #165	A seeping, mossy cutbank. Install a rolling dip. Rock dip with 15yds ³ of road rock.		15 yds ³ road rock
5.329		RD #166	Gullied waterbar. Grade waterbar into a rolling dip to drain road.		
5.390	43		A diverted stream with a plugged 6" culvert. Excavate fr5om TOP (15' above ditch) to BOT (20' down outboard fillslope). Clean out channel from TOP to the inboard ditch. Install a 24" x 60' long culvert at the base of the fill.	24" x 60' PVC	
5.394		CD #39	Install a critical dip to the left hinge line of site #43.		
5.429		RD #167	Install a rolling dip to drain road only.		
5.431		DRC #16	Install an 18' x 40' ditch relief culvert at swale.	18" x 40' PVC	
5.485	44		12" culverted stream crossing. Excavate from TOP (inlet) to BOT (just past downed tree). Install a 24" x 50' culvert at the base of the fill.	24" x 50' PVC	
5.488		CD #40	Install a critical dip to the left hinge line of site #44.		
5.533		DRC	6" plugged ditch relief culvert. Replace with an 18" x	18" x 40'	

Road Log of "As Built" Treatments for South Reed Mountain Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
		#17	40' ditch relief culvert.	PVC	
5.572		RD #168	Install a rolling dip to drain road only.		
5.574		DRC #18	Install an 18" x 40' ditch relief culvert.	18" x 40' PVC	
5.626		RD #169	Install a rolling dip to drain road only.		
5.658			Intersection on left.		
5.712			Small 8" ditch relief culvert. Road drains. No treatment.		
5.781		DRC #19 & RD #170	Wet and springy along cutbank for 100'. Install an 18" x 40' ditch relief culvert. Install a rolling dip just above or below DRC to drain road only.	18" x 40' PVC	
5.823		DRC #20 & RD #171	A wet, springy cutbank. Install an 18" x 40' ditch relief culvert. Install a rolling dip just above or below DRC to drain road only	18" x 40' PVC	
		RD #172	Install a rolling dip to drain road and any ditch.		
5.861	50		Small, diverted stream. Excavate from TOP (ditch) to BOT (10' below OBR). Install a 24" x 40' culvert at the base of the fill.	24" x 40' PVC	
5.865		CD #41	Install a critical dip on the right hinge line of site #50.		
5.893	50.1		A large gully on the right. The stream enters the ditch and flows down ditch to the right. Armor the ditch along the right side of the road with 75'l x 15'w x 2'd = ~80yds ³ .		80 yds ³ of 1.5-2.5' diameter mixed rip-rap
5.920	51		Culverted 12" stream crossing. Excavate from TOP (ditch) to BOT (just above channel). Install a 24" x 40' culvert at the base of the fill.	24" x 40' PVC	
5.947		DRC #21	Install an 18" x 40' ditch relief culvert. Outslope the road over the ditch relief culvert to make sure that the road drains here too.	18" x 40' PVC	
5.994			12" ditch relief culvert; no delivery.		
6.106			Intersection on left, Grundman Road.		
6.140		RD #173	Install a rolling dip to drain road only.		
6.181		RD #174	Install a rolling dip to drain road only and rock with 20yds ³ of road rock.		20 yds ³ road rock
6.245		RD #175	Install a rolling dip to drain the road and ditch.		
6.270		RD #176	Install a rolling dip to drain the road and the ditch (top of through-cut).		

Road Log of "As Built" Treatments for South Reed Mountain Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
6.323		RD #177	Enhance rolling dip to drain to the left. There is a large gully on the right.		
6.368			Old corral on left.		
	51.1		Unstable fill to left of site #52. Will be treated incorporation with site #52.		
6.404	52		Culverted 24" stream crossing. Excavate from TOP (20' above inlet) to BOT (under downed fir and at base of armor). Install a 60" x 70' culvert at the base of the fill. Could move the road prism in by 15-20' to decrease crossing fill volume. Lower the road 2' upon rebuild to function as a critical dip. Will need to ramp down to get to BOT. Reuse armor around inlet and below outlet of critical dip. Clean up and lay back slope to the left of crossing when done. Install 5 yds ³ of rip-rap to inlet and 35 yds ³ 1-2' diameter mixed rip-rap t the OBF.	60" x 70' CMP, 3 bands	40 yds ³ 1-2' diameter mixed rip-rap
6.443		RD #178	Install a rolling dip to drain the road and ditch.		
6.484		RD #179	Install a rolling dip to drain the road and ditch at the top of the corner.		
6.517		RD #180	Install a rolling dip to drain the road and ditch.		
6.579		RD #181	Install a rolling dip to drain the road and ditch.		
6.580		DRC #22	Install an 18" x 40' ditch relief culvert from the inboard ditch to the base of fill.	18" x 40' PVC	
6.622		RD #182	Install a rolling dip to drain the road only.		
6.639	53		Culverted 36" stream crossing. 36" culvert looks OK. No treatment, other than CD.		
6.645		CD #42	Install a critical dip on the right hinge line of site #53, removing the berm at the OBR for outlet.		
6.679	54		No treatment.		
6.690		RD #183	Install a rolling dip to drain the road only.		
6.725	54.1		Culverted 18" stream crossing. No Treatment.		
6.731		CD #43	Install a critical dip to the right hinge line of site #54.1.		
6.761		RD #184	Install a rolling dip at break large berm/through-cut.		
6.792	55		Culverted 36" stream crossing. No treat.		
6.797		CD #44	Install a critical dip to the right hinge line of site #55.		
6.815		RD #185	A spring exists at the inboard edge of the road. Install a rocked rolling dip.		20 yds ³ road rock
6.862		RD #186	Install a rolling dip to drain the road and ditch.		

Road Log of "As Built" Treatments for South Reed Mountain Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outslowing the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
6.892			Low muddy spot in road. Rock with 15 yds ³ of road rock.		15 yds ³ road rock
6.928			Uphill skid intersection on right.		
6.930		RD #187	Install a rolling dip to drain the road only.		
6.982		RD #188	Install a rolling dip to drain the road only.		
7.047		RD #189	Install a rolling dip to drain the road only.		
7.092		RD #190	Install a rolling dip to drain the road only.		
7.127		RD #191	Install a rolling dip to drain the road only.		
7.190			End of road work, East Branch South Fork Eel River.		

Road Log of "As Built" Treatments for South Reed Mountain Road Spur #1, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outslowing the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.0			End of road at grassy opening.		
0.036	49		A washed out class III stream crossing. Install armored by lowering the road through the crossing, making sure flow could not divert to site at right after excavation. Excavate outer portion of fill and armor with 0.5-3' diameter mixed rip-rap.		10 yds ³ 0.5-3' diameter mixed rip-rap
0.042	48		A washed out class II stream crossing. Install armored by lowering the road through the crossing, making sure flow could not divert to site at right after excavation. Excavate outer portion of fill and armor with 0.5-3' diameter mixed rip-rap.		10 yds ³ 0.5-3' diameter mixed rip-rap
0.046			A spring emerges out of the cutbank 25' from site #48. Drain into crossing by making a small dip in the crossing.		
0.063			Intersection on right up spur #1-A; left down.		
0.080		RD #421	Install a short (quad traffic) rolling dip to drain road.		
0.097		RD #422	Install a short (quad traffic) rolling dip to drain road.		
0.113		RD #423	A spring at the base of cut. Install a short (quad traffic) rolling dip to drain road and spring.		
0.126	47		A small, 3 x 1, class III stream crossing. Excavate	24" x 40'	

Road Log of "As Built" Treatments for South Reed Mountain Road Spur #1, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
			from TOP to BOT. Install 24" x 40' culvert at the base of fill.	PVC	
0.140		RD #424	Install a short (quad traffic) rolling dip to road where the gully outlets.		
0.171		RD #425	Install a short (quad traffic) rolling dip to road.		
0.185	46		A washed out Humboldt crossing. Excavate from TOP to BOT. Install 24" x 40' culvert at base of fill.	24" x 40' PVC	
0.200		XRD #7	Install a short (quad traffic) rolling dip to road.		
0.215		XRD #8	Install a short (quad traffic) rolling dip to road.		
0.229		XRD #9	Install a short (quad traffic) rolling dip to road.		
0.259		XRD #10	Install a c short (quad traffic) rolling dip to road.		
0.305		XRD #11	Install a short (quad traffic) rolling dip drain to road.		
0.313	45		30" culverted stream crossing. Replace culvert with 30" x 40' culvert at base of fill. Armor OBF with 10 yds ³ 1-1.5' diameter mixed rip-rap.	30" x 40' CMP, 1 band	10 yds ³ 1-1.5' diameter mixed rip-rap
0.348			Low spot in road.		
0.364		RD #426	Install a short (quad traffic) rolling dip to road.		
0.378			Low spot in road.		
0.394			High spot in road.		
0.408		RD #427	Install a rolling dip drain to road.		
0.423		RD #428	Install a rolling dip to road.		
0.440		RD #429	Install a rolling dip to road.		
0.455		RD #430	Install a cross road drain to road.		
0.466			Low spot in road looks OK.		
0.480		RD #431	Install a rolling dip to road.		
0.495		RD #432	Install a rolling dip drain to road.		
		RD #433	Install a rolling dip drain to road.		
0.532			Intersection with South Reed Mountain Road.		

Road Log of "As Built" Treatments for Star's Upper Rd, East Branch South Fork Eel River, Humboldt County, California

Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outslipping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.0			High spot past "turn around" at the top of Reed Mountain near rock quarry.		
0.013			Downhill intersection on left.		
0.016			Downhill intersection on left.		
0.085			Top of steep section nest to large Oak tree.		
0.108			Uphill intersection on right.		
0.114			Water tank on left.		
0.133	71.2	CD#58	Culverted 18" stream crossing on 3' x 1' channel. Excavate from TOP (above IBR) to BOT (at base of fill). Install a 24" x 30' plastic culvert at the base of the fill. Install a critical dip to the right hinge line. Install a critical dip to right hinge.	24" x 30' PVC	10 yds ³ road rock
			Wood splitting area on right.		
			Flat area on left.		
			Small stream enters ditch on right. No treat here. Leave stream in ditch.		
		DRC #24	Install an 18" x 20' DRC at the base of the fill.	18" x 20' PVC	10 yds ³ road rock
			Gate.		
		DRC #25	Install an 18" x 30' DRC at the base of the fill.	18" x 30' PVC	10 yds ³ road rock
		DRC #26	Install an 18" x 30' DRC at the base of the fill.	18" x 30' PVC	10 yds ³ road rock
			End road at intersection with Upper Reed Mountain Road.		

Road Log of "As Built" Treatments for Horse Pasture Road, East Branch South Fork Eel River, Humboldt County, California

Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outslipping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.0			Intersection with Upper Reed Mountain Road.		
0.024			Gate uphill on left.		
0.027	151	CD #51	Diverted class III fill crossing. Excavate from TOP (~15' above IBR) to BOT (~15' below OBR). Install a 24" x 50' CMP at the base of fill. Install critical dip at left hinge.	24" x 40' PVC	

Road Log of "As Built" Treatments for Horse Pasture Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.039		RD #305	Install a rolling dip to drain the road only.		
0.077		RD #306	Install a rolling dip to drain the road only.		
0.086		Start DD #6	Begin cleaning and/or cutting inboard ditch from the spring to site #152 and install 10 yds ³ of 0.5-1.0' diameter rip-rap in the ditch.		10 yds ³ 0.5-1' diameter mixed rip-rap.
0.106	152	End DD #6	Failing Humboldt crossing on a class II stream. Excavate from TOP (at break in slope above road) to BOT (white tanoak tree) Install a 36" x 60' CMP at the base of fill. End cleaning and/or cutting inboard ditch.	36" x 40' CMP, 1 bands	
0.128	153	CD #52	Class II fill crossing. Excavate from TOP (transition above headcut) to BOT (at break in slope ~50" below OBF). Install a 36" x 80' CMP at the base of fill. Install critical dip.	36" x 80' CMP, 3 bands	40 yds ³ 0.5-1' diameter mixed rip-rap.
0.156		RD #307	Install a rolling dip to drain the road only.		
0.171	154	CD #53	Partially diverted, class II fill crossing. Excavate from TOP (top of sediment fan/confined channel outlet) to BOT (at end of 2' diameter, rotting, cut log). Install a 36" x 60' CMP at the base of fill.	36" x 60' CMP, 2 bands	
0.209		RD #308	Install a rolling dip to drain the road only.		
0.247		RD #309	Install a rolling dip to drain the road only.		
0.285		RD #310	Install a rolling dip to drain the road only.		
0.323		RD #311	Install a rolling dip to drain the road only.		
0.361		RD #312	Install a rolling dip to drain the road only.		
0.427		RD #313 & Begin OSR #2	Install a rolling dip to drain the road only. Begin outsloping road surface.		
0.465		RD #314	Install a rolling dip to drain the road only.		
0.503		RD #315	Install a rolling dip to drain the road only.		
0.541		RD #316	Install a rolling dip to drain the road only.		
0.654		RD #319	Install a rolling dip to drain the road only.		
0.668	155	End OSR #2	Partially washed out class II fill crossing. Excavate from TOP (5' above IBR) to BOT (first bend in stream). Lay back banks 2:1. Install 50 yds ³ of 1-2' diameter rock armor to create a ford crossing.		55 yds ³ of 1-2' diameter mixed rip-rap.
0.706		CD #54	Install a critical dip on the right hinge line of site #156.		15 yds ³ road rock
0.709	156		Partially washed out class II fill crossing. Excavate	24" x 50'	

Road Log of "As Built" Treatments for Horse Pasture Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
			from TOP (large boulder approximately 5' above IBR) to BOT (~15" down OB fillslope). Install a 24" x 50' CMP at the base of fill.	CMP	
0.735	157		Install a rocked rolling dip, eliminating all diversion potential. Install 10 yds ³ of road rock to road surface.		10 yds ³ road rock
0.773		RD #320	Install a rolling dip to drain the road only.		
0.811		RD #321	Install a rolling dip to drain the road only.		
0.848		RD #322	Install a rolling dip to drain the road only.		
0.875		RD #323	Install a rolling dip to drain the road only.		
0.909		RD #324	Install a rolling dip to drain the road only.		
0.966		RD #325	Install a rolling dip to drain the road only.		
0.981	158		Diverted spring flow. No treatment. Landowner denied access due to water source.		
0.994		RD #326	Install a rolling dip to drain the road only.		
1.694		CD #55	Install a critical dip to the right hinge line of site #159.		
1.697	159		Class III stream crossing with 36" culvert. Lay back banks 2:1 below outlet and install 20 yds ³ of 0.5-1.0' diameter rip-rap.	36" x 20' CMP, 1 band	20 yds ³ of 0.5-1.0' diameter mixed rip-rap
1.705			Gate.		
1.733			Intersection with Upper Reed Mountain Road.		

Road Log of "As Built" Treatments for Grundman Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.0			Intersection with South Reed Mountain Road.		
0.002	120.1		Plugged, crushed and rusted 12" ditch relief culvert drains approximately 250' of South Reed Mountain Roads inboard ditch across the beginning of Grundman Road. Replace DRC with new 18" x 20' pipe.	18" x 20' PVC	
0.016			Wagon Wheel gate #1.		
0.037	120		Gate #2 at bridge (key lock). No treatment.		

Road Log of "As Built" Treatments for Grundman Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.061	119		Undersized 10" ditch relief culvert. Install an 18" x 30' ditch relief culvert at base of fill.	18" x 30' PVC	
0.082			Intersection with uphill Spur on left. No treatment.		
0.084		RD #200	Install a rolling dip to drain road only.		15 yds ³ road rock
0.105	119.1	RD #201	Install a rolling dip to drain road only. "Ragged Ass Road" sign to right.	24" x 35' PVC	15 yds ³ road rock
0.128	118	CD #44	Twin 18" culverted stream crossing. Excavate from TOP (small fir) to BOT (downed bay tree). Install a 36" x 50' CMP at the base of the fill. Install critical dip to left hinge.	36" x 50' CMP, 2 bands	15 yds ³ road rock
0.129		CD #44.1	Install a critical dip to left hinge of site #118.		
0.166		RD #202	Install a rolling dip to drain road only into pond. Pond on left.		15 yds ³ road rock
0.205		RD #203	Install a rolling dip to drain road only.		15 yds ³ road rock
0.228	117		Purposefully diverted class II stream. No treatment.		
0.244		RD #204	Install a rolling dip to drain road only, as if a critical dip.		15 yds ³ road rock
0.278	116	Start RB-Pull #9 & CD #44.2	Purposefully diverted class II stream crossing. Excavate from TOP (15' tall fir tree) to BOT (~25' down OB fillslope at base of tree in channel). Install a 24" x 50' CMP at the base of fill. Begin removing berm on the OB fillslope. Install a critical dip.	24" x 50' PVC	
0.300		RD #205	Install a rolling dip to drain road and ditch.		15 yds ³ road rock
0.312		End RB-Pull #9	End removing berm along outsloped section of road.		
0.318			Intersection with downhill spur on right.		
0.334		RD #206	Install a rolling dip to drain road and ditch.		15 yds ³ road rock
0.360		RD #207	Install a rolling dip to drain road and ditch.		15 yds ³ road rock
0.373	112.1	Begin DD#7	8" plastic ditch relief culvert is exposed in the road and is crushed. Flow exits culvert where it is crushed in the road and flows down the road. Install an 18" x 30' ditch relief culvert. Begin cleaning inboard ditch.	18" x 30' PVC	
0.394		End	End cleaning inboard ditch.		

Road Log of "As Built" Treatments for Grundman Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
		DD#7			
0.404	112		Culverted 18" CMP. Excavate from TOP (inlet) to BOT (large bay trees in channel). Install a 30" x 50' CMP at the base of the fill. Install a trash rack approximately 48" above new inlet.	30" x 50' CMP, 2 bands	
0.431		RD #208	Install a rolling dip to drain road only.		15 yds ³ road rock
0.464		CD #45	Install a critical dip on the right hinge line of site #111.		
0.469	111	Begin RB-Pull #10	Culverted 12" class III stream crossing. Excavate from TOP (~5' above inlet) to BOT (~10' below end of 16" flex pipe). Install a 24" x 60' CMP at the base of fill. Begin removing berm along OBF.	24" x 60' PVC	
0.503		RD #209 & End RB-Pull #10	Install a rolling dip to drain road only. End removing berm along outsloped road.		15 yds ³ road rock
0.560		RD #210	Install a rolling dip to drain road and ditch.		7 yds ³ road rock
0.600		RD #211	Install a rolling dip to drain road and ditch.		7 yds ³ road rock
0.636		RD #212	Install a rolling dip to drain road only.		7 yds ³ road rock
0.737			House on left.		
0.759		RD #213	Install a rolling dip to drain road only.		7 yds ³ road rock
0.779			Intersection with road on left.		
0.792		RD #214	Install a rolling dip to drain road only.		7 yds ³ road rock
0.807			Downhill skid road on right.		
0.829			Old opened gate.		
0.835	109		Culverted 18" class II stream crossing. Excavate from TOP (~5' above inlet) to BOT (below hanging fence). Install a 30" x 60' CMP at the base of fill.	30" x 60' CMP, 2 bands	10 yds ³ road rock
0.864			Intersection with uphill skid on left.		
0.868		RD #215	Install a rolling dip to drain road only.		
0.897		RD #216	Install a rolling dip to drain road only.		
0.933		RD #217	Install a rolling dip to drain road only.		
0.962		RD #218	Install a rolling dip to drain road only.		

Road Log of "As Built" Treatments for Grundman Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.975			Intersection with uphill spur on left.		
0.995		RD #219	Install a rolling dip to drain road only. Downhill spur on right.		
1.061		RD #220	Install a rolling dip to drain road only.		
1.111		CD #46	Install a critical dip on the right hinge line of site #106.		
1.115	106		Culverted 12" class II stream crossing. Excavate from TOP (~10' above inlet) to BOT (~25" below outlet at base of bay tree). Install a 24" x 50' CMP at the base of the fill.	24" x 50' PVC	
1.141		RD #221	Install a rolling dip to drain road only.		
1.160			Downhill intersection on right.		
1.218		RD #222	Install a rolling dip to drain road only and outslope road up to spring.		
1.257		Start OSR-FD #8 & RD #223	Install a rolling dip to drain road only.		
1.279	105		Culverted 24" class II stream crossing. Excavate from TOP (~5' above inlet) to BOT (~10' below bottom of plunge). Install a 30" x 40' CMP at the base of fill. Make sure can not divert to right.	30" x 40' CMP, 1 bands	
1.308		RD #224	Install a rolling dip to drain road only.		
1.337		RD #225	Install a rolling dip to drain road only.		
1.386	104	End OSR-FD #8	Springy, class II ford/fill crossing. Excavate from TOP (at BIS above IBR) to BOT (~20' below OBF). Install a 24" x 40' CMP at the base of fill. Create a stilling basin above new inlet to catch all spring flow.	24" x 40' PVC	
1.402	103	Begin RB-Pull #11	30" culverted class II stream crossing. Excavate from TOP (confluence of two streams) to BOT (~20' below OBR). Install a 36" x 50' CMP at the base of fill.	36" x 50' CMP, 2 bands	10 yds ³ road rock
1.418		RD #226 & End RB-Pull #11	Install a rocked rolling dip to drain road. End removing berm along outsloped road.		15 yds ³ road rock
1.427		CD #47	Install a critical dip on the right hinge line of site #102.		
1.434	102		Diverted class II ford/fill crossing. Excavate from TOP (~5' above IBR) to BOT (at two 3' diameter downed firs in channel). Install a 24" x 50' CMP at the base of fill.	24" x 50' PVC	20 yds ³ of 0.5-1' diameter mixed rip-rap

Road Log of "As Built" Treatments for Grundman Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
1.450		RD #227	Install a rolling dip to drain road only.		
1.487	101	Begin OSR-FD #9 & DRC #27	Install a rocked rolling dip to drain spring-fed inboard ditch. Begin outsloping road and removing inboard ditch. Install 18" x 40' DRC from post to gully.		15 yds ³ road rock
1.541	101.1	RD #228	Install a rolling dip to drain road only. Install 24" x 30' culvert at the base of the fill.	24" x 30' PVC	
1.571		End OSR-FD #9 & CD #4	End outsloping road and removing inboard ditch. Install a critical dip to the right hinge line of site #100.		
1.574	100		Diverted class II fill crossing. (Site #100 was written up as a gully, but is really a stream crossing). Excavate from TOP (small fir ~5' above IBR) to BOT (at break in slope ~20' below OBR). Install a 30" x 40' CMP at the base of fill.	30" x 40' PVC	
1.610	99		Culverted 24" class III stream crossing. Excavate from TOP (~5' above inlet) to BOT (~30' below OBR). Install a 30" x 40' CMP at the base of fill. Install a single post trash rack 30" above new inlet.	30" x 40' CMP, 1 bands Trash rack	
1.622	98		Class III fill crossing. Excavate from TOP (top of sediment fan at small fir) to BOT (~30' down from OBR). Install a 24" x 40' CMP at the base of fill.	24" x 40' PVC	10 yds ³ road rock
1.650		RD #229	Install a rolling dip to drain road only.		
1.687		RD #230	Install a rolling dip to drain road only.		
1.715		RD #231	Install a rolling dip to drain road only.		
1.777		RD #232	Install a rolling dip to drain road only.		
1.814		RD #233	Install a rolling dip to drain road only.		
1.856		RD #234	Install a rolling dip to drain road only.		
1.886		RD #235	Install a rolling dip to drain road only.		
1.906	98.1	RD #236 & DRC #28	Install a rocked rolling dip using 10 yds ³ of road rock and 30 yds ³ of 1-3' diameter rip-rap on OB fillslope. Install DRC 18" x 30".	18" x 30' PVC	30 yds ³ of 1-3' diameter mixed rip- rap & 15 yds ³ road rock
1.923		Begin RB-Pull	Begin removing berm along OBF.		

Road Log of "As Built" Treatments for Grundman Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
		#12			
1.935		RD #237	Install a rolling dip to drain road only.		7 yds ³ road rock
1.940		End RB-Pull #12	End removing berm along outsloped road.		
1.973		RD #238	Install a rolling dip to drain road only.		7 yds ³ road rock
2.006		RD #239	Install a rolling dip to drain road only at uphill skid/swale on left.		7 yds ³ road rock
2.046		RD #240	Install a rolling dip to drain road only.		7 yds ³ road rock
2.079		RD #241	Install a rolling dip to drain road only. Road has large berm on OBR. Only remove berm for length of dip.		7 yds ³ road rock
2.111		RD #242	Install a rolling dip to drain road only.		7 yds ³ road rock
2.123			Intersection with Reed Mountain Road.		

Road Log of "As Built" Treatments for Kenny's Driveway, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip.					
0.0			Upper intersection with Jeanie's Driveway.		
0.017		RD #419	Install a rolling dip to drain road only.		
0.035		RD #419.1	Install a rolling dip to drain road only.		
0.052	65		Culverted 4' x 1' Class III stream crossing with an 18" CMP. Excavate from TOP to BOT. Install a 30" x 30' CMP at channel gradient at the base of the fill.	30" x 30' CMP	
0.090		DRC #28	Install 18" x 30' ditch relief culvert at base of fill.	18" x 30' PVC	
0.093			Gate above house. No treatment within gates.		
0.140			Gate below house. No treatment within gates.		
0.163		RD#420	Very small class III stream crossing with 12" culvert. Replace with 24" x 30' culvert at base of fill.	24" x 40' PVC	

Road Log of "As Built" Treatments for Kenny's Driveway, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip.					
0.182	62		2' x 1' Class III stream crossing with a 9" CMP. Excavate from TOP to BOT. Install a 24" x 30' plastic culvert at channel gradient at the base of the fill. Install a critical dip to the right hinge.	24" x 30' PVC	
0.209			Lower intersection with Jeanie's Driveway.		

Road Log of "As Built" Treatments for Kenny's North Rd, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.0			Intersection with Jeanie's Drive (upper intersection with road).		
0.014			Lower intersection with Jeanie's Drive.		
0.047			Turn around area.		
0.091	61		Rocky 9' x 1' Class III stream crossing with a 36" CMP. Excavate from TOP to BOT. Install a 54" CMP at channel gradient at the base of the fill.	54" x 40' CMP	
0.035		DRC#29	Install 18" x 30' ditch relief culvert at base of fill.	18" x 30' PVC	
0.126		RD #417	Install a rolling dip to drain road only.		
0.145		RD #417.1	Install a rolling dip to drain road only.		
0.164		RD #418	Install a rolling dip to drain road only.		
0.196	60		3' x 1' Class III stream crossing diverted to the right to site #59 with a 36" CMP. Excavate from TOP to BOT. Install a 24" x 40' plastic culvert at channel gradient at the base of the fill.	24" x 40' PVC	
0.206	59		Rocky 8' x 1' Class III stream crossing with a 36" CMP. Excavate from TOP to BOT. Install a 48" CMP	42" x 30' CMP	

Road Log of "As Built" Treatments for Kenny's North Rd, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
			at channel gradient at the base of the fill.		
			End of road (at grassy turn-around).		

Road Log of "As Built" Treatments for Ben's Rd, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.0			Gate at Ben's house.		
0.076			Intersection on right. No treatment.		
0.384			Water tanks 60' below road.		
0.398			Water line through road bed.		
0.422			Downhill intersection on left, to water tanks.		
0.539	56	CD#59	Small 3' x 1' class III stream crossing with 12" culvert. Replace with 24" x 40' plastic culvert at the base of the fill. Lower road over right hinge for critical dip.	24" x 40' PVC	15 yds ³ road rock
0.554	57	CD#60	Small 3' x 1' class III stream crossing with 12" culvert. Excavate from TOP to BOT and replace with 24" x 50' plastic culvert at the base of the fill. Install a critical dip to right hinge of crossing.	24" x 50' PVC	15 yds ³ road rock
0.745			End of Road at inter section with Jeanie's Road.		

Road Log of "As Built" Treatments for Jeanie's Driveway, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.0			At drainage divide above house near gate on Upper portion of driveway.		
0.003			Gate.		
0.045		DRC #22	12" DRC. Replace with 18" x 20" DRC at the base of fill.		

Road Log of "As Built" Treatments for Jeanie's Driveway, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.092		RD #400	Install a rolling dip to drain road only.		10 yds ³ road rock
0.098			Downhill intersection on left.		
0.120		Start DD #8	Spring at inboard edge of road. Start cut ditch to site #74, 30' down road.		
0.125	74	End DD #8 & CD #55	End cut ditch to site #74, 30' down road. Culverted 12" crossing on 2' x 1' class III stream. Excavate from TOP (just above current inlet) to BOT (15' below road). Install a 24" x 40' plastic culvert at the base of the fill. Install a critical dip to the right hinge. OBF was covered with black plastic by landowner.	24" x 40' PVC	10-15 yds ³ road rock
0.158		RD #401	Install a rolling dip to drain road only at small gully.		10 yds ³ road rock
0.265	72	CD #57	Small rocky class III stream channel with 12" culvert. Excavate from TOP (confluence of two small channels 15' above inlet) to BOT (Above large Bay Tree). Install a 24" x 40' plastic culvert at the base of the fill. Install a critical dip to the right hinge line.	24" x 40' PVC	15 yds ³ road rock
0.297			Downhill intersection on left (to Kenny and Sierra's house).		
0.303		RD #402	Outslope road at low spot to enhance rolling dip.		
0.310			Uphill intersection on left (to Ben's house).		
		RD #404	Install a rolling dip to drain road only.		10 yds ³ road rock
0.459		RD #405	Install a rolling dip to drain road only, above large Madrone tree.		20 yds ³ road rock
0.473			Downhill intersection on right.		
0.476			Uphill intersection on right.		
0.498		RD #406	Install a rolling dip to drain road only, down berm break (may be too steep to install).		20 yds ³ road rock
0.501	75		Spring/class III stream crossing with 12" culvert. Excavate from TOP (4' above IBR) to BOT (at base of fill). Install a 24" x 40' plastic culvert at the base of the fill.	24" x 40' PVC	20 yds ³ road rock
0.502			Uphill driveway on left (Kenny and Sierra's house).		
0.527		RD #407	Install a rolling dip to drain road only.		10 yds ³ road rock
0.530			Gate.		
		Start DD	Define ditch to bottom of hill at intersection near site		30 yds ³ road

Road Log of "As Built" Treatments for Jeanie's Driveway, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
		#9	#31 (~175'). Dig large rocks out of road and re-rock road to ensure drainage.		rock
0.587		ISR #2	Pond on left. Inslope road for 175'.		
0.621			End at intersection with South Reed Mountain Road.		

Road Log of "As Built" Treatments for Michael's Driveway, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.0			Intersection with upper Reed Mountain Road downhill on right.		
0.006	96	CD #51	Culverted 24" class II stream crossing. Clean 15' x 4' x 5' area above inlet and 20' x 4' x 5' area below outlet. Clean sediment from inside outlet. Install a critical dip by lowering the road 1-2'.		
0.030		RD #294	Install a rolling dip to drain the road only.		
0.050	97		18" plugged DRC. Inlet and outlet are buried. Install an 18" x 30' DRC.	18" x 30' PVC	
0.069		RD # 295	Install a rolling dip to drain the road only.		
0.073			Gate.		
0.104		RD #296	Install a rolling dip to drain the road only.		
0.140		RD #297	Install a rolling dip to drain the road only.		
0.194			Low spot in road.		
0.203			Drainage divide.		
0.238		RD #298	Install a rolling dip to drain the road only.		
0.266			Low spot at Yurt.		

Road Log of "As Built" Treatments for Matthew's Pond Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs

1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.0			Intersection with Grundman Road.		
0.121	107		12" culverted, class II stream crossing. Excavate from TOP (inlet) to BOT (approximately 15' below OBR). Install a 24" x 40' CMP at base of fill.	24" x 40' PVC	
0.126	108		Diverted class II fill crossing. Excavate from TOP (base of IBF) to BOT (~25' below OBR). Install a 24" x 40' CMP at the base of fill.	24" x 40' PVC	
0.128		CD #52	Install a critical dip on the right hinge line of site #108.		
0.180			Intersection with Grundman skid road downhill to left.		
0.218			Intersection with spur on left		
0.237			End of road at Matthew's pond.		

Road Log of "As Built" Treatments for Site #112 Skid Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt ¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.0			Intersection with Grundman Road.		
0.041		RD #299	Install a rolling dip to drain road only.		
0.072	113		18" culverted, class III stream crossing. Excavate from TOP (~10' above trash rack) to BOT (10' below base of plunge). Install a 24" x 30' long CMP at the base of fill.	24" x 30' PVC	
0.074		CD #53	Install a critical dip on the left hinge of site #113.		
0.109		RD #300	Install a rolling dip to drain the road and ditch.		
0.131	113.1	RD#301	Diverted class III stream crossing. Install an armored fill crossing using 10 yds ³ of road rock for driving surface and 15 yds ³ of 0.5-1.0' diameter rip-rap on OB fillslope. Make sure to tie fill crossing into original channel below the road.		15 yds ³ of 0.5-1.0' diameter mixed rip-rap & 10 yds ³ road rock
0.180		RD #302	Install a rolling dip to drain road only.		
0.229		RD #303	Install a rolling dip to drain road only.		
0.264		RD #304	Install a rolling dip to drain road only.		
0.303	114		Pulled class II crossing. No treat.		
0.321		RD #305	Install a rolling dip to drain road only.		

Road Log of "As Built" Treatments for Site #112 Skid Road, East Branch South Fork Eel River, Humboldt County, California					
Miles	PWA Site#	Road Tmt¹	Comments/Treatment	CMP Needs	Rock Needs
1) DRC# = Install ditch relief culvert; ISR# = Inslope road with 3% grade; OSR# = Outslope road with 3% grade; OSR-KD# = Outslope road by pulling fill onto road bed to outslope the road and keep the ditch; OSR-FD# = Outslope road by pulling fill onto road bed to outslope the road and fill the ditch. RB-side# = Remove berm and sidecast; RB-Pull# = Remove berm by pulling fill onto the road and outsloping the road or hauling to a stable location; CD# = Install critical dip; RD# = Install rolling dip; DD# Define ditch.					
0.331	115		Gully draining a skid road. Install a cross-road drain.		
0.343		RD #306	Install a rolling dip to drain road only.		
0.362		RD #307	Install a rolling dip to drain road only.		
0.375		XRD #29	Install a cross-road drain.		
0.377			End of Road at very large cutbank failure.		

Appendix C

**Conceptual Treatment Diagrams of Typical Road Treatments,
East Branch South Fork Eel River/Reed Mountain Watershed
Implementation Project,
Humboldt County, California.**

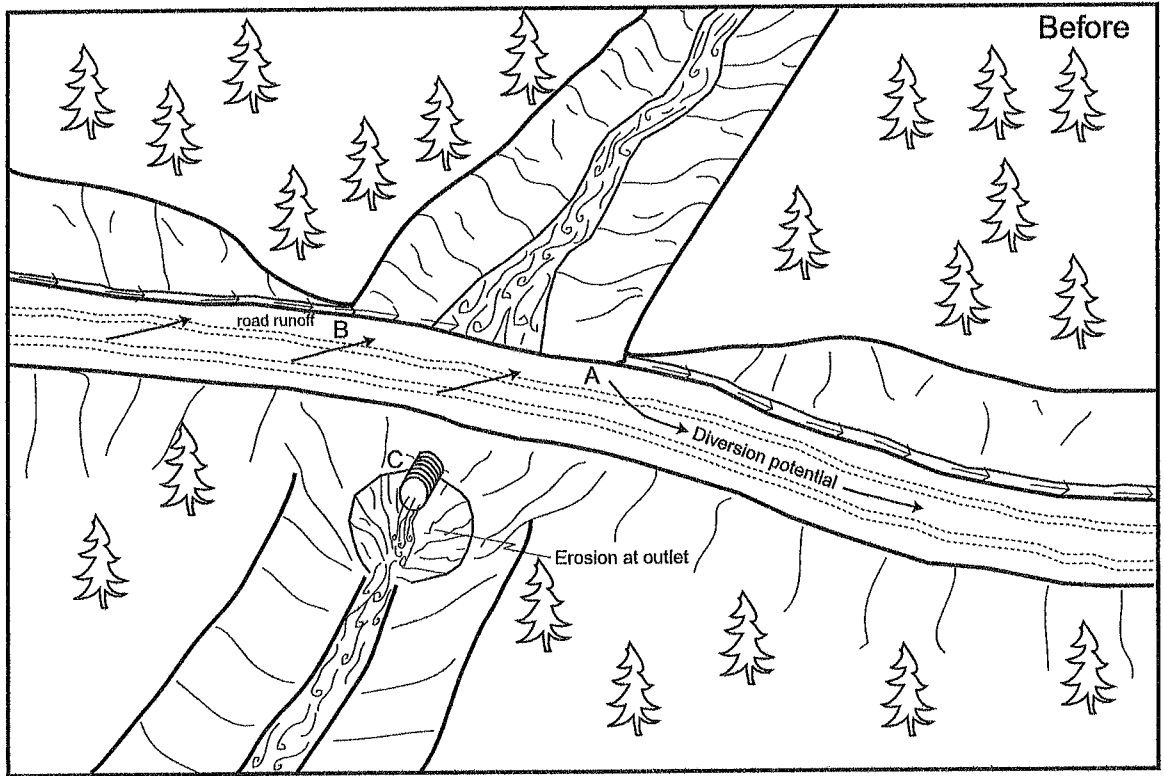
Typical Schematic Components of an upgraded stream crossing

Common problems

A - Diversion potential

B - Road surface and ditch drains to stream

C - Undersized culvert high in fill with outlet erosion

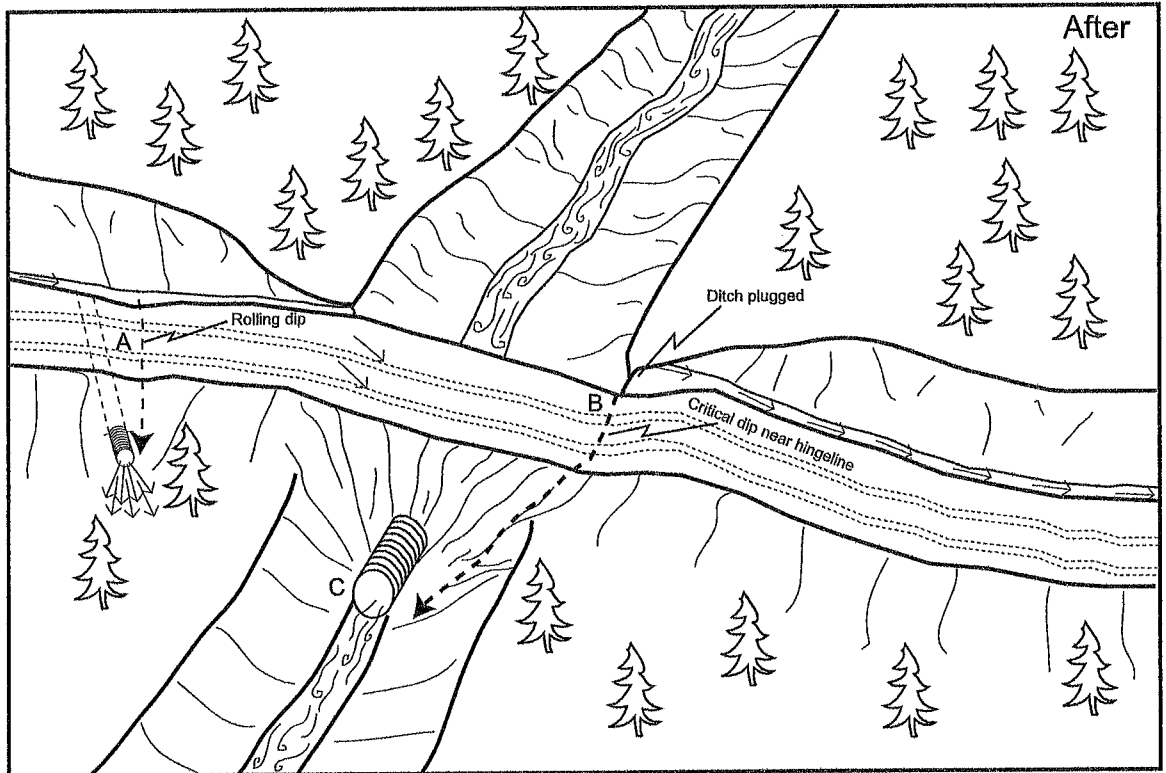


General Standards

A - Road surface and ditch "disconnected" from stream

B - No diversion potential

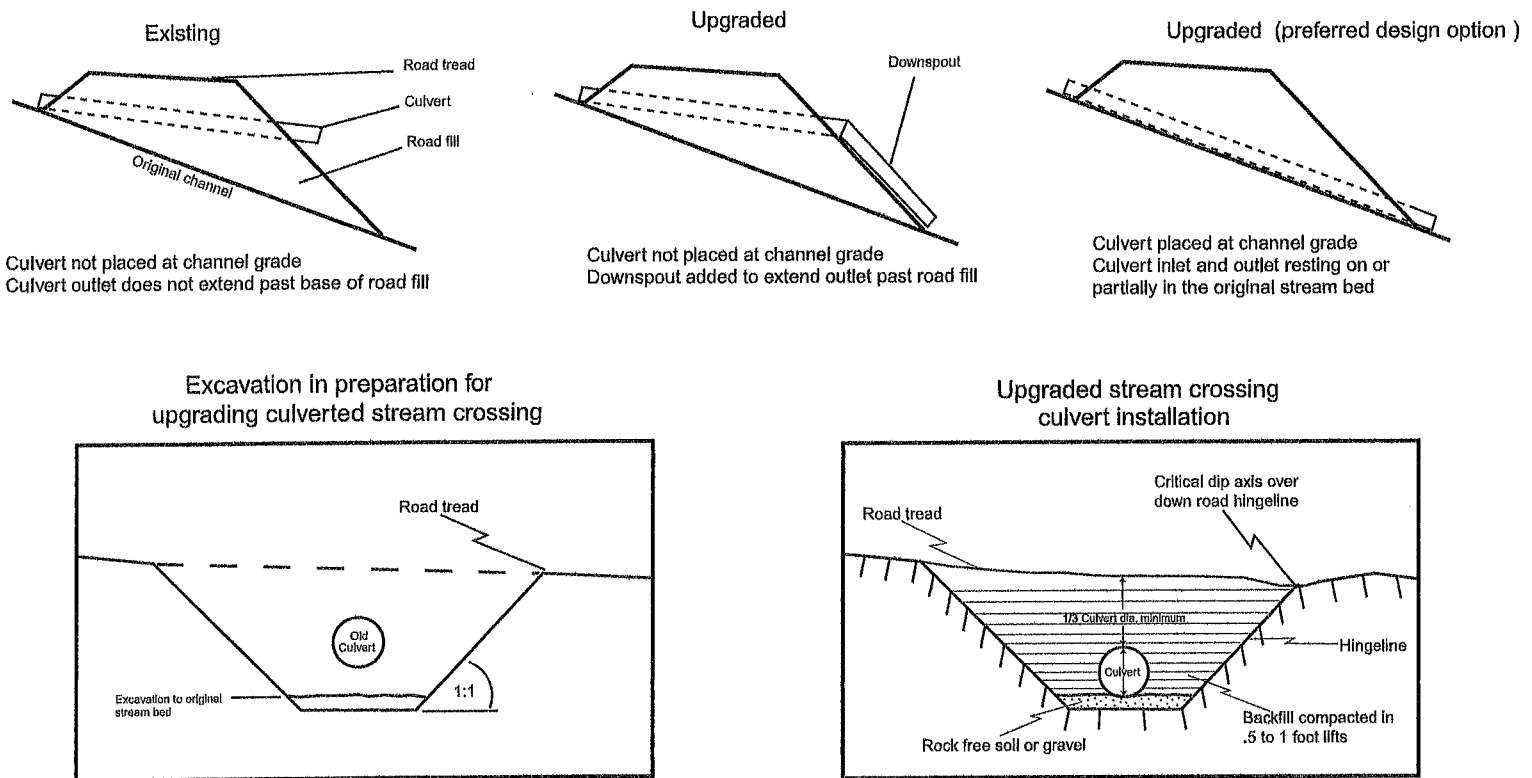
C - 100 year culvert set at base of fill



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Typical design of non-fish bearing culverted stream crossings



Typical installation of non-fish bearing culverted stream crossings

Road upgrading tasks typically include upgrading stream crossings by installing larger culverts and inlet protection (trash barriers) to prevent plugging. Culvert sizing for the 100 year flood flow should be determined by both field observation and calculations using a procedure such as the Rational Formula.

Stream crossing culvert installation

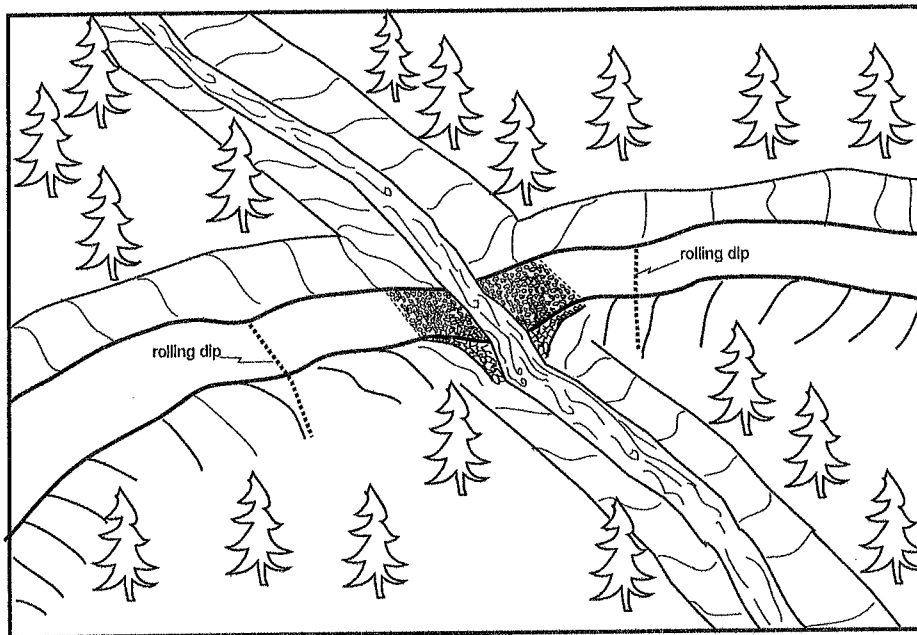
- 1) Culverts shall be aligned with natural stream channels to ensure proper function, prevent bank erosion and debris plugging problems.
- 2) Culverts shall be placed at the base of the fill and at the grade of the original streambed or downspouted past the base of the fill.
- 3) Culverts shall be set slightly below the original stream grade so that the water drops several inches as it enters the pipe.
- 4) Culvert beds shall be composed of rock free soil or gravel, evenly distributed under the length of the pipe.
- 5) To allow for sagging after burial, a camber shall be between 1.5 to 3 inches per 10 feet culvert pipe length.
- 6) Backfill material shall be free of rocks, limbs or other debris that could dent or puncture the pipe or allow water to seep around pipe.
- 7) One end of the culvert pipe shall be covered then the other end. Once the ends have been secured, the center will be covered.
- 8) Backfill material shall be tamped and compacted throughout the entire process.
 - Base and side wall material will be compacted before the pipe is placed in its bed.
 - Backfill compacting will be done in 0.5- 1 ft lifts until 1/3 of the diameter of the culvert has been covered. A gas powered tamper can be used for this work.
- 9) Inlets and outlets shall be armored with rock or mulched and seeded with grass as needed.
- 10) Trash protectors shall be installed just upstream from the culvert where there is a hazard of floating debris plugging the culvert.
- 11) Layers of fill will be pushed over the crossing until the final, design road grade is achieved, at a minimum of 1/3 to 1/2 the culvert diameter.

Erosion control measures for culvert replacement

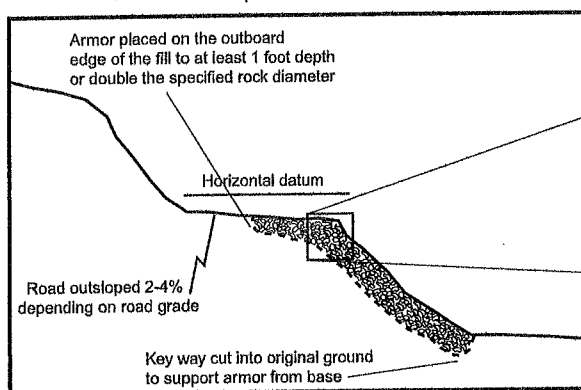
Both mechanical and vegetative measures will be employed to minimize accelerated erosion from stream crossing and ditch relief culvert upgrading. Erosion control measures that are implemented will be evaluated on a site by site basis. Erosion control measures that may be employed include but are not limited to:

- 1) Minimizing soil exposure by limiting excavation areas and heavy equipment disturbance.
- 2) Installing filter windrows of slash at the base of the road fill to minimize the movement of eroded soil to downslope areas and stream channels.
- 3) Retaining rooted trees and shrubs at the base of the fill as "anchor" for the fill and filter windrows.
- 4) Bare slopes created by construction operations will be protected until vegetation can stabilize the surface. Surface erosion on exposed cuts and fills will be minimized by mulching, seeding, planting, compacting, armoring and/or benching prior to the first fall rains.
- 5) Extra or unusable soil will be stored in long term spoils disposal locations that are not limited by factors such as excessive moisture, steep slopes greater than 10%, archeology potential or proximity to a watercourse.
- 6) On running streams water will be pumped or diverted past the crossing and into the down stream channel during the construction process.
- 7) Straw bales and/or silt fencing will be employed where necessary to control runoff within the construction zone.

Typical armored fill crossing installation

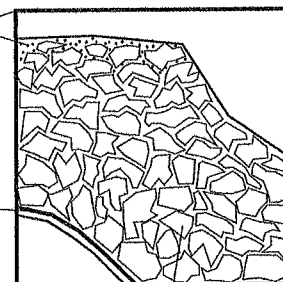


Cross section parallel to watercourse



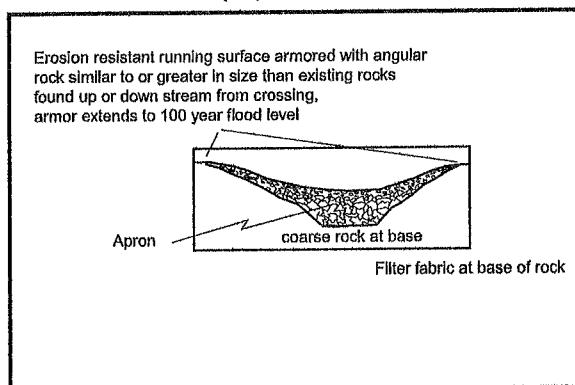
Fine grained surface
coarse on running surface

Woven geotextile



Base coarse rock protects fill

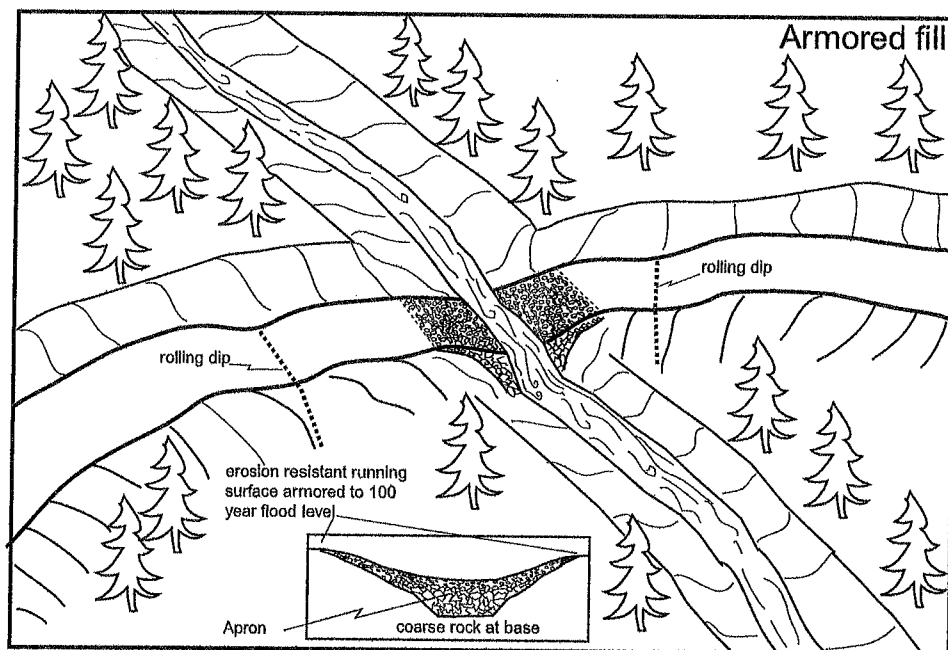
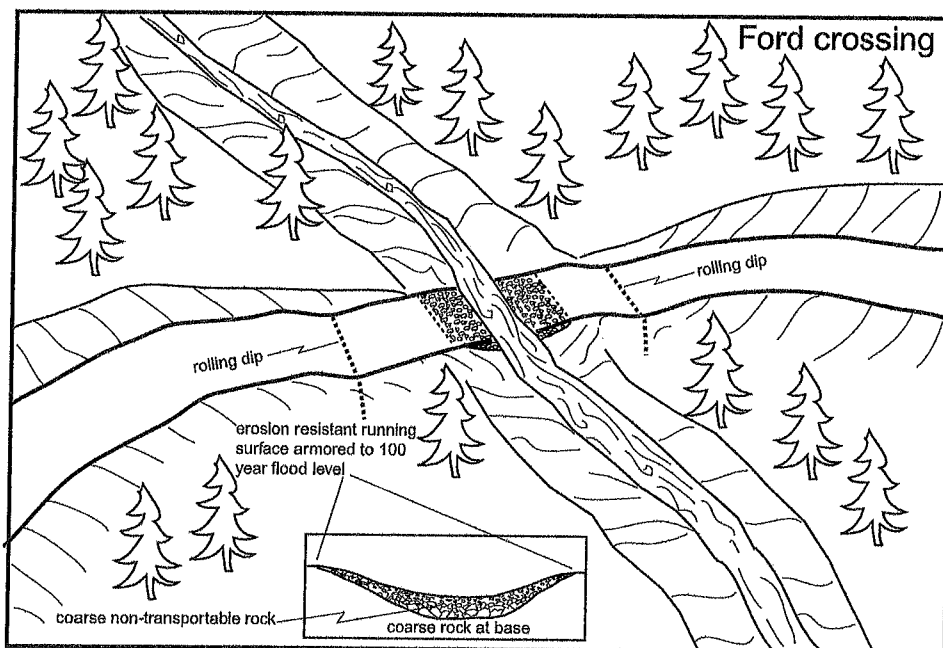
Cross section perpendicular to watercourse



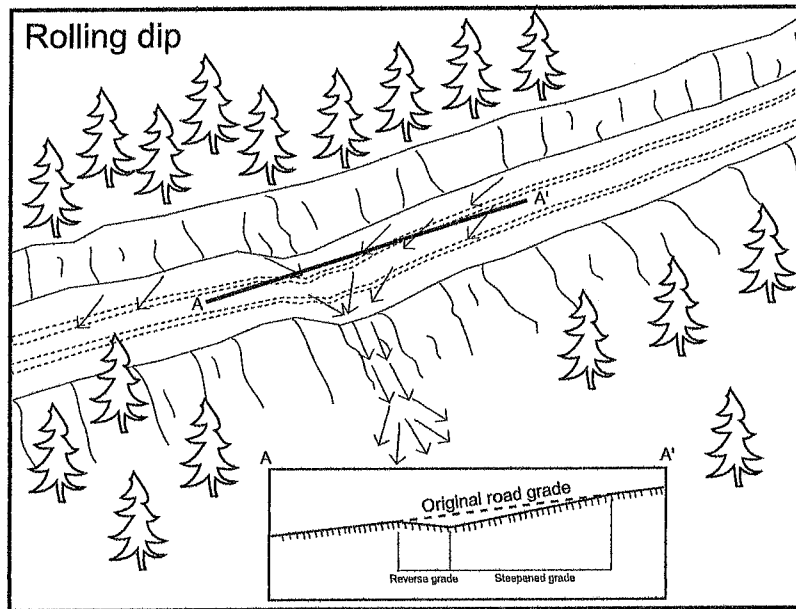
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Ford and armored fill stream crossings



Road surface drainage by rolling dips



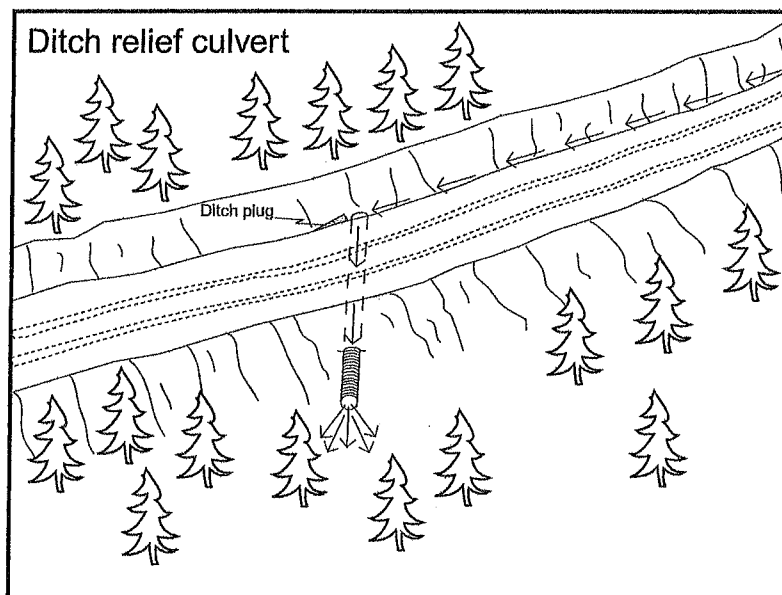
Rolling dip installation:

- 1) Rolling dips will be installed in the road bed as needed to drain the road surface.
- 2) Rolling dips will be sloped either into the ditch or to the outside of the road edge as required to properly drain the road.
- 3) Rolling dips are usually built at 30-45 degree angles to the road alignment with cross grade of at least 1 percent greater than the grade of the road.
- 4) Excavation for the dips will be done with a medium size bulldozer or similar equipment.
- 5) Excavation of the dips will begin 50 to 100 feet up-road from where the axis of the dip is planned per guidelines established in the rolling dip dimensions table.
- 6) Material will be progressively excavated from the road bed, steepening the grade until the axis is reached.
- 7) The depth of the dip will be determined by the grade of the road (see table).
- 8) On the down-road side of the rolling dip axis a grade change will be installed to prevent the runoff from continuing down the road (see figure).
- 9) The rise in grade will be carried for about 10 to 20 feet then it will fall to the original slope.
- 10) The transition from axis to bottom, through rising grade to falling grade will be in a road-distance of at least 15 to 30 feet.

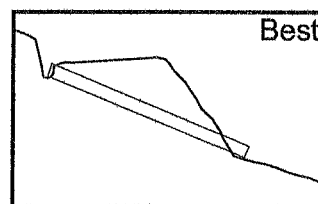
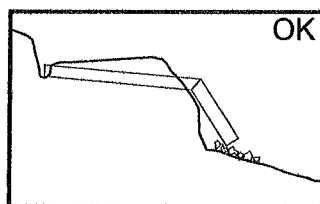
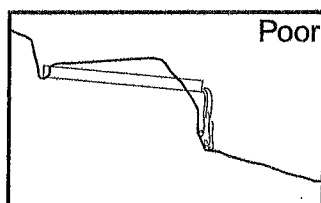
Table of rolling dip dimensions

Road grade	Upslope approach (distance from up-road start of rolling dip to trough) (ft)	Reverse grade (Distance from trough to crest)	Depth below average road grade at discharge end of trough. (ft)	Depth below average road grade at upslope end of trough. (ft)
<6	55	15-20	0.9	0.3
8	65	15-20	1.0	0.2
10	75	15-20	1.1	.01
12	85	20-25	1.2	.01
>12	100	20-25	1.3	.01

Typical ditch relief culvert installation



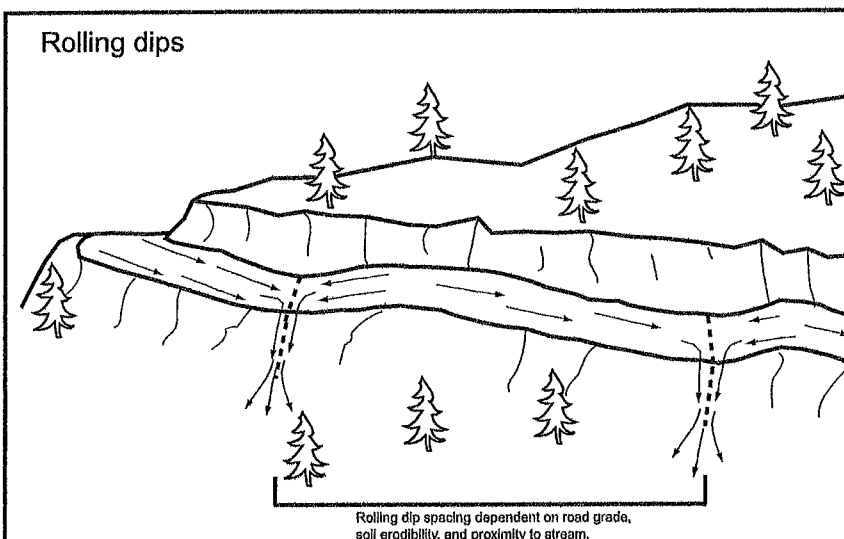
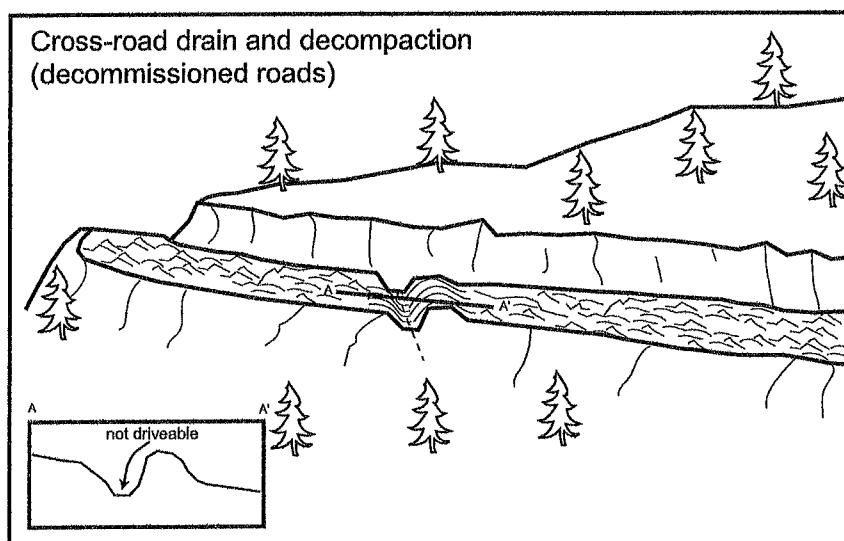
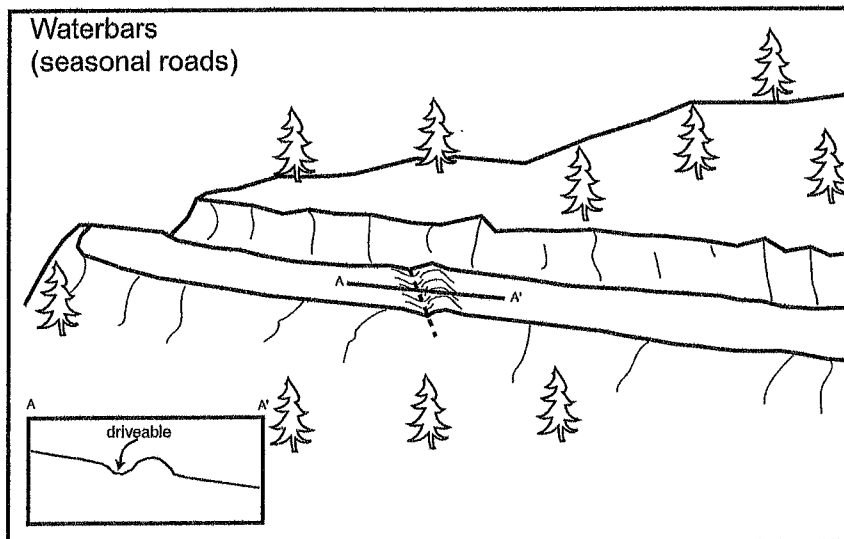
Cross sections of typical installations



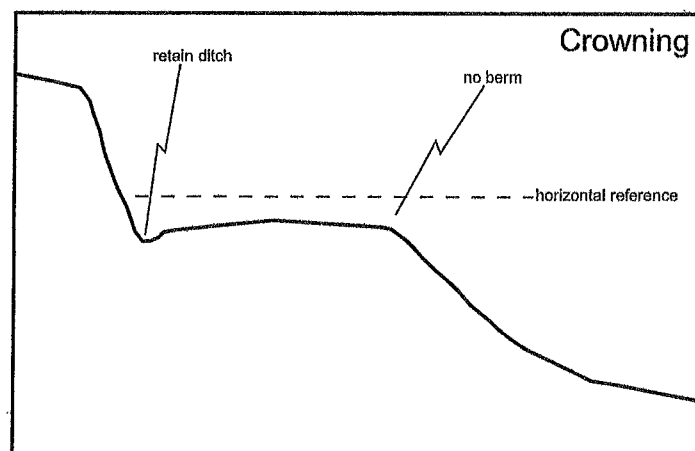
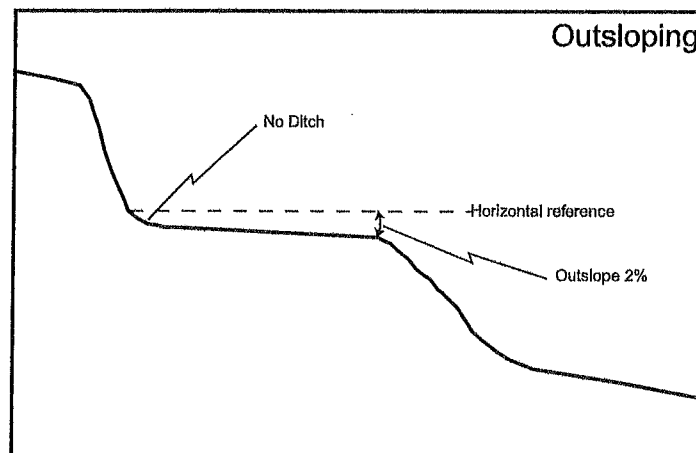
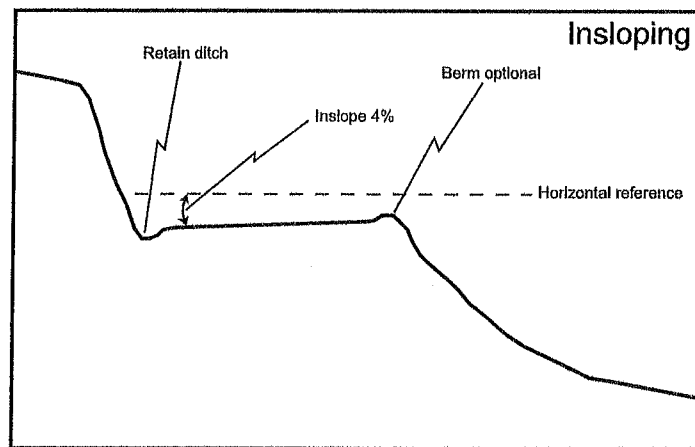
Ditch relief culvert installation

- 1) The same basic steps followed for stream crossing installation shall be employed.
- 2) Culverts shall be installed at a 30 degree angle to the ditch to lessen the chance of inlet erosion and plugging.
- 3) Culverts shall be seated on the natural slope or at a minimum depth of 5 feet at the outside edge of the road, whichever is less.
- 4) At a minimum culverts shall be installed at a slope of 2 to 4 percent steeper than the approaching ditch grade, or at least 5 inches every 10 feet.
- 5) Backfill shall be compacted from the bed to a depth of 1 foot or 1/3 of the culvert diameter, whichever is greater, over the top of the culvert.
- 6) Culvert outlets shall extend beyond the base of the road fill (or a flume downspout will be used). Culverts will be seated on the natural slope or at a depth of 5 feet at the outside edge of the road, whichever is less.

Dispersing road surface runoff

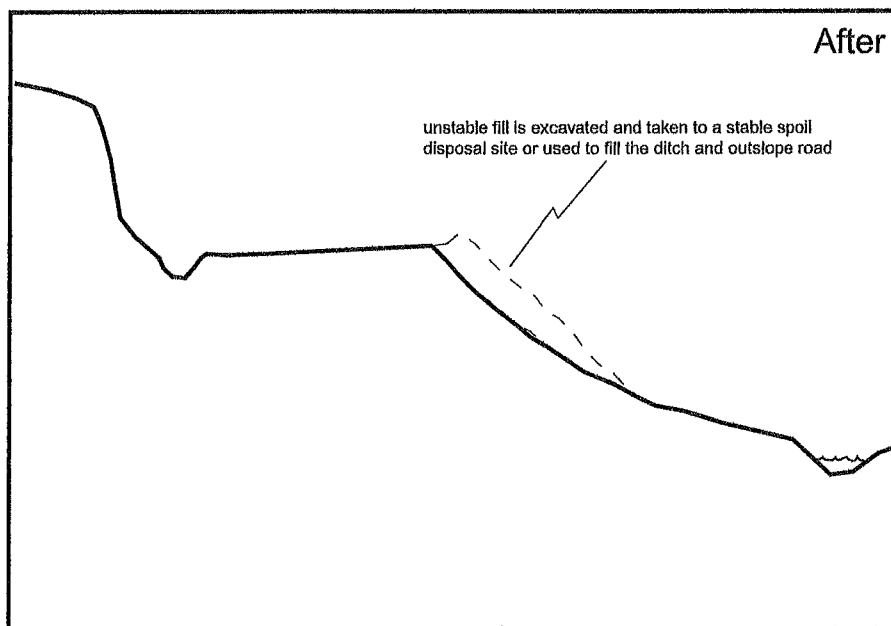
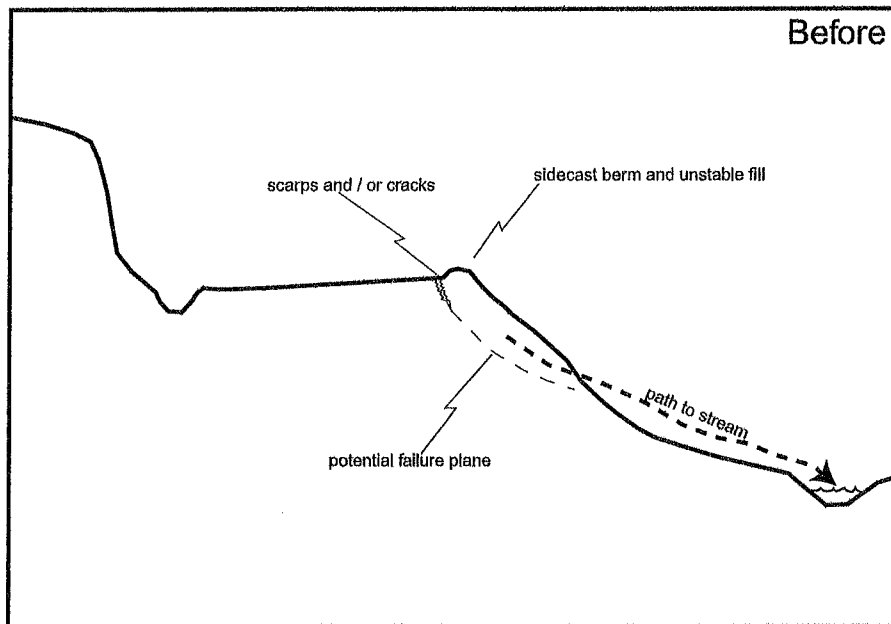


Using road shape to control road runoff



Outsloping pitch for roads up to 8% grade		
Road grade	Outslope pitch for unsurfaced roads	Outslope pitch for surfaced roads
4%, or less	3/8" per foot	1/2" per foot
5%	1/2" per foot	5/8" per foot
6%	5/8" per foot	3/4" per foot
7%	3/4" per foot	7/8" per foot
8%, or more	1" per foot	1 1/4" per foot

Excavating unstable fill slope on maintained road



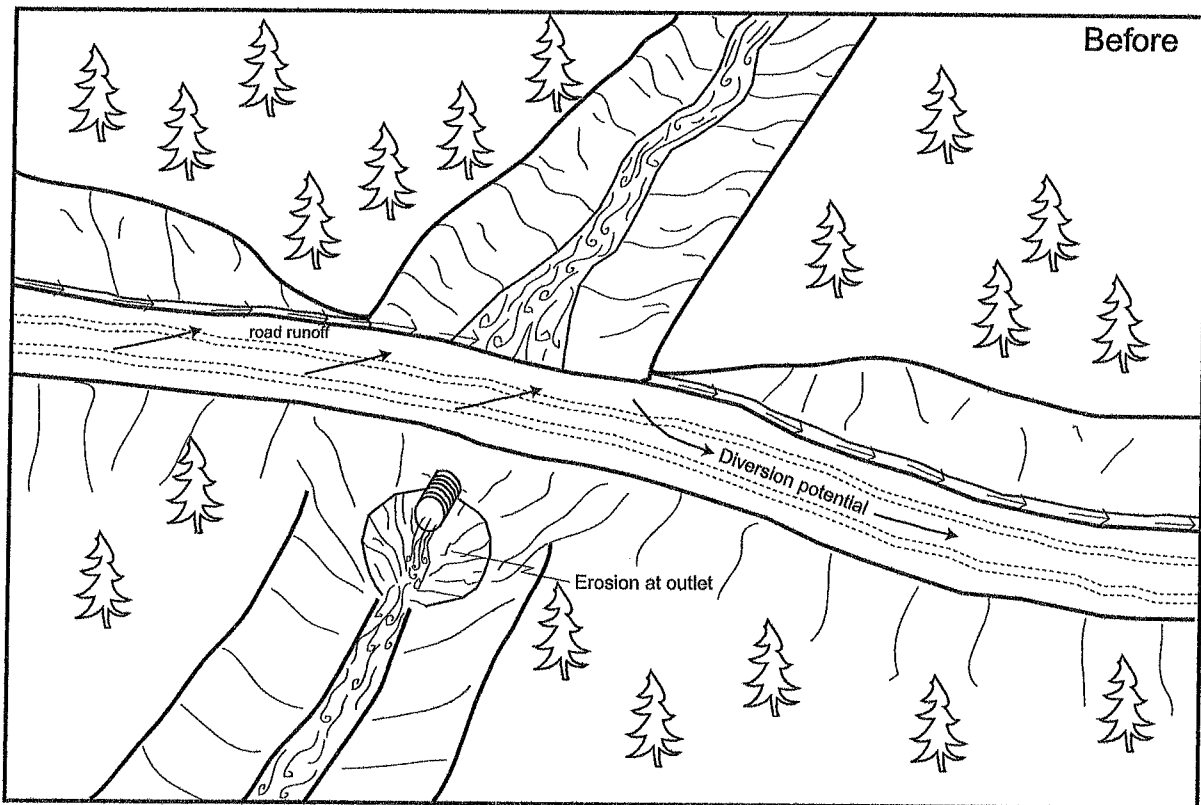
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Typical stream crossing decommissioning

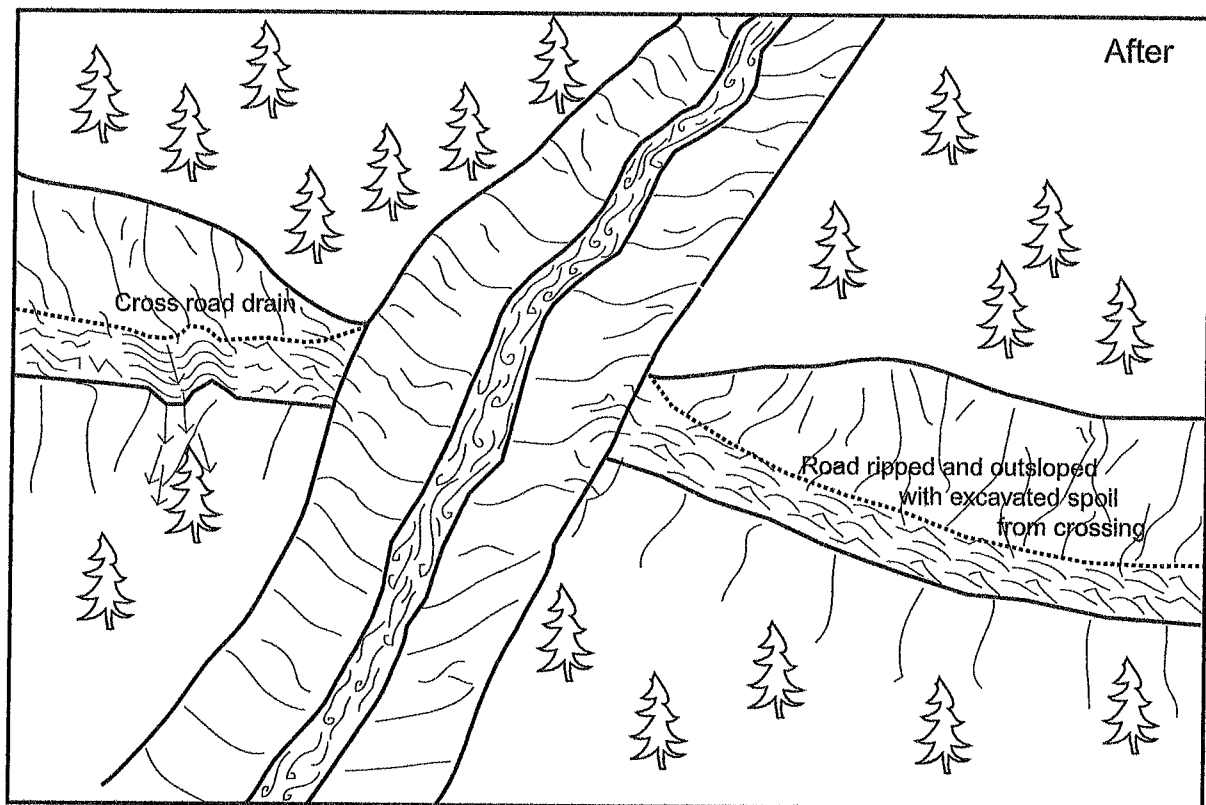
Condition

- Diversion potential
- Road surface and ditch flows drain to stream
- Undersized culvert high in fill with outlet erosion



Treatment

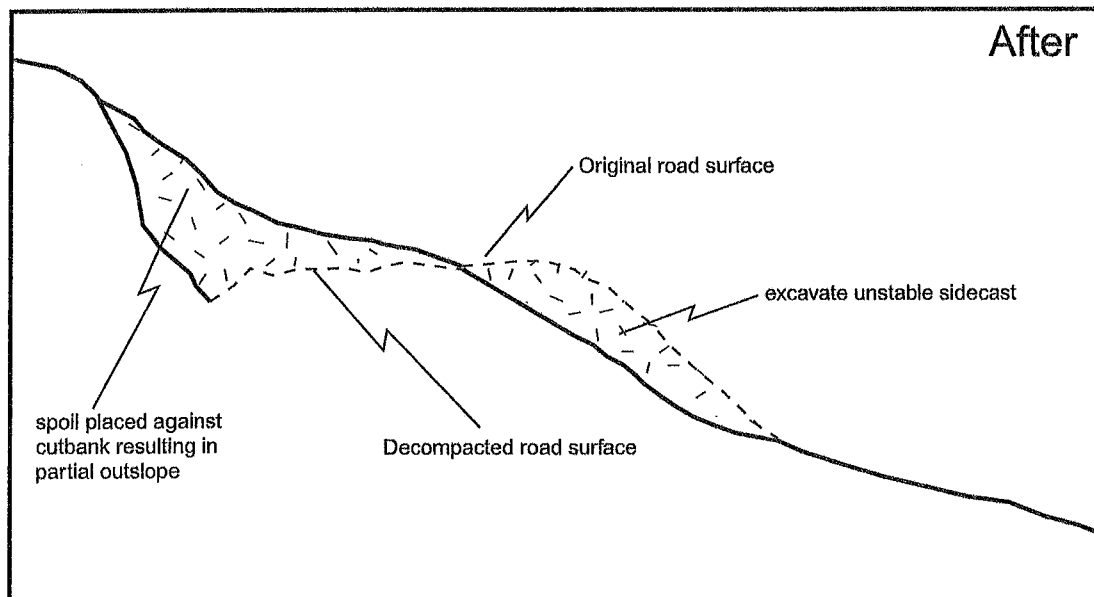
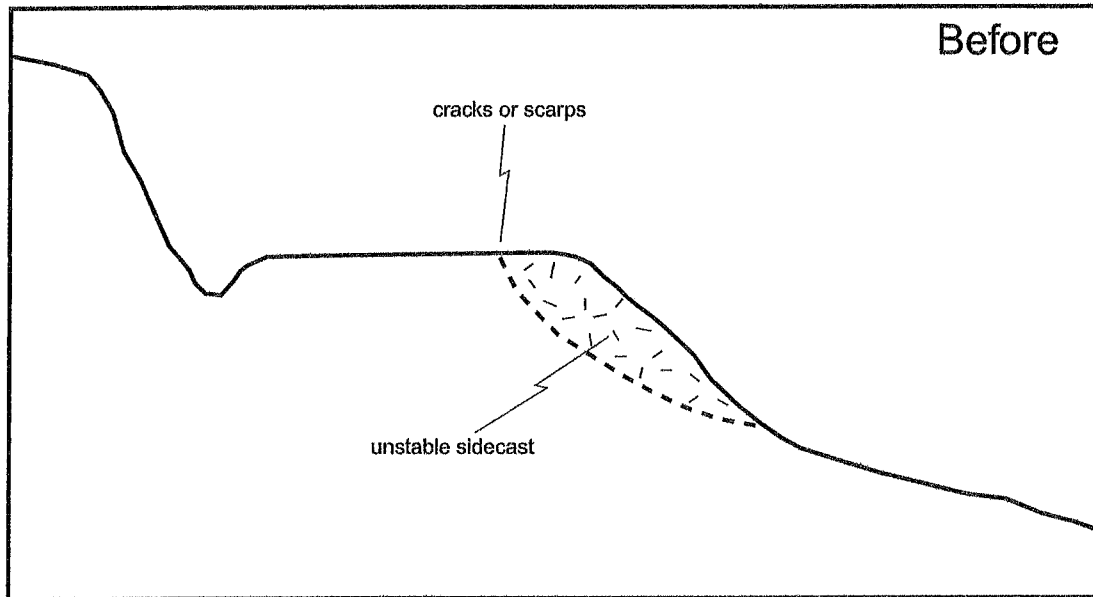
- Road surface decompacted
- Cross road drains on old road
- Stream crossing fill completely excavated
- Excavated spoil used to outslope adjacent road



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Excavation of unstable fill slope on decommissioned road



Appendix D

Selected Before, During and After Photo Point Photographs

**East Branch South Fork Eel River/Reed Mountain Watershed
Implementation Project,**

Humboldt County, California.



Figure 1a. Site #5, Reed Mountain Road, before upgrade. This picture was taken upstream from the culvert. The 2-30" culverts were undersized, too short and set high in the outboard road fill. Unstable and vertical raveling banks are present above and below the crossing.

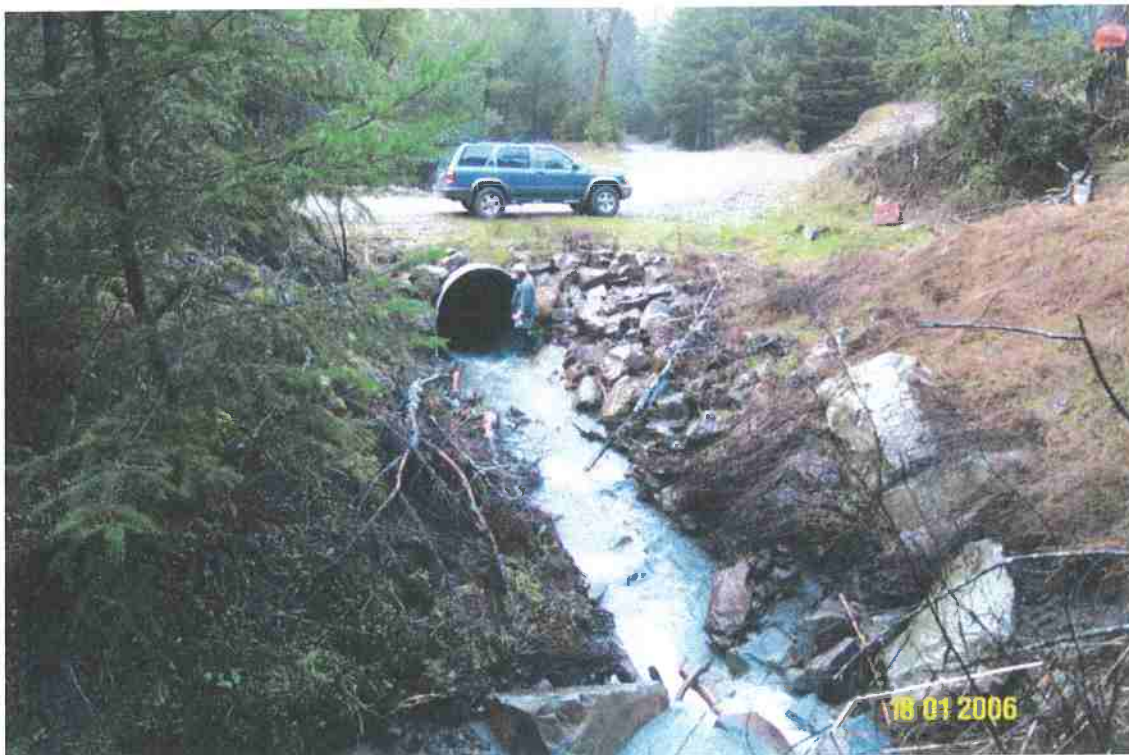


Figure 1b. Site #5, Reed Mountain Road, after upgrade. This picture was taken from the same location as above. A properly sized, 72" diameter culvert, has been installed at the natural stream grade and stable fillslopes and channel sideslopes have been constructed above and below the crossing.

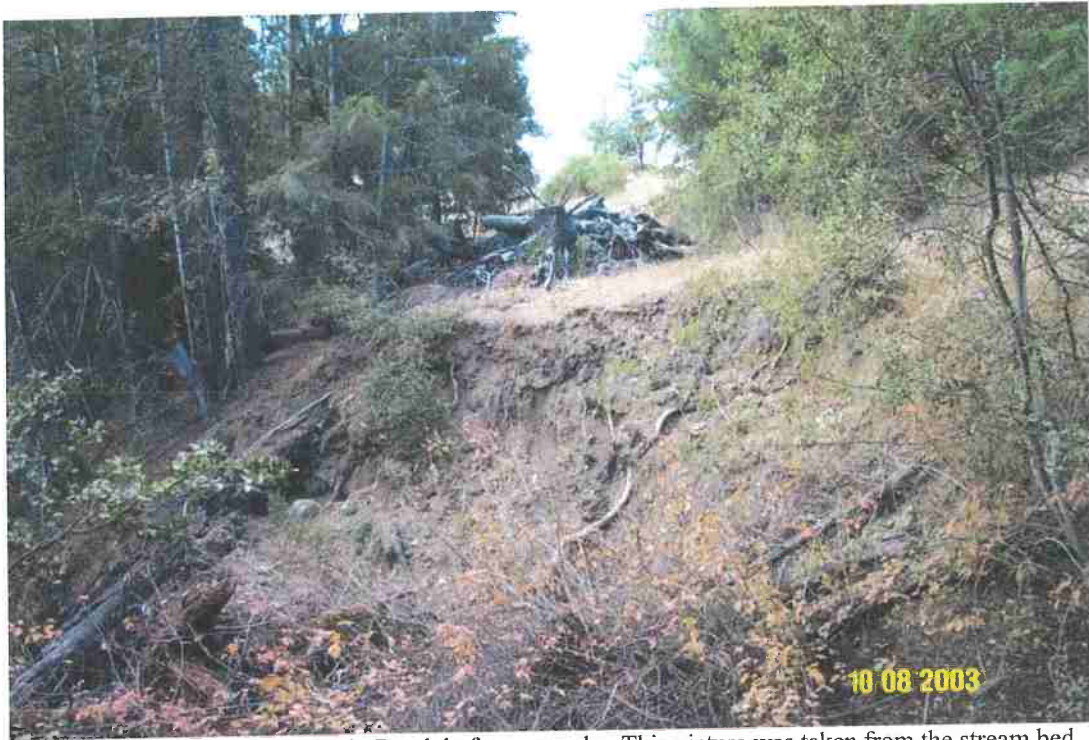


Figure 2a. Site #6.1 Reed Mountain Road, before upgrade. This picture was taken from the stream bed looking at the steep, eroding vertical bank.



Figure 2a. Site #6.1 Reed Mountain Road, after upgrade. This picture was taken from the same location as above. The vertical bank along the stream channel was excavated and laid back to a stable slope angle, and the excavated area was seeded and mulched.



Figure 3a. Site #4, Reed Mountain Road, before upgrade. This picture was taken from the right fillslope below the outlet of a plugged ditch relief culvert.



Figure 3a. Site #4, Reed Mountain Road, before upgrade. This picture was taken from the same location as above. The ditch relief culvert was replaced with a longer 18" plastic culvert with the side slopes below the outlet layed back, then seeded and mulched.



Figure 4a. RD #35, Reed Mountain Road, before upgrade. This picture was taken from the outboard edge of the road looking up the road. The roadbed is insloped and the inboard ditch drains 900 feet of road.



Figure 4a. RD #35, Reed Mountain Road, after upgrade. This picture was taken from the same location as above. A ditch relief culvert was installed near the bend, the roadbed was outsloped and a rolling dip was installed to drain the road only.



Figure 5a. Site #77, Upper Reed Mountain Road before upgrade. This photo was taken from the outboard edge of the road on the right bank of the stream crossing. The 12" culvert was undersized and the culvert was too short and set high in the fill.



Figure 5b. Site #77, Upper Reed Mountain Road, after upgrade. This picture was taken from the same location as above. A properly sized 24" culvert and a critical dip were installed with 5 yds³ of rip-rap on the fillslope.



Figure 6a. Site #79, Upper Reed Mountain Road, before upgrade. This picture was taken from the right cut bank upstream of the crossing. The 24" culvert is undersized, the culvert is too short and set high in the fill, and the stream has a diversion potential.



Figure 6b. Site #79 Upper Reed Mountain Road, after upgrade. This picture was taken from the same location as above. The 24" culvert was replaced with a 30" culvert and a critical dip was installed to the right of the crossing.



Figure 7a. Site #85, Upper Reed Mountain Road, before upgrade. This picture was taken from the left bank downstream of the crossing. The 24" culvert is undersized the outlet is set high in the fill resulting in erosion of the fill.

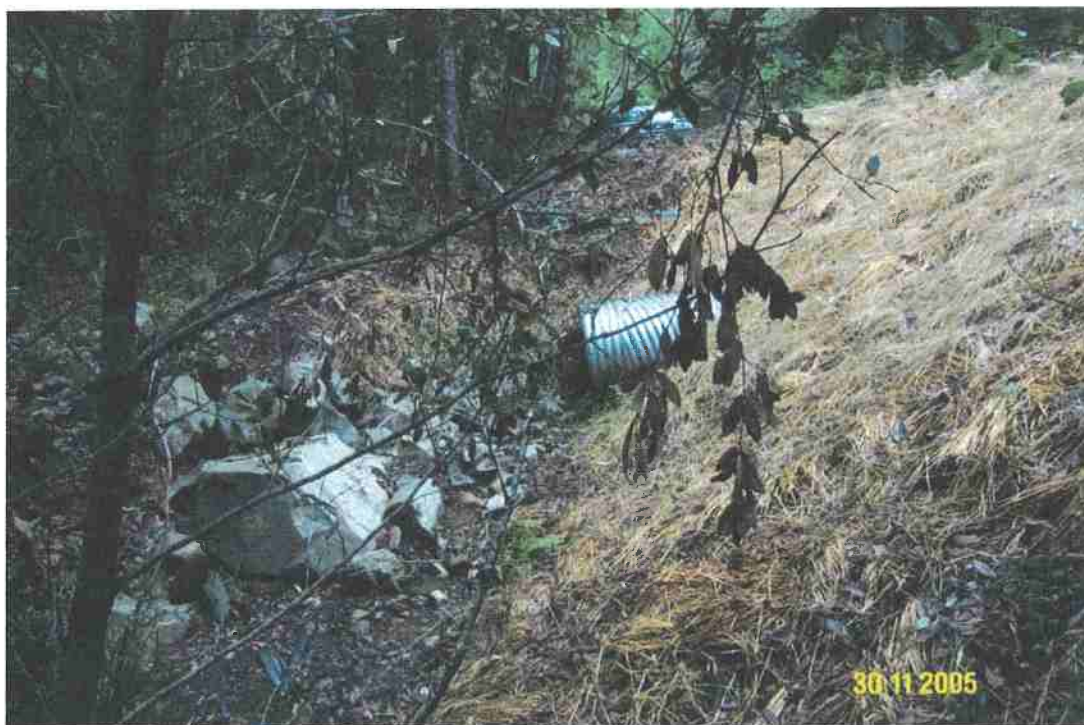


Figure 7b. Site #85, Upper Reed Mountain Road, after upgrade. This picture was taken from the same location as above. A properly sized, 30" diameter culvert, has been installed at the natural stream grade and stable fillslopes have been constructed. Due to the angle of the culvert, rock armor was installed below the outlet to serve as an energy dissipator.



Figure 8a. Site #89. Upper Reed Mountain Road, before upgrade. This picture taken from the right bank of the stream crossing below the road. A small 4" ditch relief culvert was plugged with sediment.



Figure 8b. Site #89. Upper Reed Mountain Road, after upgrade. This picture taken from the same location as above. An 18" ditch relief culvert was installed at the base of the fill.



Figure 9a. Site #94, Upper Reed Mountain Road, before upgrade. This picture was taken from the right bank downstream of the crossing. The culvert outlet is set high in the fill causing stream bank scour and a deep plunge pool below the outlet.



Figure 9b. Site #94, Upper Reed Mountain Road, after upgrade. This picture was taken from the same location as above. A 36" CMP has been placed at the natural grade (in dark area above ferns) and most of the outboard fillslope has been buttressed with rock armor. When fillslopes are reconstructed with greater than 2 to 1 slopes, an appropriate amount of coarse rock armor is required to construct a stable fill.



Figure 10a. Site #90. Upper Reed Mountain Road, before upgrade. This picture was taken from the right bank of the channel upstream of the culvert inlet. A stream channel with an undersized 12" culvert.



Figure 10b. Site #90. Upper Reed Mountain Road, after upgrade. This picture taken from the same place as above. The culvert has been replaced with a 24" culvert at the base of the fill.



Figure 11a. Site #22, South Reed Mountain Road, before upgrade. This picture was taken from the left bank downstream of the crossing. The 36" culvert is undersized and is too short, resulting in fillslope erosion.



Figure 11b. Site #22, South Reed Mountain Road, after upgrade. This picture was taken from the same location as above. A properly sized, 48" culvert, was installed at the natural stream channel gradient and the fillslope has been armored with rock armor.



Figure 12a. Site #25, South Reed Mountain Road, before upgrade. This picture was taken from the left bank downstream of the crossing. The 24" culvert is undersized and the outlet is high in the fill with several lengths of poorly installed half round downspout.



Figure 12b. Site #25, South Reed Mountain Road, after upgrade. This picture was taken from the same location as above. The properly sized, 42" culvert, has been installed at the natural stream channel gradient and the steep fillslope has been armored with rock armor. Note the outlet of the culvert at the base of the fill.



Figure 13a. Site #27, South Reed Mountain Road, before upgrade. This picture was taken from on the left bank downstream of the crossing. The 24" culvert is undersized and set high in the fill resulting in gullying below the outlet.



Figure 13b. Site #27, South Reed Mountain Road, after upgrade. This picture was taken from the same location as above. The properly sized, 36" culvert, has been installed at the natural stream channel gradient and the steep fillslope has been armored with rock armor.



Figure 14a. RD #111, South Reed Mountain Road, before upgrade. This picture was taken from the inboard ditch. The road was insloped with a minor berm along the outboard edge of the road.



Figure 14a. RD #111, South Reed Mountain Road, after upgrade. This picture taken from the same location as above. A rolling dip was installed to drain the road.



Figure 15a. Site #99 Grundman Road, before upgrade. This picture was taken from the right bank below the stream crossing. The 24" culvert was undersized, too short and set high in the fill.



Figure 15a. Site #99 Grundman Road, after upgrade. This picture was taken from the right bank below the stream crossing. A properly sized 30" culvert was installed to discharge at the base of the fill.

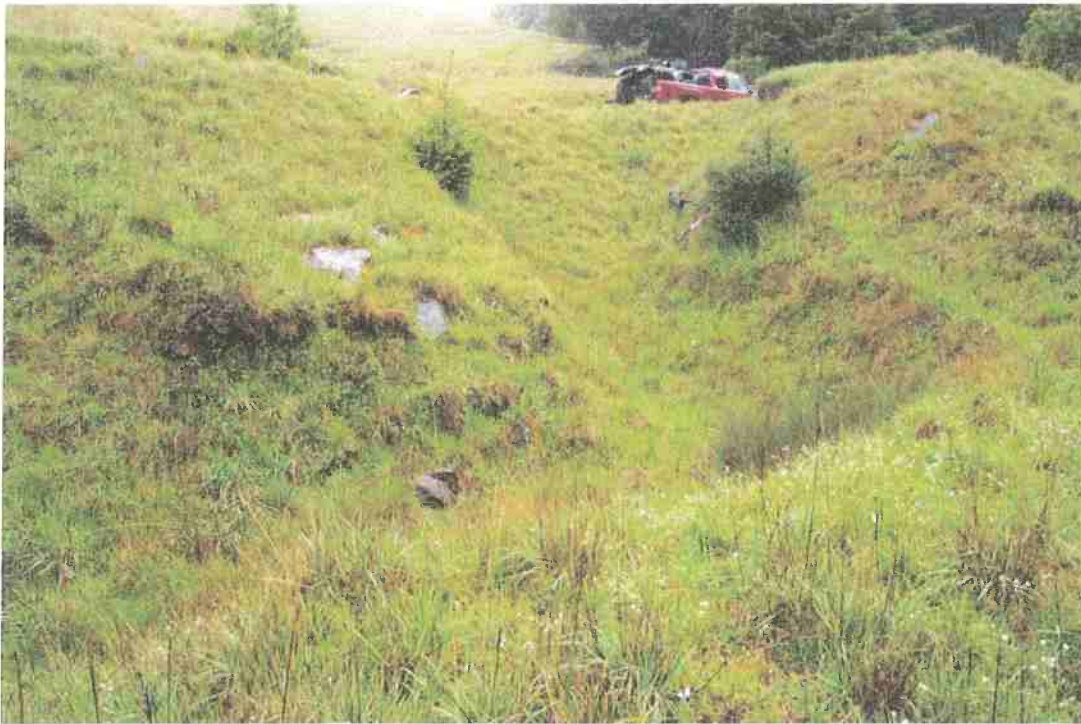


Figure 16a. site #100 Grundman Road, before upgrade. This picture was taken from the base of the fill from the right bank of the natural channel, below a diverted stream crossing.



Figure 16a. site #100 Grundman Road, after upgrade. This picture was taken from the same location as above. A properly sized 30" culvert was installed at the natural stream channel gradient.

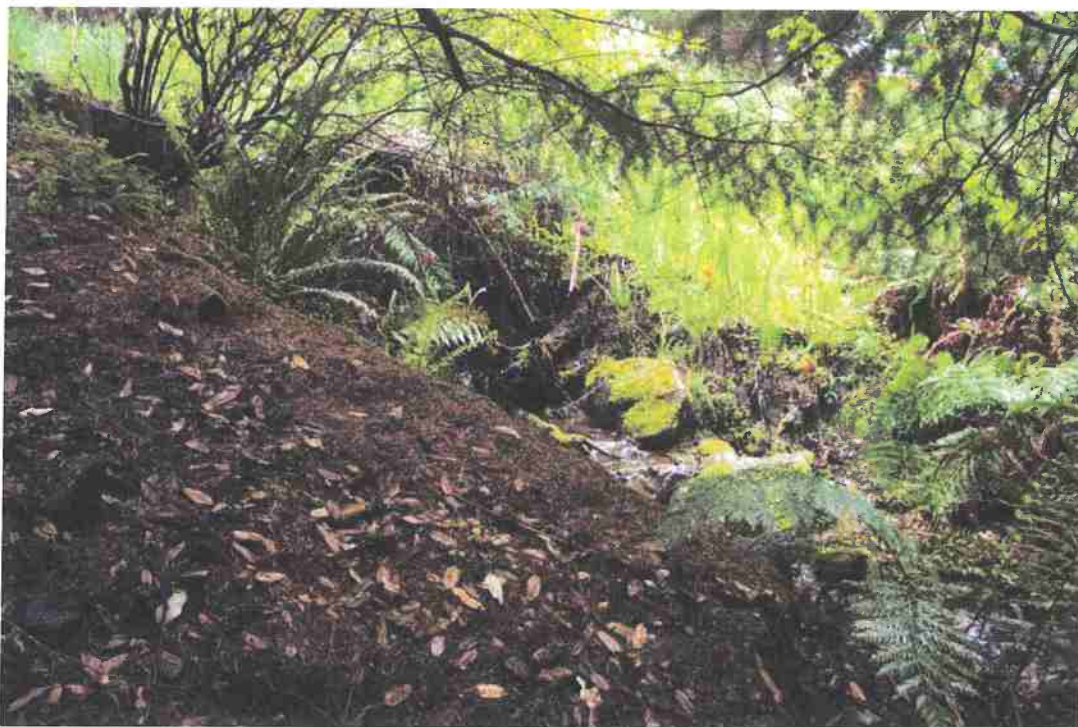


Figure 17a. site #103 Grundman Road, before upgrade. This picture was taken from the left bank below the outlet of the culvert. The 30" culvert was undersized and short in the fill with minor erosion occurring at the outlet.



Figure 17a. site #103 Grundman Road, after upgrade. This picture was taken from the same place as above. A properly sized 36" culvert was installed at the natural stream channel gradient with rock armor placed around the base of the fill slope.

Appendix E

Before and After Photographs on Compact Disc

**East Branch South Fork Eel River/Reed Mountain Watershed
Implementation Project,**

Humboldt County, California.