



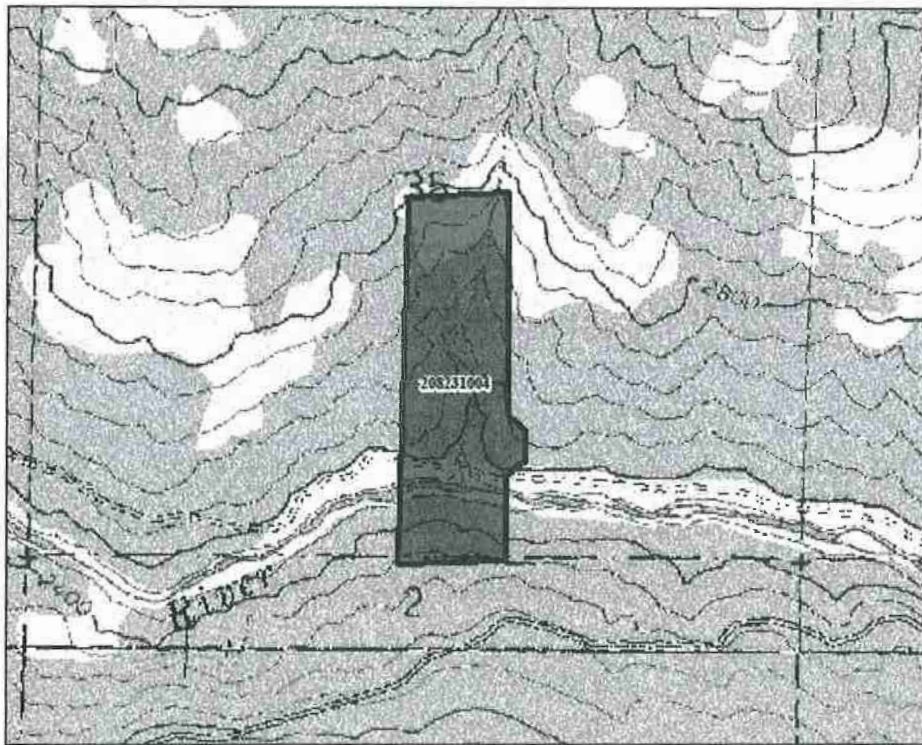
Water Resource Protection Plan (WRPP)

for

APN 208-231-004

Located at
640 River Road
Mad River, California

June 2018



Prepared for:

WD ID# 1B16499CHUM
PWA ID #180101020302-5120
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Water Resource Protection Plan (WRPP)
APN 208-231-004
640 River Road
Mad River, California

1.0 PROJECT SUMMARY

This report documents Pacific Watershed Associate's (PWA)¹ Water Resource Protection Plan (WRPP) for APN 208-231-004 located off River Road, Mad River, CA, as shown on Figure 1. This property is located in Humboldt County, CA approximately 2 miles west of the Humboldt/Trinity County line and an estimated 6 miles northwest of Mad River, in Trinity County CA, and is hereinafter is referred to as the "Project Site". Based on either site conditions and/or total cultivation area, this Project Site falls within **Tier 2** of the North Coast Regional Water Quality Control Board's (NCRWQCB) Order No. 2015-0023, Waiver of Waste Discharge and General Water Quality Certification for Discharges of Waste Resulting from Cannabis Cultivation and Associated Activities or Operations with Similar Environmental Effects ("Order"). Properties that fall into Tier 2 of the Order are required to develop a WRPP. Therefore, as required, this WRPP has been developed for you based on site inspections made by PWA on your property. PWA's recommendations for any remediation or corrective actions are a result of water quality requirements under the Order, including Best Management Practices (BMPs) designed to meet those requirements (Appendix A). This WRPP documents the findings of a site visit conducted on February 16, 2016 by PWA restoration specialist Chris Moore.

2.0 CERTIFICATIONS, LIMITATIONS AND CONDITIONS

This WRPP has been prepared by, and under the responsible charge of a California licensed geologist or certified professional in erosion and sediment control at PWA and all information herein, including treatment recommendations, are based on observations, data and information collected by PWA staff.

This WRPP has been prepared to: 1) describe the general conditions of the property at the time of our inspection; 2) summarize the site conditions and how they relate to the NCRWQCB twelve (12) Standard Conditions of the Order; 3) provide recommendations for remediation and/or correction of existing or potential water quality threats or impacts; and 4) recommend work to be conducted on this property to meet the 12 Standard Conditions of the Order. The analysis and recommendations submitted in this WRPP are based on PWA's evaluation of the Project Site and your activities which fall under the Order.

In this WRPP we have described the current conditions of the property and any water resource and water quality risk factors we observed at the time of our site inspection. PWA is not responsible for problems or issues we did not observe on our site inspection, or for changes that have naturally occurred or been made to the property after our site review. The interpretations and conclusions presented in this WRPP are based on a reconnaissance level site investigation of inherently limited scope. Observations are qualitative, or semi-quantitative, and confined to surface expressions of

¹ PWA is an approved Third Party Program for the North Coast Regional Water Quality Control Board's (NCRWQCB) Order No. 2015-0023, Waiver of Waste Discharge and General Water Quality Certification for Discharges of Waste Resulting from Cannabis Cultivation and Associated Activities or Operations with Similar Environmental Effects.

limited extent and artificial exposures of subsurface materials. Interpretations of problematic geologic, geomorphic or hydrologic features such as unstable hillslopes, erosional processes and water quality threats are based on the information available at the time of our inspection and on the nature and distribution of existing features we observed on the property.

We have also included recommendations for remediation and/or correction that are based on these observations. The recommendations included in this WRPP are professional opinions derived in accordance with current standards of professional practice, and are valid as of the date of field inspection. No other warranty, expressed or implied, is made. Furthermore, to ensure proper applicability to existing conditions, the information and recommendations contained in this report shall be regularly reevaluated and it is the responsibility of the landowner and/or lessee operating under the Order to ensure that no recommendations are inappropriately applied to conditions on the property that have changed since the recommendations were developed.

If site conditions have changed for any reason, the site should be reevaluated and the WRPP revised and updated as required. These conditions include any changes in land management activities or property conditions that have occurred since our site visit (regardless of what they are, how they occurred or who performed them). Similarly, if the landowner/lessee uses portions of this property not identified or covered under the current WRPP, this Water Resource Protection Plan will need to be updated with the new information, including possible additions or changes to the recommended remedial or corrective actions and BMPs (Appendix A).

If the property owner has enrolled their property under the Order, they are responsible for complying with all the requirements thereunder, regardless of who is operating or cultivating on that property. If the property is being formally or informally leased to an operator, and the lessee has enrolled under the Order, then the lessee is responsible for complying with the Order's requirements, including the WRPP and related recommendations and requirements. If the lease expires or the lessee is not otherwise available or does not respond to information requests by the NCRWQCB or PWA, then the landowner automatically assumes responsibility under the Order for the requirements therein and for all related penalties or actions brought by the NCRWQCB.

If at any time in the future the property is to transfer ownership, it is the responsibility of the current owner, or their representatives, to ensure that the information and recommendations contained herein are called to the attention of any future owner or agent for the property. Unless this WRPP is modified by the NCRWQCB, or another approved Third Party Program representative, the findings and recommendations contained in this WRPP shall be utilized as a tool while implementing the recommendations made within this WRPP. Necessary steps shall be taken to see that contractor(s) and subcontractor(s) carry out such recommendations in the field in accordance with the most current WRPP and BMP standards.

As a Third Party Program, PWA will be responsible for the data, interpretations and recommendations developed by PWA, but will not be responsible for the interpretation by others of that information, for implementation of corrective actions by others, or for additional or modified work arising out of those plans, interpretations and recommendations. PWA assumes no liability for the performance of other workers or suppliers while following PWA's recommendations in the WRPP, unless PWA is under contract to perform or oversee those activities. Additionally, PWA is not responsible for changes in applicable or appropriate standards

beyond our control, such as those arising from changes in legislation or regulations, or the broadening of knowledge which may invalidate or alter any of our findings or recommended actions.

Any WRPP plan review or construction management services that may be needed or identified in the recommendations sections of this report are separate tasks from the preparation of this WRPP, and are not a part of the contract under which this WRPP was prepared. If requested, additional PWA field inspections, surveys, WRPP revisions/updates, project layout, design, permitting, construction oversight/management, or other related services arising from tasks described and recommended in the WRPP may be performed under separate agreements requiring advance notice and contracting.

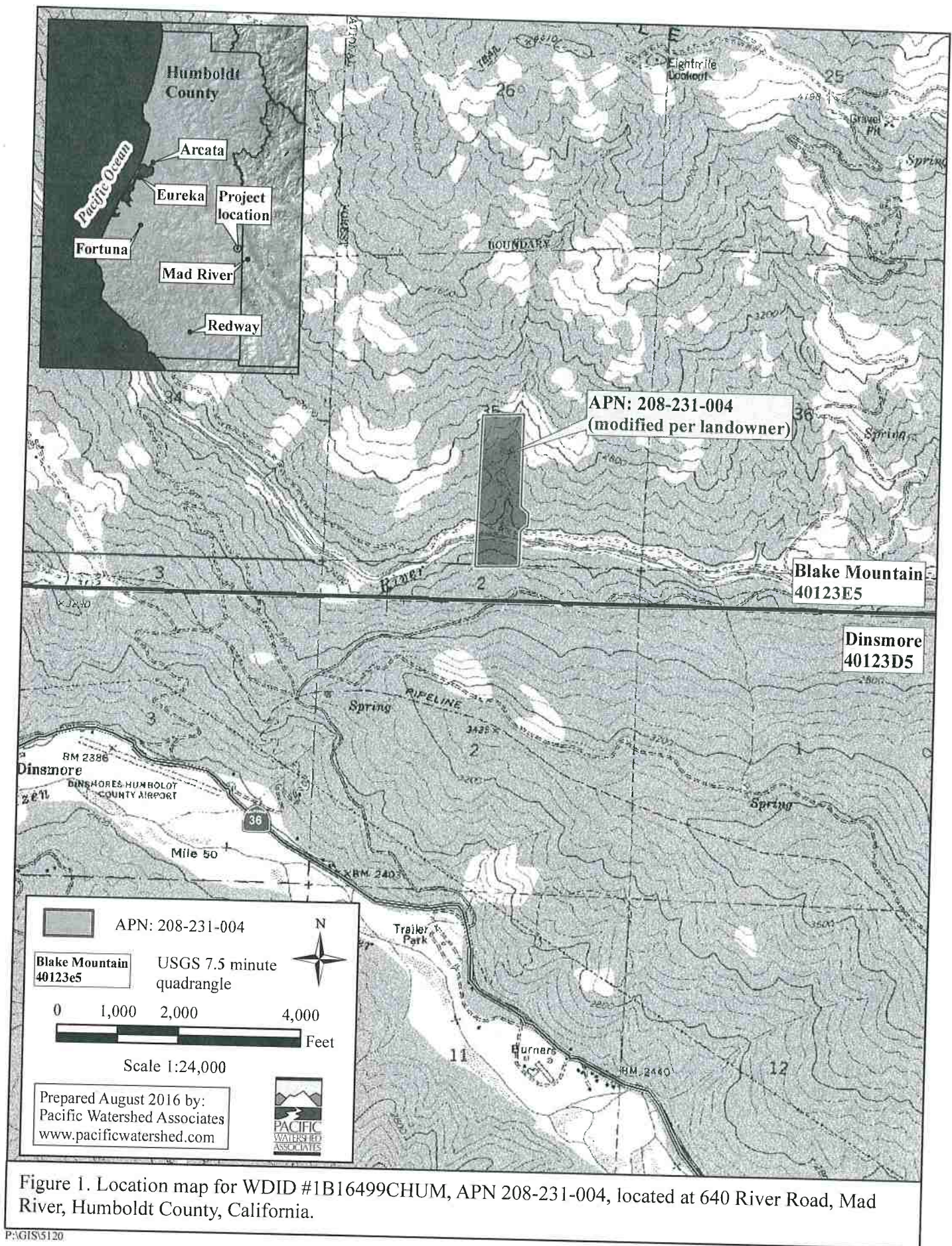
PWA's services consist of professional opinions and recommendations made in accordance with generally accepted principles and practices. No warranty, expressed or implied, or merchantability or fitness, is made or intended in connection with our work, by the proposal for consulting or other services, or by the furnishing of oral or written reports or findings. If the client desires assurances against project failures, they shall obtain appropriate insurance through their own insurance broker or guarantor.

This WRPP is considered a living document and shall be updated at least annually, or sooner if conditions have changed or land management actions have been undertaken after our site inspection. As an official part of the Waiver Program, this WRPP (including all its text, appendices, maps and photos) shall remain onsite and available for NCRWQCB staff to inspect and review upon request.

Prepared by:



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3.0 INTRODUCTION

This Water Resources Protection Plan (WRPP) summarizes the results of Pacific Watershed Associate's (PWA) site visit and subsequent analysis and documentation of site conditions on APN 208-231-004 located at 640 River Road, Mad River, California, as shown on Figure 1 and hereinafter referred to as the "Project Site." The WRPP describes and addresses the required elements and compliance with the 12 Standard Conditions established by the North Coast Regional Water Quality Control Board's (NCRWQCB) Order No. 2015-0023 to protect water quality from cannabis cultivation and related activities (Order). PWA has identified certain areas where the Project Site does not fully meet all 12 of the Standard Conditions of the Order. Section 4, below, identifies and discusses each of the 12 Standard Conditions as related to your property with regard to compliance with the NCRWQCB's Order.

The WRPP contains the following required sections:

1. Legible map (Figure 2) depicting the required site elements and features associated with the 12 Standard Conditions of the Order;
2. Description of current site conditions, compliance with the 12 Standard Conditions, and prioritized remediation or corrective actions needed to bring the site into compliance with the requirements of the Order;
3. A monitoring and inspection plan to ensure BMPs used to protect and prevent impacts to water quality are being implemented as recommended by PWA (implementation monitoring), and that they are effective (effectiveness monitoring);
4. A water use plan, including water sources, water use and storage rights documentation, monthly water use documentation (quantity), and water conservation measures that are employed to prevent adverse impacts to water quality and water quantity in the watershed;
5. List of fertilizers and chemicals stored and used onsite, including a log of the frequency and quantity of these materials used.

4.0 STANDARD CONDITIONS CHECKLIST FOR APN 208-231-004 as of 02/16/2016

The NCRWQCB has developed a set of 12 Standard Conditions that shall be followed and implemented to protect and improve water quality as required under the NCRWQCB's Order. For a property to become compliant with the Order, all 12 Standard Conditions must be fully satisfied.

The following section details the specific requirements listed and described in the Order for each of the 12 Standard Conditions. Each Standard Condition has from one to six sub-requirements (*listed in italic type*), each of which must be satisfied to protect water quality and comply with the Order. The checklist developed by PWA for your property indicates: 1) whether the Standard Condition or Standard Condition sub-requirement was adequately met as of the date of PWA's field inspection, 2) PWA's observations and comments related to the Standard Condition or Standard Condition sub-requirement, 3) whether a relevant photo has been taken and included in the WRPP, and 4) recommended corrective or remedial actions that need additional work to meet the requirements of the Order.

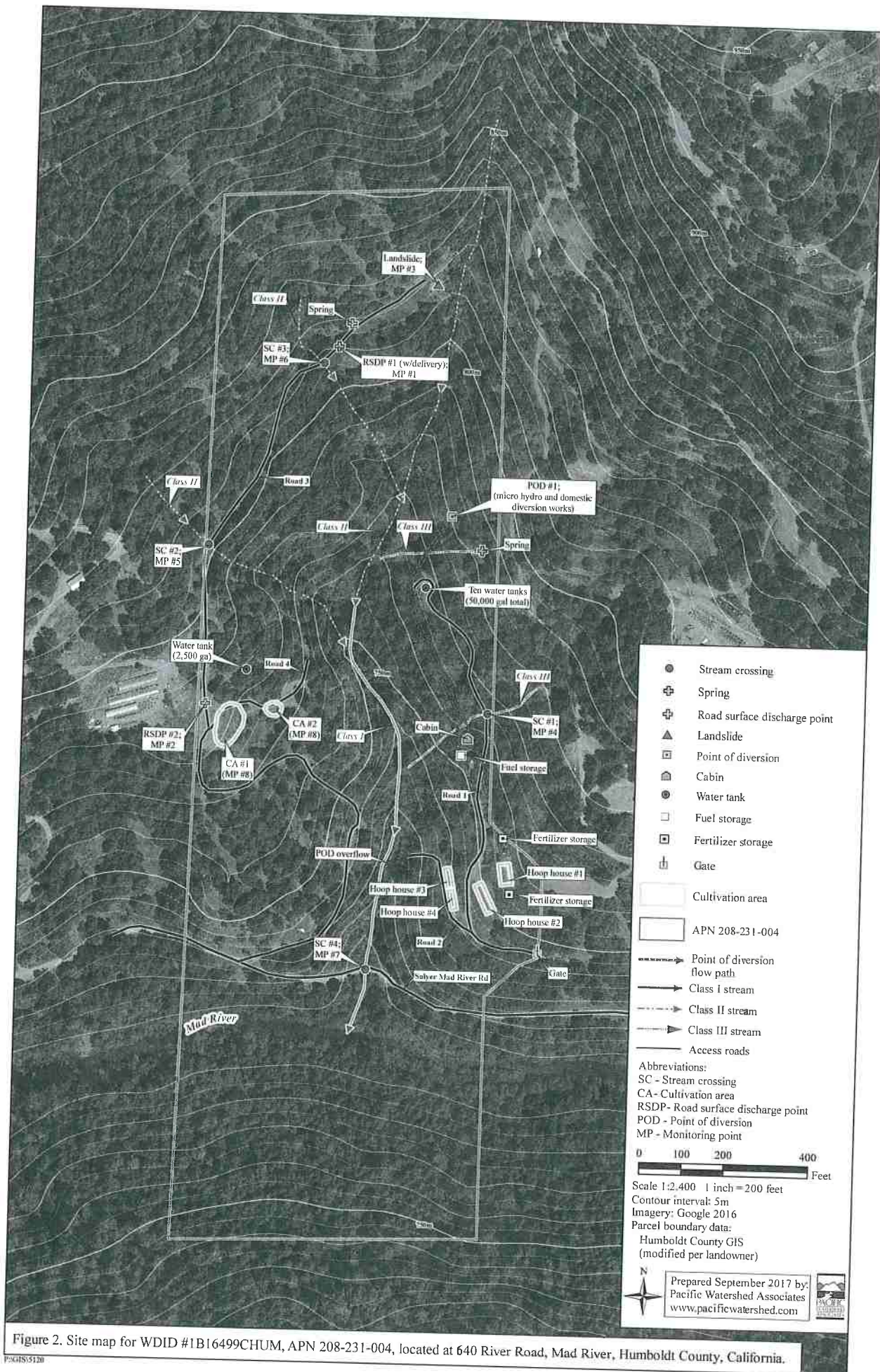


Figure 2. Site map for WDID #1B16499CHUM, APN 208-231-004, located at 640 River Road, Mad River, Humboldt County, California.

In Section 5 of this WRPP, PWA has provided a summary prioritized list (Table 1) of the recommended treatments and actions to be implemented by you to meet the requirements of the Order. PWA will consult with you to review the WRPP document and findings, and to set a preliminary schedule for implementation of the recommended measures for achieving compliance with the Order. Please note that some of the PWA recommended actions are based on regulatory requirements and deadlines, while others can be scheduled to fit the needs of both you and your property.

4.1 Standard Condition #1. Site Maintenance, Erosion Control and Drainage Features

- a) *Roads shall 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 surface waters.*

Meets condition? No

Observations/Comments: Approximately 0.92 miles of road were inspected on the Project Site, including 0.14 miles of the county-maintained Salyer Mad River Road. Roads within the Project Site lack sufficient drainage structures to effectively disperse flow and minimize hydrologic connectivity. Road Surface Discharge Point (RSDP) #1: with delivery, located on Road 3, drains excessive road surface runoff initiating from a cutbank spring, and delivers directly into the Class II watercourse below Stream Crossing #3.

Photos: Photos 1 and 2; MP #1

Corrective or remedial actions needed: Disperse concentrated road runoff through the addition of rolling dips, ditch relief culverts (DRCs) and/or road shaping changes. Additionally, it is suggested that a rock armored dip or ditch relief culvert be installed at the cutbank spring located up road from RSDP #1 to minimize road runoff and delivery to receiving waters below. See Appendix H for typical drawings describing road drainage feature construction.

- b) *Roads, driveways, trails, and other defined corridors for foot or vehicle traffic of any kind shall have adequate ditch relief drains or rolling dips and/or other measures to prevent or minimize erosion along the flow paths and at their respective outlets.*

Meets condition? No

Observations: There are several locations where the non-dispersed surface flows have become concentrated runoff as evidenced by active ruts and gullies on all the surveyed Roads. For example, RSDP #2 (non-delivery) located on Road 3, includes a gully that extends along the road past Cultivation Area (CA) #1, and then continues onto Road 4 past CA #2. This road drainage problem appears to include a significant contribution from, if not being the primary point of origin, the adjacent parcel located upslope and their cultivation related activities (see the arrow in Photo 3). This concentrated flow continues along Road 4 and exits onto a naturally vegetated hillslope with little or no sediment delivery to surface waters. These gullies, typify the lack of road drainage features and/or deferred maintenance issues observed on this property.

Photos: Photos 3-6; MP #2

Corrective or remedial actions needed: See Standard Condition 4.1a corrective actions, above.

- c) *Roads and other features shall be maintained so that surface runoff drains away from potentially unstable slopes or earthen fills. Where road runoff cannot be drained away from an unstable feature, an engineered structure or system shall be installed to ensure that surface flows will not cause slope failure.*

Meets condition? No

Observations/Comments: A landslide feature (MP#3) located on a legacy landing at the end of Road 3 has delivered sediment to a Class II watercourse. It appears that the stream is still undercutting the base of the legacy road fillslope and there is a potential for further destabilization and sediment delivery.

Photos: Photo 7; MP #3

Corrective or remedial actions needed: Consult with a professional geologist or engineer for recommendations and restoration treatments concerning landslide mitigation (MP #3). It is likely that the landing should be decommissioned by removing (excavating) any over steepened fill from above the unstable fillslope and landslide feature.

- d) *Roads, clearings, fill prisms, and terraced areas (cleared/developed areas with the potential for sediment erosion and transport) shall be maintained so that they are hydrologically disconnected, as feasible, from surface waters, including wetlands, ephemeral, intermittent and perennial streams.*

Meets condition? No

Observations: See Standard Condition 4.1a, 4.1b, and 4.1c observations, above.

Photos: Photos 1-7; MP #1-3

Corrective or remedial actions needed: See Standard Condition 4.1a, 4.1b, and 4.1c corrective actions, above.

- e) *Ditch relief drains, rolling dip outlets, and road pad or terrace surfaces shall be maintained to promote infiltration/dispersal of outflows and have no apparent erosion or evidence of soil transport to receiving waters.*

Meets condition? No

Observations/Comments: See Standard Condition 4.1a, 4.1b, and 4.1c observations, above.

Photos: Photos 1-7; MP #1-3

Corrective or remedial actions needed: See Standard Condition 4.1a, 4.1b, and 4.1c corrective actions, above.

- f) *Stockpiled construction materials are stored in a location and manner so as to prevent their transport to receiving waters.*

Meets condition? Yes

Observations/Comments: No construction materials were observed on the Project Site during the initial inspection.

Photos: None

Corrective or remedial actions needed: None

4.2 Standard Condition #2. Stream Crossing Maintenance

- a) *Culverts and stream crossings shall be sized to pass the expected 100-year peak streamflow.*

Meets condition? No

Observations/Comments: Four stream crossings were identified on the Project Site during our reconnaissance investigation, including: 1) a 12-inch culvert on a Class III watercourse (SC #1) with a 2-foot wide by 6-inch deep channel that is potentially sourced from a pond spillway on a neighboring parcel, 2) an unculverted fill crossing on a Class II watercourse (SC #2) that is washed out with an old culvert remaining within the fill, 3) an unculverted fill crossing on a Class III watercourse (SC #3) that has washed out, and 4) a culverted crossing located at a Class I watercourse on Salyer Mad River Road. There appears to have been another stream crossing, which has undoubtedly washed out, where the road crossed the Class II stream just upstream from the landslide. The section of the Humboldt County-maintained Salyer Mad River Road that traverses the Project Site was not assessed as part of inspection because maintenance of this road is not the responsibility of the landowner.

Photos: Photos 8-9; MP #4-7

Corrective or remedial actions needed: Culverts sizes for SC #1, SC #2, and SC #3 were calculated for the 100-year design storm flow using the Rational Method. All three culverts are undersized. SC #1 requires a 30" culvert, and SC #2 and SC #3 require 48" culverts. All upgraded culverts should be installed at the base of fill and aligned with the natural channel. Finally, periodically monitor SC #4 for potential erosion problems, culvert plugging, and threats to water quality. Any problems should be reported to Humboldt County Department of Public Works for future maintenance. Inspect the probable legacy stream crossing upstream from the landslide to determine if it existed and if there is continuing erosion. If found, the crossing should be inspected by a geologist at the same time the landside is reviewed and any needed treatment can then be prescribed.

- b) *Culverts and stream crossings shall be designed and maintained to address debris associated with the expected 100-year peak streamflow.*

Meets condition? No

Observations/Comments: See Standard Condition 4.2.a observations, above.

Photos: Photos 8-9; MP #4-6

Corrective or remedial actions needed: See Standard Condition 4.2.a corrective actions, above.

- c) *Culverts and stream crossings shall allow passage of all life stages of fish on fish-bearing or restorable streams, and allow passage of aquatic organisms on perennial or intermittent streams.*

Meets condition? No

Observations/Comments: Partially washed out stream crossings SC #2 and SC #3 are steeply gullied and do not allow for passage of aquatic organisms.

Photos: Photos 8-9; MP #5-6

Corrective or remedial actions needed: All upgraded culverts will be designed and installed to allow for aquatic organism passage by installing the new culverts at the

base of the fill and in line with the natural stream channel. SC #4 should be inspected by Humboldt County Public Works to determine whether the crossing is adequate for fish passage.

- d) *Stream crossings shall be maintained so as to prevent or minimize erosion from exposed surfaces adjacent to, and in the channel and on the banks.*

Meets condition? No

Observations/Comments: Stream crossings SC #2 and SC #3 are partially washed out, and if not treated, will continue to erode and deliver sediment to streams.

Photos: Photos 8-9; MP #5-6

Corrective or remedial actions needed: See Standard Condition 4.2a corrective actions, above.

- e) *Culverts shall align with the stream grade and natural stream channel at the inlet and outlet where feasible.*

Meets condition? No

Observations/Comments: See Standard Condition 4.2.a observations, above.

Photos: Photos 8-9; MP #5-6

Corrective or remedial actions needed: When rebuilding stream crossings, ensure they are installed in-line and at grade with the natural channel and utilize critical dips, when necessary, to prevent diversion if the culvert plugs with debris and the fill is overtopped with flood flow.

- f) *Stream crossings shall be maintained so as to prevent stream diversion in the event that the culvert/crossing is plugged, and critical dips shall be employed with all crossing installations where feasible.*

Meets condition? No

Observations/Comments: Three stream crossings (SC #1, SC #2, and SC #3) exhibit diversion potential.

Photos: None

Corrective or remedial actions needed: After new properly sized culverts have been installed, install one critical dip on (1) the left hingeline of SC #1 and (2) on the right hingelines of SC #2 and SC #3 to eliminate the potential of diversion if the culvert plugs and overtops.

Standard Condition #2. - General comments and recommendations: Obtain all necessary agreements and permits prior to commencing work in any watercourse or at any stream crossing. These may include, but not be limited to: California Department of Fish and Wildlife (CDFW) Lake and Streambed Alteration Agreement (LSAA) 1602, State Water Resources Control Board (SWRCB) 401 Certification, and Army Corps of Engineers (ACOE) 404 Permit.

4.3 Standard Condition #3. Riparian and Wetland Protection and Management

- a) *For Tier 1 Dischargers, cultivation areas or associated facilities shall not be located within 200 feet of surface waters. While 200 foot buffers are preferred for Tier 2 sites, at a*

minimum, cultivation areas and associated facilities shall not be located or occur within 100 feet of any Class 1 or 2 watercourse or within 50 feet of any Class 3 water course or wetlands.

Meets condition? Yes

Observations/Comments: All cultivation areas and associated facilities are located more than 100 feet from Class I, II, and III watercourses.

Photos: None

Corrective or remedial actions needed: None

- b) *Buffers shall be maintained at natural slope with native vegetation.*

Meets condition? Yes

Observations/Comments: See general comments below.

Photos: None.

Corrective or remedial actions needed: None.

- c) *Buffers shall be of sufficient width to filter wastes from runoff discharging from production lands and associated facilities to all wetlands, streams, drainage ditches, or other conveyances.*

Meets condition? Yes.

Observations/Comments: See general comments below.

Photos: None

Corrective or remedial actions needed: None

- d) *Riparian and wetland areas shall be protected in a manner that maintains their essential functions, including temperature and microclimate control, filtration of sediment and other pollutants, nutrient cycling, woody debris recruitment, groundwater recharge, streambank stabilization, and flood peak attenuation and flood water storage.*

Meets condition? Yes

Observations/Comments: See general comments below.

Photos: None

Corrective or remedial actions needed: None

Standard Condition #3. - General comments and recommendations: Based on field observations, it is PWA's opinion that the Project Site is currently compliant with this condition as all cultivation areas and associated facilities are outside of riparian buffer zones.

4.4 Standard Condition #4. Spoils Management

- a) *Spoils shall not be stored or placed in or where they can enter any surface water.*

Meets condition? Yes

Observations/Comments: See general comment below.

Photos: None

Corrective or remedial actions needed: None

- b) *Spoils shall be adequately contained or stabilized to prevent sediment delivery to surface waters.*

Meets condition? Yes

Observations/Comments: See general comment below.

Photos: None

Corrective or remedial actions needed: None

- c) *Spoils generated through development or maintenance of roads, driveways, earthen fill pads, or other cleared or filled areas shall not be sidecast in any location where they can enter or be transported to surface waters.*

Meets condition? Yes

Observations/Comments: See general comment below.

Photos: None

Corrective or remedial actions needed: None

Standard Condition #4 - General comments and recommendations: Based on field observations it is PWA's opinion that the Project Site is currently compliant with this condition as there were no spoils observed during the Project Site inspection. However, stockpiled soil was observed but it was properly covered with a functional tarp. It is recommended that a straw wattle be installed around the soil stockpile for perimeter control purposes.

4.5 Standard Condition #5. Water Storage and Use

- a) *Size and scope of an operation shall be such that the amount of water used shall not adversely impact water quality and/or beneficial uses, including and in consideration with other water use operations, instream flow requirements and/or needs in the watershed, defined at the scale of a HUC 12 watershed or at a smaller hydrologic watershed as determined necessary by the Regional Water Board Executive Officer.*

Meets condition? Unknown

Observations/Comments: The primary water source at the Project Site is a spring (POD#1) located near a Class III watercourse, which gravity feeds flow directly to a micro-hydroelectric system and to storage. The diversion works for the micro-hydroelectric system and domestic water supply include waterlines traversing the property for approximately two miles; the hydro-line terminating in an overflow delivering into a Class I watercourse and the domestic line terminating at a place of use which is reportedly to be domestic. Current water storage equals 52,500 gallons in rigid water tanks. A Preliminary Water Budget has been prepared for the Project Site based on the current total cultivation area and existing water storage at the time of the field inspection, and an estimated water usage of 10 gallon/ft²/year for the cultivation area (per comm. Humboldt County Planning and Building Department) during the forbearance period from May 15 to October 31. The Project Site contains 16,500 ft² of cultivation area, 52,500 gallons of water storage, and a calculated volume of 165,000 gallons of irrigation water necessary to forebear (not divert) during the dry season. Based on these estimates, there is not enough water storage for your cultivation needs

during the dry season forbearance period. Water monitoring will provide you with a more refined water use and water storage estimate for your Project Site.

Photos: None

Corrective or remedial actions needed: Install water meters and automatic shut-off valves on both the supply lines delivering water to the micro-hydro and for domestic uses. The point of diversion, micro-hydro, and overflow delivering into the Class I watercourse will require inclusion in the LSAA for the project and this property; as per this Order and the Division of Water Rights. A Water Budget should be developed and further refined by water monitoring to determine how much additional water storage volumes are needed on the Project Site for cultivation and other uses during low flow periods from May 15 through October 31. Based on the storage on-site at the time of our site inspection, the preliminary water budget suggests approximately 112,500 gallons of additional water storage may be required; water use monitoring will be required to refine this number. A Water Monitoring Plan will also need to be implemented (see comments below). Under the Order, you are required to measure, document and report the water you divert, store and use throughout the year. PWA has created a simple log sheet to help you monitor this water data for your Project Site (Appendix D). This water data will help you refine the water budget and water storage requirements, and is required to be reported annually to the NCRWQCB no later than March 31 for the preceding calendar year, and similarly to the State Water Resources Control Board, Division of Water Rights, by June 30.

- b) *Water conservation measures shall be implemented. Examples include use of rainwater catchment systems or watering plants with a drip irrigation system rather than with a hose or sprinkler system.*

Meets condition? Yes

Observations/Comments: Several water conserving strategies are currently being implemented, these include: 1) drip irrigation; 2) controlled hand watering in geo-pots and beds; 3) the use of compost and mulch fertilizer to improve soil structure, increasing its water-holding capacity; and 4) the use of soil mediums that retain moisture and therefore limit the frequency of irrigation.

Photos: None

Corrective or remedial actions needed: Continue to employ current conservation techniques. In addition, evaluate and employ: 1) top mulching; 2) incorporating native soils and compost into the planting mix to retain water; 3) capturing and storing rainwater (to reduce diversion); 4) planting in-ground and not in above-ground pots; 5) irrigation scheduling; and 6) the use of cover crops during rotations and winter, to protect and increase soil fertility. Begin quantifying water use so you can evaluate each of the conservation techniques. Other water conservation measures should continue to be investigated and employed in order to most effectively maximize water use efficiency and minimize or eliminate summer diversions, including additional water storage (a rainwater-fed off-stream pond or more tanks) and rainwater harvesting that will allow you to forbear in the dry summer months (see 4.5a, above).

- c) *For Tier 2 Dischargers, if possible, develop off-stream storage facilities to minimize surface water diversion during low flow periods.*

Meets condition? No

Observations/Comments: At the time of the site inspection, PWA staff identified 11 rigid water tanks yielding approximately 52,500 gallons of water storage that is utilized for irrigation.

Photos: None

Corrective or remedial actions needed: Refine the preliminary water budget to determine overall water needs for irrigation uses during the dry season. Add rainwater-fed water storage, including an off-stream pond and/or additional rigid water tanks, to meet your forbearance requirements.

- d) *Water is applied using no more than agronomic rates.*

Meets condition? Unknown

Observations/Comments: According to the cultivator, water is applied sparingly, though application was not observed due to the early inspection date.

Photos: None

Corrective or remedial actions needed: To verify compliance with this Standard Condition, start measuring and recording your water usage using flow meters on a per plant basis, based on type and size of plant pot, full term versus short season (light deprivation) plant, and type of irrigation. Observe and monitor soil moisture so watering, fertilizer and chemical applications are made only when necessary and overwatering and excess infiltration is avoided. This data will help you refine a Water Budget for your operation and determine agronomic rates of watering.

- e) *Diversion and/or storage of water from a stream should be conducted pursuant to a valid water right and in compliance with reporting requirements under Water Code section 5101.*

Meets condition? No

Observations/Comments: The source of water on this property is a jurisdictional spring. The cultivator has filed an Initial Statement of Diversion and Use for the spring with the State Water Resource Control Board, Division of Water Rights, for the purpose of irrigating cannabis as of June 23, 2017.

Photos: None

Corrective or remedial actions needed: Water diversion and water storage requires valid water rights documentation. As opposed to employing one or more surface water diversions and securing various water rights, consider obtaining irrigation water for your agricultural needs by developing rainwater capture systems to fill rigid water tanks and/or one or more off-stream, rainwater-fed ponds, or drilling a well.

Domestic water rights: If you plan on storing water diverted from the spring for over 30 days for your domestic water needs, you will need to file, obtain, and maintain water rights for your parcel. Storing domestic water for over 30 days that is sourced from surface waters, such as your spring, requires a Small Domestic Use (SDU) Appropriation, which covers domestic uses such as drinking, bathing, cooking, and fire control. This type of water right cannot be used for commercial crop irrigation. Appropriate domestic water rights applications to be filed with the State Water Resources Control Board (SWRCB) include:

- Small Domestic Use (SDU) Appropriation Registration

http://www.waterboards.ca.gov/waterrights/publications_forms/forms/docs/sdu_registration.pdf

Agricultural water rights: If you plan to continue flow diversions for your agricultural water needs, you need to file and obtain water rights for your parcel. The State Water Resources Control Board, Division of Water Rights (SWRCB, DWR) has developed a Small Irrigation Use (SIUR) water right registration program specific for water storage needs for commercial cannabis cultivation forbearance requirements. PWA recommends that you apply for this Small Irrigation Use water right for cannabis cultivators:

https://www.waterboards.ca.gov/water_issues/programs/cannabis/cannabis_water_rights.shtml

There is an online application portal for this program located at:
<https://public2.waterboards.ca.gov/cgo>

Water Use Reporting: Submit annual water diversion and use volumes to the NCRWQCB by each March 31 for the preceding calendar year, and to the State Water Resources Control Board, Department of Water Rights (SWRCB, DWR) for supplemental reporting required for the Annual Statement of Diversion and Use (ISDU) by June 30 of each year. Annual reporting for additional water right permitting as recommended and presented above (SDU and SIUR) will be April 1st of the following year of submitting the registration applications.

Fish and Wildlife impacts: While not a true water right, if you are directly diverting water from a jurisdictional spring or stream, pumping water from a well, or capturing surface water in a pond, you will need to obtain a consultation with California Department of Fish and Wildlife (CDFW) staff to determine if you are required to file a CDFW Lake and Streambed Alteration Agreement (LSAA). The agreement will be needed to cover your spring diversion to include the hydro and distribution lines, and overflow/discharge locations, the three stream crossing upgrades (SC #1, SC#2, and SC #3), and the landslide (MP #3) on the Project Site. SC #4 is located on the Salyer Mad River Road and is the responsibility of Humboldt County Public Works.

Lake and Streambed Alteration Agreement (LSAA).
<https://www.wildlife.ca.gov/Conservation/LSA>

- f) *Water storage features, such as ponds, tanks, and other vessels shall be selected, sited, designed, and maintained so as to insure integrity and to prevent release into waters of the state in the event of a containment failure.*

Meets condition? Yes

Observations/Comments: The eleven water tanks are located on stable slopes and located outside of the required stream buffers (50 feet for Class III streams and 100 feet for Class I and II streams) making it unlikely that water storage structure failures will result in delivery of runoff and eroded sediment to the stream network.

Photos: None

Corrective or remedial actions needed: None

Standard Condition #5 - General comments and recommendations: In addition to the corrective actions listed above, PWA highly recommends, and state agencies may require, that you install flow meters on your surface water diversions, water tanks, and/or on your distribution lines, to accurately document the timing and volume of your water diversion and use. You will need to accurately document the amount of water that is diverted from the spring and water used for irrigation, domestic uses and for other purposes. PWA has created a simple log sheet to help you monitor your water usage (see Appendix D).

4.6 Standard Condition #6. Irrigation Runoff

- a) *Implementing water conservation measures, irrigating at agronomic rates, applying fertilizers at agronomic rates and applying chemicals according to the label specifications, and maintaining stable soil and growth media should serve to minimize the amount of runoff and the concentration of chemicals in that water. In the event that irrigation runoff occurs, measures shall be in place to treat/control/contain the runoff to minimize the pollutant loads in the discharge. Irrigation runoff shall be managed so that any entrained constituents, such as fertilizers, fine sediment and suspended organic particles, and other oxygen consuming materials are not discharged to nearby watercourses. Management practices include, but are not limited to, modifications to irrigation systems that reuse tailwater by constructing off-stream retention basins, and active (pumping) and or passive (gravity) tailwater recapture/redistribution systems. Care shall be taken to ensure that irrigation tailwater is not discharged towards or impounded over unstable features or landslides.*

Meets condition? Yes

Observations/Comments: No evidence of irrigation runoff was observed on the Project Site. With the closest stream located more than 100 feet away from all cultivation areas, any runoff that theoretically might flow off the Project Site could not travel far due to the low gradient topography and adequate vegetative buffer.

Photos: None

Corrective or remedial actions needed: None

Standard Condition #6 - General comments and recommendations: According to the Order, irrigation and fertilization shall occur at agronomic rates and chemicals shall be applied according to the label instructions and specifications. Agronomic rates are those rates of application of water, fertilizers and other amendments that are sufficient for utilization by the crop being grown, but not at a rate that would result in surface runoff or infiltration below the root zone of the crop being grown.

In the event that irrigation runoff occurs or could occur, you shall ensure that contaminated runoff does not enter nearby watercourses. This can be accomplished by constructing or designing containment measures, including sediment basins, berms, infiltration ditches and/or other Best Management Practices (BMPs), as needed, to contain and control surface runoff (see Appendix A).

4.7 Standard Condition #7. Fertilizers and Soil Amendments

- a) *Fertilizers, potting soils, compost, and other soils and soil amendments shall be stored in locations and in a manner in which they cannot enter or be transported into surface waters and such that nutrients or other pollutants cannot be leached into groundwater.*

Meets condition? Yes

Observations/Comments: All fertilizers and amendments are stored inside two covered sheds.

Photos: None

Corrective or remedial actions needed: If the landowner wishes to keep fertilizers and soil amendments on the Project Site, they should continue to be stored fully under cover, off the ground, and in a stable location not exposed to the elements. If stored outdoors, they should be fully tarped in a stable location with no chance of nutrient leaching or delivery to surface waters. PWA recommends liquid fertilizers, amendments and other chemicals be stored under cover, off the ground and with adequate secondary containment. Fertilizers, potting soils, compost, and other soils and soil amendments should not be stored with petroleum products as they may be incompatible and could potentially react (see Appendix G for more information).

- b) *Fertilizers and soil amendments shall be applied and used per packaging instructions and/or at proper agronomic rates.*

Meets condition? Unknown

Observations/Comments: Based on verbal communication with the cultivator, the recommended application rates are being followed.

Photos: None

Corrective or remedial actions needed: To confirm compliance with this Standard Condition, you are required to keep detailed records of the type, timing, and volume of fertilizers and/or other soil amendments you use in your operations. They can be recorded on log sheets such as those provided in Appendix E or by using another accurate record keeping method. Observe and monitor soil moisture so watering, fertilizer and chemical applications are made only when necessary and overwatering and excess infiltration is avoided. Also see general comments and recommendations below.

- c) *Cultivation areas shall be maintained so as to prevent nutrients from leaving the site during the growing season and post-harvest.*

Meets condition? No

Observations/Comments: Planting beds, pots and beds are left uncovered over the winter and the used soil is subject to nutrient leaching during the wet season.

Photos Photo 10; MP #8

Corrective or remedial actions needed: To prevent nutrient leaching from cultivation areas, either: 1) plant dense cover crops in spent pots, holes and beds to enrich soil and lock up nutrients; 2) fully tarp any exposed soils and growing mediums in beds, pots, holes or piles; or 3) move spent soils and amendments inside or under cover to temporarily store them during the wet season (November 1 – May 15). If dense cover crops cannot be kept alive due to snow or freezing conditions, all pots, holes, and

planted areas should be tarped to protect them from rainfall, snowmelt and subsequent infiltration and leaching of nutrients.

Winterize all cultivation areas and all disturbed areas on the Project Site by placing straw wattles on the downslope perimeter or by mulching/seeding any bare surface areas on cultivation sites.

Standard Condition #7 - General comments and recommendations: All soil, nutrients, and amendments must be stored in an appropriate fashion such that they will not leach or be transported into the waters of the State, especially during the wet season. Keep soil piles in stable locations, plant cover crops or (preferably) cover with tarps to prevent runoff, leaching and delivery to surface water or ground water. Store liquid fertilizers, nutrients, amendments and other chemicals indoors or in a covered area, off the ground, with sufficient secondary containment.

PWA recommends you compost organic plant wastes so the material can be reused in future years. If you plan to burn the plant stalks, you will first need to obtain burn permits from CAL FIRE and the North Coast Unified Air Quality Management District (or relevant jurisdiction for your area). You can then, incorporate the ash into the pots or planting holes prior to planting the cover crop to add minerals and recycle the ash.

4.8 Standard Condition #8. Pesticides/Herbicides

- a) *At the present time, there are no pesticides or herbicides registered specifically for use directly on cannabis and the use of pesticides on cannabis plants has not been reviewed for safety, human health effects, or environmental impacts. Under California law, the only pesticide products not illegal to use on cannabis are those that contain an active ingredient that is exempt from residue tolerance requirements and either registered and labeled for a broad enough use to include use on cannabis or exempt from registration requirements as a minimum risk pesticide under FIFRA section 25(b) and California Code of Regulations, title 3, section 6147. For the purpose of compliance with conditions of this Order, any uses of pesticide products shall be consistent with product labelling and any products on the site shall be placed, used, and stored in a manner that ensures that they will not enter or be released into surface or ground waters.*

Meets condition? Unknown

Observations/Comments: Neither pesticides nor herbicides were observed on the property at the time of our inspection. The landowner stated that only organic chemicals will be employed and recommended application rates will be followed.

Photos: None

Corrective or remedial actions needed: All pesticides, herbicides and related materials (e.g., fungicides) must be used and applied consistent with product labeling. When present, these chemicals should be stored within enclosed buildings in such a way they cannot enter or be released into surface or ground waters. Pesticides and herbicides should not be stored with petroleum products because they are considered incompatible materials and could potentially react (See guidelines for hazardous material storage in Appendix G).

For the health of the environment and your workers, you are encouraged to utilize organic or biologic controls, rather than highly toxic petro-chemicals, to prevent pest and mildew problems. Several safe alternatives are available. Please ask about our cultivators BMP handbook

To confirm compliance with the Order, you are required to keep records (logs) of the type, timing and volume of pesticides and herbicides used in your operations. This can be done using a simple log form, such as the one included in Appendix F1.

Additionally, for any pesticide use you must comply with any Pesticide Registration Requirements. For more information, see Appendix F2 in this report or Appendix E2 included in the NCRWQCB Order, or on their web site at:

http://www.waterboards.ca.gov/northcoast/board_decisions/adopted_orders/pdf/2015/150728_Appendix_E2_DPR_MJ%20Pesticide%20Handout.pdf

4.9 Standard Condition #9. Petroleum Products and other Chemicals

- a) *Petroleum products and other liquid chemicals, including but not limited to diesel, biodiesel, gasoline, and oils shall be stored so as to prevent their spillage, discharge, or seepage into receiving waters. Storage tanks and containers must be of suitable material and construction to be compatible with the substance(s) stored and conditions of storage such as pressure and temperature.*

Meets condition? No

Observations/Comments: At the time of the site inspection, there were a few small (~5 gal) gas cans on the Project Site that were stored under cover but lack secondary containment.

Photos: None

Corrective or remedial actions needed: Place all small fuel cans, generators, diesel tanks, gasoline powered garden equipment and any other items containing petroleum products in adequate secondary containment basins and store in a covered, safe, secure location (e.g. away from slopes and outside of riparian buffers) out of the elements. All petroleum products and other liquid chemicals onsite must be stored under cover and off the ground, and in a secondary containment basin (tote, tub, impermeable basin/floor, etc.) capable of containing the entire stored volume. Although not required by the Order and provided they are empty, PWA recommends placing a sign on any tank or generator not in use, with the current date that reads "Empty, not in use."

If feasible, do not store petroleum products and/or chemicals with fertilizers, soil amendments and/or pesticides/herbicides. See guidelines for hazardous material storage in Appendix G.

The State of California requires an owner or operator of a facility to complete and submit a Hazardous Material Business Plan (HMBP) if the facility handles a hazardous material or mixture containing a hazardous material that has a quantity at any one time during the reporting year equal to or greater than 55 gallons (liquids), 500 pounds (solids), or 200 cubic feet for compressed gas (propane) that are used for the cultivation

operations. If at any time during the year your operations exceed any one of these quantities, you need to prepare and file a HMBP for your operation. Information regarding HMBPs can be found at <http://ca-humboldtcounty.civicplus.com/DocumentCenter/Home/View/3224>.

- b) *Above ground storage tanks and containers shall be provided with a secondary means of containment for the entire capacity of the largest single container and sufficient freeboard to contain precipitation.*

Meets condition? No

Observations/Comments: See Standard Condition 4.9a observations and comments, above.

Photos: None

Corrective or remedial actions needed: See Standard Condition 4.9a corrective actions, above.

- c) *Dischargers shall ensure that diked areas are sufficiently impervious to contain discharged chemicals.*

Meets condition? Yes

Observations/Comments: No diked areas were observed on the Project Site.

Photos: None

Corrective or remedial actions needed: None

- d) *Discharger(s) shall implement spill prevention, control, and countermeasures (SPCC) and have appropriate cleanup materials available onsite.*

Meets condition? No

Observations/Comments: No spill prevention cleanup kit is kept onsite to help clean up small spills.

Photos: None

Corrective or remedial actions needed: Purchase and have at least one spill prevention cleanup kit of sufficient capacity onsite at each storage or use location of petroleum products, chemicals, and any other hazardous materials to help clean up small spills. The Order states that "Discharger(s) shall implement spill prevention, control, and countermeasures (SPCC) and have appropriate cleanup materials available onsite." The plan you implement does not have to be written, but your actions and what you plan for on your Project Site should be consistent with the volume of the possible spill that could occur on the operations (see the CA-EPA fact sheet: <http://www.rivcoeh.org/Portals/0/documents/guidance/hazmat/FactSheetSPCC.pdf>).

- e) *Underground storage tanks 110 gallons and larger shall be registered with the appropriate County Health Department and comply with State and local requirements for leak detection, spill overflow, corrosion protection, and insurance coverage.*

Meets condition? Yes

Observations/Comments: No underground storage tanks were observed on the Project Site.

Photos: None

Corrective or remedial actions needed: None

4.10 Standard Condition #10. Cultivation-Related Wastes

- a) *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 shall, for as long as they remain on the site, be stored at locations where they will not enter or be blown into surface waters, and in a manner that ensures that residues and pollutants within those materials do not migrate or leach into surface water or groundwater.*

Meets condition? No

Observations/Comments: PWA observed the cultivation areas and surrounding property appeared to be relatively clean, but geo-pots with exposed soil were observed during the winter. See Standard Condition 4.7 observations and comments, above, regarding spent potting soil.

Photos: Photo 10; MP #8

Corrective or remedial actions needed: See Standard Condition 4.7 corrective actions, above. Maintain good housekeeping by cleaning up cultivation related wastes around the property. Spent soil and plant material, plant stocks, root balls, old soil bags, and plastic wastes, etc. should be appropriately disposed of or covered before the rainy season in order to stop them from being transported to surface waters and to prevent nutrients from leaching into the groundwater. Remove and store indoors, or tarp or otherwise cover, all spent soil in piles, pots or beds during the wet season to prevent soil and nutrients from being transported to surface waters or leaching nutrients into the groundwater. Alternately, spent soils may be heavily cover cropped to tie up nutrients during the wet season, but if the dense cover crop cannot be maintained due to cold weather or snow, then the soil materials must be tarped and fully protected from the weather. Also see general comments below.

Standard Condition #10 - General comments and recommendations: We encourage you to chip or shred your plant stalks and compost them after harvest. If you burn the stalks, you must first obtain burn permits from CAL FIRE and the North Coast Unified Air Quality Management District (or other relevant jurisdiction for your area). You can then recycle the ash and add minerals to the soil by mixing the ash into your spent pots and plant holes prior to planting a cover crop at the end of the season. Any additional cultivation-related waste can be easily contained by keeping soils and garbage greater than 200 feet from drainage areas and on gentle slopes, tarping or otherwise covering soil piles, and/or by placing straw wattles or other containment structures around the perimeter of spoil piles. Organic cultivation-related waste should be recycled if possible, and inorganic wastes and garbage should be removed from the property on a regular basis and disposed of at an appropriate facility.

4.11 Standard Condition #11. Refuse and Human Waste

- a) *Disposal of domestic sewage shall meet applicable County health standards, local agency management plans and ordinances, and/or the Regional Water Board's Onsite Wastewater*

Treatment System (OWTS) policy, and shall not represent a threat to surface water or groundwater.

Meets condition? Yes

Observations/Comments: The Project Site reportedly has a permitted Onsite Wastewater Treatment System.

Photos: None

Corrective or remedial actions needed: Proof of permitting is required, and you should keep your OWTS permits with this WRPP for possible future inspection. Ensure that the size of the existing OWTS is adequate for the number of people onsite when your cultivation operations are at their peak. If the septic system is found to not be permitted, then you should work with a professional to either retroactively permit the current system (if approved by HCDEH), or to site, design and construct a new, permitted OWTS for the Project Site.

- b) *Refuse and garbage shall be stored in a location and manner that prevents its discharge to receiving waters and prevents any leachate or contact water from entering or percolating to receiving waters.*

Meets condition? Yes

Observations/Comments: All garbage is hauled off-site and disposed of properly.

Photos: None

Corrective or remedial actions needed: Continue to store all garbage and refuse generated onsite in cans that are placed in a secure location. It is important to utilize storage facilities which prevent animals from accessing or disturbing garbage or refuse.

- c) *Garbage and refuse shall be disposed of at an appropriate waste disposal location.*

Meets condition? Yes

Observations/Comments: According to the client the garbage and refuse generated onsite is disposed of at an appropriate waste disposal location.

Photos: None

Corrective or remedial actions needed: None

4.12 Standard Condition #12. Remediation/Cleanup/Restoration

- a) *Remediation/cleanup/restoration activities may include, but are not limited to, removal of fill from watercourses, stream restoration, riparian vegetation planting and maintenance, soil stabilization, erosion control, upgrading stream crossings, road outsloping and rolling dip installation where safe and suitable, installing ditch relief culverts and overside drains, removing berms, stabilizing unstable areas, reshaping cutbanks, and rocking native-surfaced roads. Restoration and cleanup conditions and provisions generally apply to Tier 3 sites, however owners/operators of Tier 1 or 2 sites may identify or propose water resource improvement or enhancement projects such as stream restoration or riparian planting with native vegetation and, for such projects, these conditions apply similarly.*

Appendix A accompanying the NCRWQCB Order, (and Appendix A in your WRPP), includes environmental protection and mitigation measures that apply to cleanup activities such as: temporal limitations on construction; limitations on earthmoving and construction equipment; guidelines for removal of plants and revegetation; conditions for

erosion control, limitations on work in streams, riparian and wetland areas; and other measures.

These protection and mitigation measures have been developed to prevent or reduce the environmental impacts and represent minimum, enforceable standards by which cleanup activities shall be conducted under this Order.

Meets condition? Yes

Observations/Comments: See general comments below.

Photos: None

Corrective or remedial actions needed: None

Standard Condition #12 - General comments and recommendations: No major site remediation or clean-up work that otherwise threatened water quality was identified at the Project Site. All corrective and remedial actions needed to satisfy the other 11 Standard Conditions have been outlined above.

5.0 PRIORITIZED CORRECTIVE ACTIONS AND SCHEDULE TO REACH FULL COMPLIANCE

The following check list should be followed to become fully compliant with the Order. Please see the detailed comments and recommendations above for a more complete description of the problems and the needed corrective actions and monitoring requirements.

Table 1. Features Needing Improvement or Action Items (Prioritized implementation schedule for corrective actions)

Standard Condition Requiring Action	Treatment Priority	Schedule	Summary of Corrective Actions/Recommendations (see more detailed listing of corrective actions in Section 4, above)	Monitoring Point and Photo	Estimated Cost	Date Completed
1 – Site Maintenance, Erosion Control and Drainage Features	Moderate-High	Oct.15, 2018	<ul style="list-style-type: none"> - Disperse concentrated road runoff through the addition of rolling dips, ditch relief culverts (DRCs) and/or road shaping changes. - A rock armored dip or ditch relief culvert should be installed at the cutbank spring located up road from RSDP #1 to minimize road runoff. - See Appendix H for typical drawings describing road drainage feature construction. - Consult with a professional geologist for recommendations and treatment concerning landslide mitigation (MP #3). It is likely that the landing fillslope should be decommissioned (excavated) by removing any over steepened fill from above the landslide feature. - The geologist should also inspect the probable legacy stream crossing upstream from the landslide site to see if treatments are needed. 	MP #1-3; Photos 1-7	To be determined	
2 – Stream Crossing Maintenance	High	Oct.15, 2019 or as per LSAA	<ul style="list-style-type: none"> - SC #1 requires a 30" culvert, and SC #2 and SC #3 require 48" culverts. All upgraded culverts should be installed at the base of fill and aligned with the natural channel to allow for aquatic organism passage. - Periodically monitor SC #4 for potential erosion problems, culvert plugging, and threats to water quality. Any problems should be reported to Humboldt County Public Works for future maintenance. 	MP #4-7 Photos 8-9	To be determined	
	High	Oct.15, 2019 or as per LSAA	<ul style="list-style-type: none"> - After new properly sized culverts have been installed, install one critical dip on (1) the left hinge line of SC #1 and (2) on the right hinge lines of SC #2 and SC #3 to eliminate the potential of diversion if the culvert plugs and overtops. 	N/A	To be determined	

Table 1. Features Needing Improvement or Action Items (Prioritized implementation schedule for corrective actions)

Standard Condition Requiring Action	Treatment Priority	Schedule	Summary of Corrective Actions/Recommendations (see more detailed listing of corrective actions in Section 4, above)	Monitoring Point and Photo	Estimated Cost	Date Completed
2	High	Oct. 15, 2018	<ul style="list-style-type: none"> - Obtain all necessary agreements and permits prior to commencing work in any watercourse or at any stream crossing. These may include, but not be limited to: California Department of Fish and Wildlife (CDFW) Lake and Streambed Alteration Agreement (LSAA) 1602, State Water Resources Control Board (SWRCB) 401 Certification, and Army Corps of Engineers (ACOE) 404 Permit. - A Water Budget should be developed and further refined to determine how much additional water storage is needed on the Project Site for cultivation and other uses so you can forbear (not divert) during low flow periods from May 15 through October 31. Forbearance from surface waters will be required in 2019. - The preliminary water budget suggests approximately 112,500 gallons of additional water storage may be required; accurate water use monitoring will be required to refine this number. - Water monitoring will also need to be implemented. Under the Order, you are required to measure, document and report the water you divert, store and use throughout the year. PWA has created a simple log sheet to help you monitor this water data for your Project Site (Appendix D). Furthermore, PWA recommends and state agencies will be requiring water meters to be installed on all intakes and for each place of use at a minimum. - Water data is required to be reported annually to the NCRWQCB no later than March 31 for the preceding calendar year, and similarly to the State Water Resources Control Board, Division of Water Rights, by June 30. 	N/A	To be determined	
5a, c	Moderate	On or before June 15, 2018 and continuing Report water data by March 31 and June 30	<ul style="list-style-type: none"> - Continue to employ current conservation techniques. In addition, evaluate and employ: 1) top mulching; 2) incorporating native soils and compost into the planting mix to retain water; 3) capturing and storing rainwater (to reduce diversion); 4) planting in-ground and not in above-ground pots; 5) irrigation scheduling; and 6) the use of cover crops during rotations and winter, to protect and increase soil fertility. - Begin quantifying water use so you can evaluate each of the conservation techniques. - Other water conservation measures should continue to be investigated to most effectively maximize water use efficiency and minimize or eliminate summer diversions. 	N/A	Approx. \$150.00 to \$250.00 per water meter.	
5b	Moderate	June 1, 2018 and continuing	<ul style="list-style-type: none"> - Continue to employ current conservation techniques. In addition, evaluate and employ: 1) top mulching; 2) incorporating native soils and compost into the planting mix to retain water; 3) capturing and storing rainwater (to reduce diversion); 4) planting in-ground and not in above-ground pots; 5) irrigation scheduling; and 6) the use of cover crops during rotations and winter, to protect and increase soil fertility. - Begin quantifying water use so you can evaluate each of the conservation techniques. - Other water conservation measures should continue to be investigated to most effectively maximize water use efficiency and minimize or eliminate summer diversions. 	N/A	N/A	

5 -- Water Use

Table 1. Features Needing Improvement or Action Items (Prioritized implementation schedule for corrective actions)

Standard Condition Requiring Action	Treatment Priority	Schedule	Summary of Corrective Actions/Recommendations (see more detailed listing of corrective actions in Section 4, above)	Monitoring Point and Photo	Estimated Cost	Date Completed
5b	High	Oct. 31, 2019	Develop sufficient additional water storage (a rainwater-fed, off-stream pond or more tanks) and rainwater harvesting so you can forgo during the dry summer months (see 4.5a, above).	N/A	To be determined	
5d	Moderate	On or before July 1, 2018 and continuing	<ul style="list-style-type: none"> - To verify compliance with this Standard Condition, start measuring and recording your water usage on a per plant basis, based on type and size of plant pot, full term versus short season (light deprivation) plant, and type of irrigation. - Observe and monitor soil moisture so watering, fertilizer and chemical applications are made only when necessary and overwatering and excess infiltration is avoided. - Water diversion and water storage requires valid water rights documentation. If you intend to divert surface water in the future from a spring or stream for your agricultural or domestic needs, you need to file and obtain water rights for your parcel. Appropriate water rights applications to be filed with the State Water Resources Control Board (SWRCB) include: 1) Small Domestic Use Appropriation (SDU) to cover your domestic use requirements such as drinking, bathing, cooking and fire control, and 2) a Small Irrigation Use (SIU) water right for commercial irrigation needs. - Submit annual water diversion and use volumes to the NCRWQCB by each March 31 for the preceding calendar year, and to the State Water Resources Control Board, Department of Water Rights (SWRCB, DWR) for supplemental reporting required for the Annual Statement of Diversion and Use (ISDU) by June 30 of each year. 	N/A	N/A	
5e	High	On or before July 1, 2018	<ul style="list-style-type: none"> - If you are directly diverting water from a jurisdictional spring or stream, pumping water from a well, or capturing surface water in a pond, you will need to obtain a consultation with California Department of Fish and Wildlife (CDFW) staff to determine if you are required to file a CDFW Lake and Streambed Alteration Agreement (LSAA). The agreement will be needed to cover your spring diversion and stream crossing upgrade treatments at SC #1, SC #2, and SC #3. 	N/A	To be determined	
5	Moderate-High	On or before July 1, 2018	<ul style="list-style-type: none"> - PWA highly recommends, and state agencies will be requiring, that you install flow meters on your surface water diversions, water tanks, and/or on your distribution lines, to accurately document the timing and volume of your water diversion and use. 	N/A	Approx. \$150.00 to \$250.00 per water meter.	

Table 1. Features Needing Improvement or Action Items (Prioritized implementation schedule for corrective actions)

Standard Condition Requiring Action	Treatment Priority	Schedule	Summary of Corrective Actions/Recommendations (see more detailed listing of corrective actions in Section 4, above)	Monitoring Point and Photo	Estimated Cost	Date Completed
7 – Fertilizers and Soil Amendments	7a	Moderate	<ul style="list-style-type: none"> - If the landowner wishes to keep fertilizers and soil amendments on the Project Site, they should continue to be stored fully under cover, off the ground, and in a stable location not exposed to the elements. - If stored outdoors, they should be fully tarped in a stable location with no chance of nutrient leaching or delivery to surface waters. - Liquid fertilizers, amendments and other chemicals should be stored under cover, off the ground and with adequate secondary containment. - Fertilizers, potting soils, compost, and other soils and soil amendments should not be stored with petroleum products as they may be incompatible and could potentially react (see Appendix G for more information). 	N/A	N/A	
		June 1, 2018	<ul style="list-style-type: none"> - Under the Order, you are required to keep track of the type, timing and volume of fertilizers and other soil amendments that are applied. This can be done using the simple log form we have provided in Appendix E. - Observe and monitor soil moisture so watering, fertilizer and chemical applications are made only when necessary and overwatering and excess infiltration is avoided. 			
	7b	High	<ul style="list-style-type: none"> - To prevent nutrient leaching from cultivation areas, either: 1) plant dense cover crops in spent pots, holes and beds to enrich soil and lock up nutrients; 2) fully tarp any exposed soils and growing mediums in beds, pots, holes or piles; or 3) move spent soils and amendments inside or under cover to temporarily store them during the wet season (November 1 – May 15). - If dense cover crops cannot be kept alive, all pots, soils piles and planted areas should be tarped to protect them from rainfall, snowmelt and subsequent infiltration and leaching of nutrients. 	MP #8; Photo 10	N/A	
8 – Pesticides/Herbicides	8a	High	<ul style="list-style-type: none"> - Under the Order you are required to keep records (logs) of the type, timing and volume of pesticides and herbicides used in your operations. This can be done using a simple log form, such as the one included in Appendix F. - All pesticides, herbicides and related materials (e.g., fungicides) must be used and applied consistent with product labeling. - When present, these chemicals should be stored within enclosed buildings in such a way they cannot enter or be released into surface or ground waters. 	NONE	N/A	
		On or before June 1, 2018 and continuing				

Table 1. Features Needing Improvement or Action Items (Prioritized implementation schedule for corrective actions)

Standard Condition Requiring Action	Treatment Priority	Schedule	Summary of Corrective Actions/Recommendations (see more detailed listing of corrective actions in Section 4, above)	Monitoring Point and Photo	Estimated Cost	Date Completed
9 – Petroleum Products and Other Chemicals	High	On or before June 15, 2018 and continuing	<ul style="list-style-type: none"> - Place all small fuel cans, generators, diesel tanks, gasoline powered garden equipment and any other items containing petroleum products under cover, off the ground and in a secondary containment basin (tote, tub, impermeable floor/basin, etc.). - Obtain and make available one or more spill prevention cleanup kits to clean up small spills. Spill kits should be located where fuel is stored and refueling occurs. - Store all hazardous materials of differing type (e.g. petroleum products vs. agricultural chemicals) in separate locations (see General Comments in Section 4.9 for more information) 	NONE	Spill Kits range from \$25 to \$50	
10- Cultivation-Related Wastes	Moderate-High	Oct. 15, 2018 and continuing	<ul style="list-style-type: none"> - Maintain good housekeeping by cleaning up cultivation related wastes around the property. - Spent soil and plant material (stalks and root balls), old soil bags, plastic wastes, etc. should be appropriately disposed of or covered before the rainy season in order to stop them from being transported to surface waters and to prevent nutrients from leaching into the groundwater. - Remove and store indoors, or tarp or otherwise cover, all spent soil in piles, pots or beds during the wet season to prevent soil and nutrients from being transported to surface waters or leaching nutrients into the groundwater. - Spent soils may be heavily cover cropped to tie up nutrients during the wet season, but if the dense cover crop cannot be maintained due to cold weather or snow, then the soil materials must be tarped and fully protected from the weather. - If you burn the stalks, you must first obtain burn permits from CAL FIRE and the North Coast Unified Air Quality Management District (or other relevant jurisdiction for your area). Recycle ash and add minerals to the soil by mixing the ash into your spent pots and plant holes prior to planting a cover crop at the end of the season. - Any additional cultivation-related waste can be easily contained by keeping soils and garbage greater than 200 feet from drainage areas and on gentle slopes, tarping or otherwise covering soil piles, and by placing straw wattles or other containment structures around the perimeter of spoil piles. - Organic cultivation-related waste should be recycled if possible, and inorganic wastes and garbage should be removed from the property on a regular basis and disposed of at an appropriate facility. 	MP #8; Photo 10	The cost of Burn Permits.	

Table 1. Features Needing Improvement or Action Items (Prioritized implementation schedule for corrective actions)

Standard Condition Requiring Action	Treatment Priority	Schedule	Summary of Corrective Actions/Recommendations (see more detailed listing of corrective actions in Section 4, above)	Monitoring Point and Photo	Estimated Cost	Date Completed
11 – Refuse and Human Waste	11a	Moderate	<ul style="list-style-type: none"> - Proof of septic system permitting is required, and you should keep your OWTS permits with this WRPP for possible future inspection. - Consult with HCDEH to ensure that the size of the existing OWTS is adequate for the number of people onsite when your cultivation operations are at their peak. 	N/A	N/A	
	11a	Moderate	<ul style="list-style-type: none"> - If the current septic system is found to not be permitted, then you should work with a professional to either retroactively permit the current system (if approved by HCDEH), or to site, design and construct a new, permitted OWTS for the Project Site. 	N/A	To be determined, if necessary.	

6.0 MONITORING AND INSPECTION PLAN

Under the Order, sites are required to be monitored and inspected periodically to ensure conformance with the 12 Standard Conditions. In most cases, inspections and records of inspections identify conditions that have been corrected and are now in compliance; conditions that remain in compliance; and conditions that have changed and may no longer be in compliance with the Order. An inspection and monitoring plan is used to document these conditions, identify problems and make corrections using best management practices (BMPs) to protect water quality (Appendix A).

Monitoring Plan – Please refer to Appendix B and Figure 2 to review the monitoring plan and specific monitoring points for which you are responsible.

Monitoring guidelines and reporting standards have been created by the NCRWQCB as part of the Order. Monitoring of the Project Site includes visual inspection and photographic documentation of each feature of interest listed on the Project Site map, with new photographic documentation recorded with any notable changes to the feature of interest.

Site inspection schedule - According to the NCRWQCB, periodic inspections should include visual inspection of the site, including any management measures/practices, to ensure they are being implemented correctly and are functioning as expected. Inspections include photographic documentation of any controllable sediment discharge sites, as identified on the site map, and a visual inspection of those locations on the site where pollutants or wastes, if uncontained, could be transported into receiving waters, and those locations where runoff from roads or developed areas drains into or towards surface water.

At a minimum, sites shall be inspected at the following times to ensure timely identification of changed site conditions and to determine whether implementation of additional management measures is necessary to prevent or minimize discharges of waste or pollutants to surface water:

- 1) Before and after any significant alteration or upgrade to a given stream crossing, road segment, or other controllable sediment discharge site. Inspection should include photographic documentation, with photo records to be kept onsite.
- 2) Prior to October 15th to evaluate site preparedness for storm events and stormwater runoff.
- 3) Following the accumulation of 3 inches cumulative precipitation (starting September 1st) or by December 15th, whichever is sooner.
- 4) Following any rainfall event with an intensity of 3 inches precipitation in 24 hours. Precipitation data can be obtained from the National Weather Service by entering the site zip code at <http://www.srh.noaa.gov/forecast>; Pick the nearest or most relevant zip code and then select the 3 day history that will also show precipitation totals.

Inspection and Monitoring Checklist – Appendix B contains a checklist data form that will be used by the landowner and/or operator to: 1) document inspection dates, 2) document visual and photographic inspection results, 3) describe remediation and management measures that are being applied, 4) identify new problems and their treatments, and 5) document the progress and effectiveness of implementing remedial and corrective measures that are needed to meet the 12 Standard Conditions, as outlined in this WRPP. Appendix C contains photo documentation of your

monitoring points and will need to be updated as corrective treatments are implemented and treatments are monitored and evaluated over time.

Annual Reporting – An Annual Report is to be submitted directly to the NCRWQCB or to PWA (through our 3rd Party Program). The information in the annual reporting form must be submitted by March 31st of each year. The reported information is to be reflective of current site conditions, and includes monitoring data and tasks accomplished to protect water quality. Among other things, the report includes such items as the reporting of monthly monitoring data collected during the year (e.g., chemical use, water diversions, water storage, water use, etc.), management measures (BMPs) applied during the year and their effectiveness, and tasks accomplished during the year towards meeting each of the 12 Standard Conditions identified as deficient in this WRPP.

7.0 WATER USE PLAN

Requirements - According to the Order, a Water Use Plan (WUP) shall record water source, relevant water right documentation, and amount used monthly. All water sources shall be recorded, including alternative sources such as rain catchment and groundwater, and/or hauled water. Other elements of the WUP will include:

- Developing a Water Budget for determining the timing and volume of actual water use on the site. Water related data will be summarized monthly for the preceding month.
- Designing and implementing water conservation measures to reduce water diversion and water use.
- Calculating water storage requirements needed to support cultivation activities during the dry season, and implementing those required storage measures.

The Water Use Plan must also describe water conservation measures and document your approach to ensure that the quantity and timing of water use is not impacting water quality objectives and beneficial uses (including cumulative impacts based on other operations using water in the same watershed). Water use will only be presumed to not adversely impact water quality under one of the following scenarios:

- No surface water diversions occur from May 15th to October 31st.
- Water diversions are made pursuant to a local plan that is protective of instream beneficial uses.
- Other options that may affect water quality: (e.g., percent of flow present in stream; minimum allowable riffle depth; streamflow gage at bottom of Class I stream; AB2121 equations; CDFW instream flow recommendations; promulgated flow objective in Basin Plan; etc.).

Site Water Use Plan -The record of activities, accomplishments and water monitoring results for the Water Use Plan for this site will be logged and recorded in data tables and site records (data forms) included in Appendix D of this WRPP. These will be tracked and kept up-to-date by the landowner or cultivator of the site.

Water Storage and Forbearance – The ultimate goal of the applicant is to accumulate enough water storage capacity to forebear the entire period from May 15th to October 31st. According to

the Order, this will ensure the timing of water use is not impacting water quality objectives and beneficial uses. There is 52,500 gallons of potential water storage in rigid tanks on the Project Site. Based on the total size of the cultivation areas (16,500 ft²) it is clear that there is not enough water storage to avoid surface water diversions during the dry season from May 15 through October 31. The preliminary Water Budget (see below), indicating the need for an additional 112,500 gallon of water storage, will need to be refined by accurate water monitoring to determine more exactly how much additional storage is needed for your operations to forbear (not divert) during this period.

Water Conservation - Water conservation measures currently practiced include the use of a drip irrigation system, controlled hand watering, and mulching. We suggest growing plants in-ground (as compared to above-ground pots) and watering late in the afternoon or evening to minimize water loss through evaporation and maximize water up-take by the plants. Starting this year, new water conserving techniques and equipment will be utilized and tested to evaluate their effectiveness and efficiency. Test and employ timed or volume limited drip emitters and incorporating water holding amendments and native soil during the initial soil preparation at the start of the season.

Water sources and use - Though several Class I, II, and III watercourses are located within the Project Site parcel, the water used for irrigation activities comes from one spring diversion identified in Figure 2.

A Preliminary Water Budget has been prepared for the Project Site based on total cultivation area and existing water storage at the time of the field inspection, and an average estimated water usage of 10 gallon/ft² cultivation area (per comm. Humboldt County Planning and Building Department) during the forbearance period (May 15th to October 31st. The Project Site contains 16,500 ft² of cultivation area, 52,500 gallons of water storage, and a calculated volume of 165,000 gallons of water necessary to forbear (not divert) during the dry season. Based on these estimates, there is not enough water storage for the forbearance period. This preliminary Water Budget is for irrigation needs only, and will need to be refined by your water monitoring of both domestic and irrigation water uses to determine how much additional storage is needed for your operations to forbear (not divert surface waters or pump from the well) during this period.

Over the course of the current and future season, water use should be documented using the log forms supplied to you by PWA, attached in Appendix D, or by some other equally accurate method. Water meters will need to be installed on your main diversion and distribution lines to document your water diversion and use. Annual reporting of water diversion and use rates are required to be submitted annually to the NCRWQCB by March 31 for the preceding calendar year, and to the State Water Resource Control Board (Division of Water Rights) no later than June 30 to document your water right. As more accurate data is gathered, refined targets can be made to ensure adequate storage exists to protect downstream water quality and beneficial uses during the driest time of the year. Domestic and commercial cannabis water rights will need to be applied for and obtain for your operations and a CDFW LSAA is required for your spring diversion and for the three stream crossings that require upgrading.

8.0 LIST OF CHEMICALS

The WRPP must contain a list of chemicals being stored onsite, in addition to quantities used and frequency of application. These include fertilizers/soil amendments, pesticides, herbicides, fungicides, petroleum products and other chemicals used in, or associated with, your cultivation activities and related operations.

Because this is the first year of enrollment, information regarding chemical use and storage is deficient or anecdotal. Appendixes E and F contain monitoring forms that should be used to list the chemical inventory record over time, as supplies are added to the site and used during the growing season. The landowner or operator will use these forms to track the types, storage volumes, timing of application, and volume of use of these products throughout the year. The initial chemicals and amendment list that may be used and stored onsite include:

Fertilizers and amendments (N-P-K):

Age Old Kelp, 50 gallons (0.3-0.25-0.15)

Age Old Grow, 50 gallons (12-6-6)

Age Old Bloom, 50 gallons (5-10-5)

Petroleum and Other Chemicals:

Gasoline

Motor oil

Propane

Pesticides, Herbicides, and Fungicides:

N/A

9.0 LANDOWNER/LESSEE CERTIFICATION/SIGNATURES

This Water Resource Protection Plan (WRPP) has been prepared by Pacific Watershed Associates, an approved Third Party Program acting on behalf of the North Coast Regional Water Quality Control Board (NCRWQCB).

"I have read and understand this WRPP, including Section 2.0 – Certifications, Conditions and Limitations. I agree to comply with the requirements of the California Regional Water Quality Control Board North Coast Region Order No. 2015-0023 (Waiver of Waste Discharge Requirements and General Water Quality Certification for Discharges of Waste Resulting from Cannabis Cultivation and Associated Activities or Operations with Similar Environmental Effects in the North Coast Region), including the recommendations and actions listed in this WRPP."

Name of Legally Responsible Person (LRP): Seth Adams

Title (owner, lessee, operator, etc.): Owner

Signature: [Signature] Date: 8/3/18

WRPP prepared by (if different from LRP): Pacific Watershed Associates, Inc.

WRPP prepared and finalized on (date): 03 Aug 2018

Signature: [Signature]

Date: 03 Aug 2018

Appendix A

Best Management Practices for Discharges of Waste Resulting from Cannabis Cultivation and Associated Activities or Operations with Similar Environmental Effects

Best Management Practices for Discharges of Waste Resulting from Cannabis Cultivation and Associated Activities or Operations with Similar Environmental Effects

I. Introduction

Best management practices (BMPs) provided here may be applicable to prevent, minimize, and control the discharge of waste and other controllable water quality factors associated with site restoration/cleanup/remediation and site operations and maintenance. These BMPs are all considered enforceable conditions under the Order as applicable to a given site, and are referenced by and made conditions in the mitigated negative declaration (CEQA document) for the Order, as well.

This appendix to Order No. R1-2015-0023 includes section II. Standard BMPs for Construction, section III. BMPs for Site Maintenance and Operations (per standard conditions), and section IV. References. For additional BMP suggestions, staff encourage consultation of the various manuals listed in section IV. References, many of which are available online for free.

II. Standard BMPs for Construction

Where applicable during restoration, remediation, cleanup, or site maintenance activities, the following BMPs will be used.

A. General BMPs to Avoid or Minimize Adverse Impacts

Temporal Limitations on Construction

1. To avoid impacting migrating fish and causing erosion and sedimentation of the stream channel, the project work season shall be from May 1 to October 15. If operations are to be conducted during the winter period from October 15 to May 1, a winter period operating plan must be incorporated into the project work plan. This plan shall include specific measures to be taken in the winter operating period to avoid or substantially lessen erosion and sedimentation into surface waters.
2. A 2-day (48-hour) forecast¹ of rain shall be the trigger for temporary cessation of project activities and winterization/erosion protection of the work site.

¹ Any weather pattern that is forecasted by NOAA to have a 50% or greater probability of producing precipitation in the project area. The permittee shall obtain and keep for record likely precipitation forecast information from

Limitation on Earthmoving

3. Disturbance to existing grades and vegetation shall be limited to the actual site of the cleanup/remediation and necessary access routes.
4. Placement of temporary access roads, staging areas, and other facilities shall avoid or minimize disturbance to habitat.
5. Disturbance to native shrubs, woody perennials or tree removal on the streambank or in the stream channel shall be avoided or minimized. If riparian trees over six inches dbh (diameter at breast height) are to be removed, they shall be replaced by native species appropriate to the site at a 3:1 ratio. Where physical constraints in the project area prevent replanting at a 3:1 ratio and canopy cover is sufficient for habitat needs, replanting may occur at a lesser replacement ratio.
6. If shrubs and non-woody riparian vegetation are disturbed, they shall be replaced with similar native species appropriate to the site.
7. Whenever feasible, finished grades shall not exceed 1.5:1 side slopes. In circumstances where final grades cannot achieve 1.5:1 slope, additional erosion control or stabilization methods shall be applied as appropriate for the project location.
8. Spoils and excavated material not used during project activities shall be removed and placed outside of the 100-year floodplain, and stored/disposed of in compliance with Order conditions related to spoils management.
9. Upon completion of grading, slope protection of all disturbed sites shall be provided prior to the rainy season through a combination of permanent vegetative treatment, mulching, geotextiles, and/or rock, or equivalent.
10. Vegetation planting for slope protection purposes shall be timed to require as little irrigation as possible for ensuring establishment by the commencement of the rainy season.
11. Only native plant species shall be used with the exception of non-invasive, non-persistent grass species used for short-term vegetative cover of exposed soils.
12. Rock placed for slope protection shall be the minimum necessary to avoid erosion, and shall be part of a design that provides for native plant revegetation and minimizes bank armoring.

Limitations on Construction Equipment

13. Dischargers and/or their contractors shall ensure that chemical contamination (fuel, grease, oil, hydraulic fluid, solvents, etc.) of water and soils is prohibited during routine equipment operation and maintenance.
14. Heavy equipment shall not be used in flowing water. Please refer to BMPs 57 through 64 for dewatering of live streams.

the National Weather Service Forecast Office (e.g. by entering the zip code of the project's location at <http://srh.noaa.gov/forecast>).

15. When possible, existing ingress or egress points shall be used or work shall be performed from the top of the creek banks.
16. Use of heavy equipment shall be avoided or minimized in a channel bottom with rocky or cobbled substrate.
17. If project work or access to the work site requires heavy equipment to travel on a channel bottom with rocky or cobbled substrate, wood or rubber mats shall be placed on the channel bottom prior to use by heavy equipment.
18. Heavy equipment shall not introduce chemicals or foreign sediment to the channel (e.g., remove mud from tracks or cover channel work area with plastic sheeting prior to heavy equipment entry).
19. The amount of time this equipment is stationed, working, or traveling within the channel shall be minimized.
20. When heavy equipment is used, any woody debris and stream bank or streambed vegetation disturbed shall be replaced to a pre-project density with native species appropriate to the site. If riparian trees over six inches dbh are to be removed, they shall be replaced by native species appropriate to the site at a 3:1 ratio per BMP 5.
21. The use or storage of petroleum-powered equipment shall be accomplished in a manner that prevents the potential release of petroleum materials into waters of the state (Fish and Game Code 5650). To accomplish this, the following precautionary measures shall be followed:
 - Schedule excavation and grading activities for dry weather periods.
 - Designate a contained area for equipment storage, short-term maintenance, and refueling. Ensure it is located at least 50 feet from waterbodies.
 - Inspect vehicles for leaks and repair immediately.
 - Clean up leaks, drips and other spills immediately to avoid soil or groundwater contamination.
 - Conduct major vehicle maintenance and washing offsite (except as necessary to implement BMP 18).
 - Ensure that all spent fluids including motor oil, radiator coolant, or other fluids and used vehicle batteries are collected, stored, and recycled as hazardous waste offsite.
 - Ensure that all construction debris is taken to appropriate landfills and all sediment disposed of in upland areas or offsite, beyond the 100-year floodplain.
 - Use dry cleanup methods (e.g., absorbent materials, cat litter, and/or rags) whenever possible. If necessary for dust control, use only a minimal amount of water.
 - Sweep up spilled dry materials immediately.

Revegetation and Removal of Exotic Plants

22. The work area shall be restored to pre-project work condition or better.

23. All exposed soil resulting from the cleanup/restoration activities shall be revegetated using live planting, seed casting or hydroseeding.
24. Any stream bank area left barren of vegetation as a result of cleanup/restoration activities shall be stabilized by seeding, replanting, or other means with native trees, shrubs, and/or grasses appropriate to the site prior to the rainy season in the year work was conducted.
25. Soil exposed as a result of project work, soil above rock riprap, and interstitial spaces between rocks shall be revegetated with native vegetation by live planting, seed casting, or hydroseeding prior to the rainy season of the year work is completed.
26. The spread or introduction of exotic plant species shall be avoided to the maximum extent possible by avoiding areas with established native vegetation during cleanup/restoration activities, restoring disturbed areas with appropriate native species, and post-project monitoring and control of exotic species.
27. Removal of invasive exotic species is strongly recommended. Mechanical removal (hand tools, weed whacking, hand pulling) of exotics shall be done in preparation for establishment of native perennial plantings.
28. Revegetation shall be implemented after the removal of exotic vegetation occurs. Erosion control implementation shall be timed in accordance with BMPs 1 and 2.
29. Native plants characteristic of the local habitat shall be used for revegetation when implementing and maintaining cleanup/restoration work in riparian and other sensitive areas. Non-invasive, non-persistent grass species (e.g., barley grass) may be used for their temporary erosion control benefits to stabilize disturbed slopes and prevent exposure of disturbed soils to rainfall.
30. Annual inspections for the purpose of assessing the survival and growth of revegetated areas and the presence of exposed soil shall be conducted for three years following project work.
31. Dischargers and/or their consultant(s) or third party representative(s) shall note the presence of native/non-native vegetation and extent of exposed soil, and take photographs during each inspection.
32. Dischargers and/or their consultant(s) or third party representative(s) shall provide the location of each work site, pre- and post-project work photos, diagram of all areas revegetated and the planting methods and plants used, and an assessment of the success of the revegetation program in the annual monitoring report as required under the Order.

Erosion Control

33. Erosion control and sediment detention devices and materials shall be incorporated into the cleanup/restoration work design and installed prior to the end of project work and before the beginning of the rainy season. Any continuing, approved project work conducted after October 15 shall have erosion control works completed up-to-date and daily.

34. Erosion control materials shall be, at minimum, stored on-site at all times during approved project work between May 1 and October 15.
35. Approved project work within the 5-year flood plain shall not begin until all temporary erosion controls (straw bales or silt fences that are effectively keyed-in) are installed downslope of cleanup/restoration activities.
36. Non-invasive, non-persistent grass species (e.g., barley grass) may be used for their temporary erosion control benefits to stabilize disturbed slopes and prevent exposure of disturbed soils to rainfall.
37. Upon work completion, all exposed soil present in and around the cleanup/restoration sites shall be stabilized within 7 days.
38. Soils exposed by cleanup/restoration operations shall be seeded and mulched to prevent sediment runoff and transport.

Miscellaneous

39. During temporary stream crossing siting, locations shall be identified where erosion potential is low. Areas where runoff from roadway side slopes will spill into the side slopes of the crossing shall be avoided.
40. Vehicles and equipment shall not be driven, operated, fueled, cleaned, maintained, or stored in the wet or dry portions of a waterbody where wetland vegetation, riparian vegetation, or aquatic organisms may be impacted.
41. Riparian vegetation, when removed pursuant to the provisions of the work, shall be cut off no lower than ground level to promote rapid re-growth. Access roads and work areas built over riparian vegetation shall be covered by a sufficient layer of clean river run cobble to prevent damage to the underlying soil and root structure. The cobble shall be removed upon completion of project activities.
42. Avoidance of earthwork on steep slopes and minimization of cut/fill volumes, combined with proper compaction, shall occur to ensure the area is resilient to issues associated with seismic events and mass wasting. If cracks are observed, or new construction is anticipated, consultation with a qualified professional is appropriate.
43. Operations within the 100-year floodplain shall be avoided. Refuse and spoils shall not be stored within the hundred-year floodplain. If roads are located within the 100-year floodplain, they shall be at grade; bridges shall have vented approaches and bridge deck shall be above anticipated 100-year flood water surface elevations. Consultation with a qualified professional is required for project work within the floodplain. .
44. Project work-related dust shall be controlled. Dust control activities shall be conducted in such a manner that will not produce sediment-laden runoff. Dust control measures, including pre-watering of excavation/grading sites, use of water trucks, track-out prevention, washing down vehicles/equipment before leaving site, and prohibiting grading/excavation activities during windy periods, shall be implemented as appropriate.

45. Short term impacts from project work-related emissions can be minimized via retrofitting equipment and use of low emissions vehicles when possible.
46. Position vehicles and other apparatus so as to not block emergency vehicle access.

B. BMPs for Specific Activities

Critical Area Planting, Channel Vegetation and Restoration and Management of Declining Habitats

The following measures shall be employed:

47. Plant materials used shall be native to the site and shall be locally collected if possible.
48. Straw mulch shall be applied at a rate of 2 tons per acre of exposed soils and, shall be secured to the ground.
49. When implementing or maintaining a critical area planting above the high water line, a filter fabric fence, straw wattles, fiber rolls and/or hay bales shall be utilized to keep sediment from flowing into the adjacent water body.

Structure for Water Control and Stream Crossings

These practices shall be used generally to replace or retrofit existing culverts and to install culverts where water control is needed at a stream crossing or road ditch to restore natural hydrology, and to reduce potential diversions and road-related erosion. In addition to the general limitations set forth in the previous section, the following measures shall be employed for these types of projects:

50. Culvert fill slopes shall be constructed at a 2:1 slope or shall be armored with rock.
51. All culverts in fish-bearing streams and in streams where fish have historically been found and may potentially re-occur, shall be designed and constructed consistent with NMFS Southwest Region's Guidelines for Salmonid Passage at Stream Crossings (NMFS 2000) and CDFG's Culvert Criteria for Fish Passage (CDFG 2002).

Limitations on Work in Streams and Permanently Poned Areas

52. If it is necessary to conduct work in or near a live stream, the work space shall be isolated to avoid project activities in flowing water.
53. Water shall be directed around the work site.
54. Ingress/egress points shall be utilized and work shall be performed from the top of the bank to the maximum extent possible.
55. Use of heavy equipment in a channel shall be avoided or minimized. Please refer to BMPs 57 through 64 for dewatering of live streams. The amount of time construction equipment is stationed, working or traveling within the creek bed shall be minimized.

56. If the substrate of a seasonal pond, creek, stream or water body is altered during work activities, it shall be returned to approximate pre-construction conditions after the work is completed.

Temporary Stream Diversion and Dewatering: All Live Streams

57. For project work in a flowing or pooled stream or creek reach, or where access to the stream bank from the channel bottom is necessary, the work area shall be isolated with the use of temporary cofferdams upstream and downstream of the work site and all flowing water shall be diverted around the work site throughout the project period.
58. Other approved water diversion structures shall be utilized if installation of cofferdams is not feasible.
59. Cofferdam construction using offsite river-run gravel and/or sand bags is preferred. If gravel materials for cofferdams are generated onsite, measures shall be taken to ensure minimal disturbance to the channel, such as careful extraction from elevated terraces. The upstream end of the upstream cofferdam shall also be reinforced with thick plastic sheeting to minimize leakage.
60. Gravity diversions are preferred to pumping as dewatering techniques. If pumping is required to supplement gravity diversions, care shall be taken to minimize noise pollution and prevent the pump or generator-borne pollution to the watercourse.
61. The diversion pipe shall consist of a large plastic HDPE or ADS pipe or similar material, of a sufficient diameter to safely accommodate expected flows at the site during the full project period.
62. The pipe shall be protected from project activities to ensure that bypass flows are not interrupted.
63. Continuous flow downstream of the work site shall be maintained at all times during project work.
64. When project work is complete, the flow diversion structure shall be removed in a manner that allows flow to resume with a minimum of disturbance to the substrate.

Protection of Sensitive Species

65. Sensitive species - Consult with federal, state and local agencies regarding location of rare, threatened or endangered species.
66. Prior to commencing work, designate and mark a no-disturbance buffer to protect sensitive species and communities.
67. All work performed within waters of the state shall be completed in a manner that minimizes impacts to beneficial uses and habitat. Measures shall be employed to minimize land disturbances that shall adversely impact the water quality of waters of the state. Disturbance or removal of vegetation shall not exceed the minimum necessary to complete Project implementation.

68. All equipment, including but not limited to excavators, graders, barges, etc., that may have come in contact with extremely invasive animals (e.g. zebra mussels or new Zealand mud snails) or plant (e.g., Arundo donax, scotch broom, pampas grass) or the seeds of these plants, shall be carefully cleaned before arriving on site and shall also be carefully cleaned before removal from the site, to prevent spread of these plants.
69. Vegetation shall be established on disturbed areas with an appropriate mix of California native plants and/or seed mix. All initial plantings and seed shall be installed prior to completion of the project work.

III. BMPs for Site Maintenance and Operations (per standard conditions)

The following BMPs are intended to address compliance with the standard conditions. Individual or multiple BMPs may be selected to address compliance with a given standard condition depending on site-specific conditions. BMPs are considered enforceable conditions as applicable to a given site.

A. Site Maintenance, Erosion Control, Drainage Features

70. Drainage of roads, clearings, fill prisms, and terraced areas is critical to ensuring their integrity and to prevent or minimize sediment discharges to watercourses. Proper design and location of roads and other features is critical to ensuring that a road or other feature be adequately drained and is best accomplished through consultation with a qualified professional. If inspection identifies surface rills or ruts, surfacing and drainage likely needs maintenance.
71. Surfacing of exposed/disturbed/bare surfaces can greatly reduce erosion associated with runoff. BMP features such as vegetative ground cover, straw mulch, slash, wood chips, straw wattles, fiber rolls, hay bales, geotextiles, and filter fabric fences may be combined and implemented on exposed/disturbed/bare surfaces as appropriate to prevent or minimize sediment transport and delivery to surface waters. Non-invasive, non-persistent grass species (e.g. barley grass) may be used for their temporary erosion control benefits to stabilize bare slopes and prevent exposure of bare soils to rainfall. If utilized, straw mulch shall be applied at a rate of 2 tons per acre of exposed soils and, if warranted by site conditions, shall be secured to the ground. Consultation with a qualified professional is recommended for successful site-specific selection and implementation of such surface treatments. Guidance literature pertaining to such BMPs is referenced in section IV. of this document.
72. Road surfacing, especially within a segment leading to a watercourse, is critical to prevent and minimize sediment delivery to a watercourse and maintain road integrity for expected uses. Road surfacing can include pavement, chip-seal, lignin, rock, or other material appropriate for timing and nature of use. Steeper sections of road require higher quality rock (e.g. crushed angular versus river-run) to remain in place.

73. Road shaping to optimize drainage includes out-sloping and crowning; shaping can minimize reliance on inside ditches. Drainage structures can include rolling dips and water bars within the road surface and ditch-relief culverts to drain inside ditches. Adequate spacing of drainage structures is critical to reduce erosion associated with runoff. Generally speaking, steep slopes require greater frequency of drainage structures. The drainage structures shall be maintained to ensure capture of and capacity for expected flow. The outlets of the structures shall be placed in such a manner as to avoid discharge onto fill, unstable areas, or areas that can enter a watercourse. If site conditions prohibit drainage structures at an adequate interval to avoid erosion, bioengineering techniques² are the preferred solution (e.g. live fascines), but other techniques may also be appropriate including armoring (i.e. rock of adequate size and depth to remain in place under traffic and flow conditions) and velocity dissipaters (e.g. gravel-filled "pillows" in an inside ditch to trap sediment). In the case that inside ditches need maintenance, grade ditches only when and where necessary, since frequent routine mechanical grading can cause erosion of the ditch, undermine banks, and expose the toe of the cutslope to erosion. Do not remove more leaves and vegetation than necessary to keep water moving, as vegetation prevents scour and filters out sediment.
74. Road drainage shall be discharged to a stable location away from a watercourse. Use sediment control devices, such as check dams, sand/gravel bag barriers, and other acceptable techniques, when it is neither practical nor environmentally sound to disperse ditch water immediately before the ditch reaches a stream. Within areas with potential to discharge to a watercourse (i.e. within riparian areas of at least 200 feet of a stream) road surface drainage shall be filtered through vegetation, slash, or other appropriate material or settled into a depression with an outlet with adequate drainage. Caution should always be exercised with catchment basins in the event of failure.
75. Any spoils associated with site maintenance shall be placed in a stable location where it cannot enter a watercourse. Sidecasting shall be minimized and shall be avoided on unstable areas or where it has the potential to enter a watercourse.
76. Do not sidecast when the material can enter the stream directly or indirectly as sediment. Sidecast material can indirectly enter the stream when placed in a position where rain or road runoff can later deliver it to a channel that connects with the stream.
77. Disconnect road drainage from watercourses (drain to hill slopes), install drainage structures at intervals to prevent erosion of the inboard ditch or gull formation at the hill slope outfall, outslope roads.

² A Primer on Stream and River Protection for the Regulator and Program Manager: Technical Reference Circular W.D. 02-#1, San Francisco Bay Region, California Regional Water Quality Control Board (April 2003) http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stream_wetland/streamprotectioncircular.pdf

78. Ditch-relief culverts shall also be inspected regularly, and cleared of debris and sediment. To reduce plugging, 15 to 24-inch diameter pipes shall be the minimum size considered for ditch relief culverts and shall be informed by site-specific conditions.
79. Grade ditches only when and where necessary, since frequent routine mechanical grading can cause erosion of the ditch, undermine banks, and expose the toe of the cutslope to erosion. Do not remove more grass and weeds than necessary to keep water moving, as vegetation prevents scour and filters out sediment.
80. Use sediment control devices, such as check dams, sand/gravel bag barriers, and other acceptable techniques, when it is neither practical nor environmentally sound to disperse ditch water immediately before the ditch reaches a stream.

B. Stream Crossing Maintenance

81. Proper maintenance of stream crossings is critical to ensure support of beneficial uses of water. Regular inspection and maintenance is necessary to identify, in a timely manner, if problems are occurring. Crossings include rock fords³, armored fills with culverts³, and bridges³.
82. Rock fords are appropriate when temporary and minor moisture or over-land flow is expected, not typically when a bed and bank is present; exceptions may be justified if warranted by site specific conditions. Additionally, rock fords are appropriate if aquatic life is not present. An adequate layer of crushed angular rock shall be maintained at rock fords such that soil compaction is minimized under expected traffic levels.
83. Stream crossings consisting of armored fills with culverts and bridges are appropriate for streams with defined bed and bank². They shall be sized to ensure the 100-year streamflow event can pass unimpeded. Additionally, crossings shall allow migration of aquatic life during all life stages potentially supported by that stream reach; water depth and velocity can inhibit migration of adult and juvenile fish species.
84. Stream crossing design and installation is best accomplished with the assistance of a qualified professional. Site conditions can change over time (e.g. channel filling or incision); consultation with a qualified professional is appropriate to evaluate maintenance or replacement needs and opportunities.
85. Regular inspection of the stream crossing is appropriate to identify changed conditions within the stream channel (e.g., bank erosion, headward incision, and channel filling).
 - If large wood is accumulated upstream or within the crossing that could impede or deflect flow and result in erosion or debris capture, the wood

³ Explanation of term, available within the following document (as of the date of the Order):
http://www.pacificwatershed.com/sites/default/files/handbook_chapter_download_page.pdf

- should generally be removed. In some cases, it may be appropriate to re-orient debris with the streamflow.
- If sediment or debris is accumulated within a culvert and limits flow capacity, the short term solution should generally be to clean out the culvert and place the debris and sediment in a stable location with no potential to discharge into a stream. In some cases a trash rack, post, or other deflection structure at the culvert inlet can reduce plugging.
 - If sediment is accumulated in a culvert without other debris accumulation and limits flow capacity, the long term solution may generally involve changing the culvert's slope, diameter, or embedment in the streambed.
86. The roadway adjacent to and over the crossing is an area of potential discharge. All road surfaces approaching a crossing shall be drained before the crossing, adequately filtered through vegetation or other material, and not discharged to a watercourse. If turbid water is discharged at a stream crossing, additional measures to control erosion at the source(s) or to remove sediment prior to discharge shall be implemented. Road surfaces shall be of rock, pavement, or other material appropriate for type and level of use.
87. If a culvert is used, the approaches and fill slopes shall be properly compacted during installation and shall be stabilized with rock or other appropriate surface protection to minimize surface erosion and slumping to the receiving waters. If possible, the road surface over the culvert shall have a critical-dip to ensure that if the culvert becomes plugged, water can flow over the road surface without washing away the fill prism. If site-specific conditions do not allow for a critical dip, alternatives such as emergency overflow culverts, oversized culverts, flared inlets, and debris racks may be warranted.

C. Riparian and Wetland Protection and Management:

88. Buffer width will be in compliance with Tier category.
89. Trees within riparian areas shall be retained for natural recruitment to streams. Large woody debris (LWD) shall be retained in stream or within riparian areas. The size of wood that can be beneficial to the stream will vary depending on the size of the stream (i.e., larger pieces of wood are necessary to withstand flows in large streams). In the event that LWD or trees are disturbed during excavation, care shall be taken to separate the LWD from soil. The pieces shall be stockpiled separately until they can be replaced in appropriate locations to enhance instream or riparian conditions. Placement of instream wood for habitat enhancement should be done under the consultation of a qualified professional and in conformance with applicable regulatory permits.
90. Avoidance of disturbance in riparian areas (within 200 feet of a watercourse) should result in protection and restoration of the quality/health of the riparian stand so as to promote: 1) shade and microclimate controls; 2) delivery of wood to channels, 3) slope stability and erosion control, 4) ground cover, and 5) removal of excess nutrients. This recognizes the importance of the riparian zone

with respect to temperature protection, sediment delivery, its importance with respect to the potential for recruitment of large wood, and removal of nutrients transported in runoff. In the event that past disturbance has degraded riparian conditions, replanting with native species capable of establishing a multi-storied canopy will ensure these riparian areas can perform these important ecologic functions.

D. Spoils Management

To ensure spoil pile stability and to reduce the potential for spoil pile slope failure or transport to waters of the state, the following measures shall be implemented when placing or disposing of spoils onsite:

91. Rip compacted soils prior to placing spoils to prevent the potential for ponding under the spoils that could result in spoil site failure and subsequent sedimentation;
92. Compact and contour stored spoils to mimic the natural slope contours and drainage patterns to reduce the potential for fill saturation and failure;
93. Ensure that spoil materials are free of woody debris, and not placed on top of brush, logs or trees.
94. Spoils shall not be placed or stored in locations where soils are wet or unstable, or where slope stability could be adversely affected.
95. Do not locate spoil piles in or immediately adjacent to wetlands and watercourses.
96. Store spoil piles in a manner (e.g. cover pile with plastic tarps and surround base of pile with straw wattle) or location that would not result in any runoff from the spoil pile ending up in wetlands and watercourses.
97. Separate organic material (e.g., roots, stumps) from the dirt fill and store separately. Place this material in long-term, upland storage sites, as it cannot be used for fill.
98. Keep temporary disposal sites out of wetlands, adjacent riparian corridors, and ordinary high water areas as well as high risk zones, such as 100-year floodplain and unstable slopes.
99. After placement of the soil layer, track walk the slopes perpendicular to the contour to stabilize the soil until vegetation is established. Track walking creates indentations that trap seed and decrease erosion of the reclaimed surfaces.
100. Revegetate the disposal site with a mix of native plant species. Cover the seeded and planted areas with mulched straw at a rate of 2 tons per acre. Apply jute netting or similar erosion control fabric on slopes greater than 2:1 if site is erosive.

E. Water Storage and Use

WATER USE

101. Conduct operations on a size and scale that considers available water sources and other water use and users in the planning watershed.
102. Implement water conservation measures such as rainwater catchment systems, drip irrigation, mulching, or irrigation water recycling. (Also see BMPs for Irrigation, below)
103. Take measures to minimize water diversion during low flow periods.
104. Options for documentation of water diversions and/or water usage may include the use of water meter devices and date-stamped photographs of water meter readings.
105. Hauled water utilized for irrigation shall be documented via receipt or similar, and show the date, name, and license plate of the water hauler, and the quantity of water purchased.
106. Apply water at agronomic rates (do not overwater plants).

WATER STORAGE

107. If using a water storage tank, do not locate the tank in a flood plain or next to equipment that generates heat. Locate the tank so it is easy to install, access, and maintain.
108. Vertical tanks should be installed according to manufacturer's specifications and placed on firm, compacted soil that is free of rocks/sharp objects and capable of bearing the weight of the tank and its maximum contents. In addition, a sand or pea gravel base with provisions for preventing erosion is highly recommended. Installation sites for tanks 8,000 gallons or more must be on a reinforced concrete pad providing adequate support and enough space to attach a tank restraint system (anchor using the molded-in tie down lugs with moderate tension, being careful not to over-tighten), especially where seismic or large wind forces are present.
109. Horizontal tanks shall be secured with bands and/or hoops to prevent tank movement.
110. Design and construct storage ponds in properly sited locations, off-stream. Plant vegetation along the perimeter of the pond. Construct berms or excess freeboard space around the perimeter of the pond to allow for sheet flow inputs.
111. Provide adequate outlet drainage for overflow of ponds, including low impact designs, to promote dispersal and infiltration of flows.
112. Place proper lining or sealing in ponds to prevent water loss.

113. Storage bladders are not encouraged for long term water storage reliability. If they are utilized, ensure that they are designed to store water, and that they are sited to minimize potential for water to flow into a watercourse in the event of a catastrophic failure. Used bladders (e.g. military surplus bladders) shall be checked for interior residual chemicals and integrity prior to use. Inspect bladder and containment features periodically to ensure integrity.

F. Irrigation Runoff

114. Irrigate at rates to avoid or minimize runoff.
115. Regularly inspect for leaks in mains and laterals, in irrigation connections, or at the ends of drip tape and feeder lines. Repair any found leaks.
116. Design irrigation system to include redundancy (i.e., safety valves) in the event that leaks occur, so that waste of water is prevented and minimized.
117. Recapture and reuse irrigation runoff (tailwater) where possible, through passive (gravity-fed) or active (pumped) means.
118. Construct retention basins for tailwater infiltration; percolation medium may be used to reduce pollutant concentration in infiltrated water. Constructed treatment wetlands may also be effective at reducing nutrient loads in water. Ensure that drainage and/or infiltration areas are located away from unstable or potentially unstable features.
119. Regularly replace worn, outdated or inefficient irrigation system components and equipment.
120. Use mulches (e.g. wood chips or bark) in cultivation areas that do not have ground cover to prevent erosion and minimize evaporative loss.
121. Leave a vegetative barrier along the property boundary and interior watercourses to act as a pollutant filter.
122. Employ rain-triggered shutoff devices to prevent irrigation after precipitation.

G. Fertilizers, Soil Amendments, Pesticides, Petroleum Products, and Other Chemicals

123. Evaluate irrigation water, soils, growth media, and plant tissue to optimize plant growth and avoid over-fertilization.
124. Reference Department of Pesticide Regulations Guidance (see Attachments E-1 and E-2 of Order No. R1-2015-0023)
125. All chemicals shall be stored in a manner, method, and location that ensures that there is no threat of discharge to waters of the state.
126. Products shall be labeled properly and applied according to the label.
127. Use integrated pest management strategies that apply pesticides only to the area of need, only when there is an economic benefit to the grower, and at times when runoff losses are least likely, including losses of organic matter from dead plant material.

128. Periodically calibrate pesticide application equipment.
129. Use anti-backflow devices on water supply hoses, and other mixing/loading practices designed to reduce the risk of runoff and spills.
130. Petroleum products shall be stored with a secondary containment system.
131. Throughout the rainy season, any temporary containment facility shall have a permanent cover and side-wind protection, or be covered during non-working days and prior to and during rain events.
132. Materials shall be stored in their original containers and the original product labels shall be maintained in place in a legible condition. Damaged or otherwise illegible labels shall be replaced immediately.
133. Bagged and boxed materials shall be stored on pallets and shall not be allowed to accumulate on the ground. To provide protection from wind and rain throughout the rainy season, bagged and boxed materials shall be covered during non-working days and prior to rain events.
134. Have proper storage instructions posted at all times in an open and conspicuous location.
135. Prepare and keep onsite a Spill Prevention, Countermeasures, and Cleanup Plan (SPCC Plan) if applicable⁴.
136. Keep ample supply of appropriate spill clean-up material near storage areas.

H. Cultivation-Related Wastes

137. Cultivation-related waste shall be stored in a place where it will not enter a stream. Soil bags and other garbage shall be collected, contained, and disposed of at an appropriate facility, including for recycling where available. Pots shall be collected and stored where they will not enter a waterway or create a nuisance. Plant waste and other compostable materials be stored (or composted, as applicable) at locations where they will not enter or be blown into surface waters, and in a manner that ensures that residues and pollutants within those materials do not migrate or leach into surface water or groundwaters.
138. Imported soil for cultivation purposes shall be minimized. The impacts associated with importation of soil include, but are not limited to increased road maintenance and the increased need for spoils management. Use of compost increases the humic acid content and water retention capacity of soils while reducing the need for fertilizer application. In the event that containers (e.g. grow bags or grow pots) are used for cultivation, reuse of soil shall be maximized to the extent feasible.

⁴ SPCC plans are required for over 1,320 gallons of petroleum stored aboveground or 42,000 gallons below ground. Additionally, any type of storage container requires an SPCC if it is larger than 20,000 gallons, or if the cumulative storage capacity on-site exceeds 100,000 gallons (Health and Safety Code section 25270-25270.13) A sample SPCC can be found here: <http://www.calcupa.net/civica/filebank/blobdownload.asp?BlobID=3186>

139. Spent growth medium (i.e. soil and other organic medium) shall be handled to minimize discharge of soil and residual nutrients and chemicals to watercourses. Proper handling of spent soil could include incorporating into garden beds, spreading on a stable surface and revegetation, storage in watertight dumpsters, covering with tarps or plastic sheeting prior to proper disposal, and use of techniques to reduce polluted runoff described under Item F. Irrigation Runoff.
140. Other means of handling cultivation-related waste may be considered on a site-specific basis.

I. Refuse and Human Waste

141. Trash containers of sufficient size and number shall be provided and properly serviced to contain the solid waste generated by the project. Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers. Use lined bins or dumpsters to reduce leaking of liquid waste. Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This might include berming or grading the waste handling area to prevent run-on of stormwater. Make sure trash container areas are screened or walled to prevent off-site transport of trash. Consider using refuse containers that are bear-proof and/or secure from wildlife. Refuse shall be removed from the site on a frequency that does not result in nuisance conditions, transported in a manner that they remain contained during transport, and the contents shall be disposed of properly at a proper disposal facility.
142. Ensure that human waste disposal systems do not pose a threat to surface or ground water quality or create a nuisance. Onsite treatment systems should follow applicable County ordinances for human waste disposal requirements, consistent with the applicable tier under the State Water Resources Control Board Onsite Waste Treatment System Policy⁵.

⁵ Available at: http://www.waterboards.ca.gov/water_issues/programs/owts/docs/owts_policy.pdf (as of the date of the Order).

IV. References

- Handbook for Forest, Ranch, & Rural Roads: A Guide for Planning, Designing, Constructing, Reconstructing, Upgrading, Maintaining, and Closing Wildland Roads
http://www.pacificwatershed.com/sites/default/files/handbook_chapter_download_page.pdf
- A Water Quality and Stream Habitat Protection Manual for County Road Maintenance in Northwestern California Watersheds
<http://www.5counties.org/roadmanual.htm>
- Construction Site BMP Fact Sheets
<http://www.dot.ca.gov/hq/construc/stormwater/factsheets.htm>
- EPA Riparian/Forested Buffer
<http://water.epa.gov/polwaste/npdes/swbmp/Riparian-Forested-Buffer.cfm>
- Creating Effective Local Riparian Buffer Ordinances
http://www.rivercenter.uga.edu/publications/pdf/riparian_buffer_guidebook.pdf
- How to Install Residential Scale Best Management Practices (BMPs) in the Lake Tahoe Basin
<http://www.tahoebmp.org/Documents/Contractors%20BMP%20Manual.pdf>
- Spoil Pile BMPs
http://michigan.gov/documents/deq/deq-wb-nps-sp_250905_7.pdf
- Sanctuary Forest Water Storage Guide
http://agwaterstewards.org/images/uploads/docs/1213661598_Water_Storage_Guide.pdf
- Natural Resources Conservation Service-USDA, "Ponds – Planning, Design, Construction", Agriculture Handbook
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_030362.pdf
- Division of Safety of Dams size requirements
<http://www.water.ca.gov/damsafety/jurischart/>
- Water Tanks: Guidelines for Installation and Use
http://dnn7.snydernetwork.com/_pdf/_septic/Septic%20Catalog%202010.pdf
- BEST MANAGEMENT PRACTICES (BMP's) University of California Cooperative Extension
http://www.waterboards.ca.gov/sandiego/water_issues/programs/wine_country/docs/updates081910/ucce_bmps.pdf
- California Stormwater Quality Association
Section 4: Source Control BMPs
<https://www.casqa.org/sites/default/files/BMPHandbooks/sd-12.pdf>
- CA DOT Solid Waste Management Plan
<http://www.dot.ca.gov/hq/construc/stormwater/WM-05.pdf>
- State Water Resources Control Board Onsite Wastewater Treatment System (OWTS) policy
http://www.waterboards.ca.gov/water_issues/programs/owts/docs/owts_policy.pdf

California Stormwater Quality Association
Section 4: Source Control BMPs

<https://www.casqa.org/sites/default/files/BMPHandbooks/sd-32.pdf>

California Riparian Habitat Restoration Handbook

http://www.conservation.ca.gov/dlrp/watershedportal/InformationResources/Documents/Restoration_Handbook_Final_Dec09.pdf

The Practical Streambank Bioengineering Guide

http://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/idpmcpu116.pdf

150728_KVG_of_AppendixB_BMP

Appendix B

Monitoring Plan and Photo Log

APPENDIX B: MONITORING PLAN AND PHOTO LOGS

Monitoring Plan – In general, the entire road network, cultivation area and associated facilities need to be monitored throughout the year to catch any problems that might arise and to monitor the effectiveness of corrective actions which are implemented. Refer to Figure 2 for the location of site specific monitoring points you are responsible for tracking. Regardless, the entire project site needs to be regularly inspected and monitored to ensure that the site achieves and maintains compliance with the 12 Standard Conditions. If additional deficiencies develop, or individual problems arise, then corrective actions must be implemented immediately and these problem areas will need to be further monitored according to the WRPP.

For this Project Site, eight (8) Monitoring Points (MPs) have been identified. MP #1 and MP #2 focus on road-related erosion control, including site maintenance and the lack of proper road surface drainage features. MP #3 is located at an active fillslope landslide located on a legacy road landing. MP #4 through MP #7 are located at stream crossings exhibiting poor culvert installation, past and active erosion, and diversion potential. MP #8 addresses improper soil and cultivation waste storage.

The goal of the monitoring on this Project Site is to ensure the original problems or non-compliant features (e.g., road drainage issues; under-designed stream crossings, etc.) have been effectively treated and that environmental problems or threats to water quality do not arise or are adequately mitigated during the year. Consult with PWA if a problem is detected at any of these monitoring locations or elsewhere on the property, or if you would like our assistance in monitoring or developing corrective actions (BMPs) for problems that develop. Please also report to PWA when one or more of the corrective actions in the WRPP have been implemented, and include photos and descriptions of the actions taken.

Site inspection schedule - According to the NCRWQCB, periodic inspections should include visual inspection of the site, including any management measures/practices, to ensure they are being implemented correctly and are functioning as expected. Inspections include photographic documentation of any controllable sediment discharge sites, as identified on the site map, and a visual inspection of those locations on the site where pollutants or wastes, if uncontained, could be transported into receiving waters, and those locations where runoff from roads or developed areas drains into or towards surface water.

At a minimum, sites shall be inspected at the following times to ensure timely identification of changed site conditions and to determine whether implementation of additional management measures is necessary to prevent or minimize discharges of waste or pollutants to surface water:

- 1) Before and after any significant alteration or upgrade to a given stream crossing, road segment, or other controllable sediment discharge site. Inspection should include photographic documentation, with photo records to be kept on-site.
- 2) Prior to October 15 to evaluate site preparedness for storm events and stormwater runoff.
- 3) Following the accumulation of 3 inches cumulative precipitation (starting September 1st) or by December 15th, whichever is sooner.
- 4) Following any rainfall event with an intensity of 3 inches precipitation in 24 hours. Precipitation data can be obtained from the National Weather Service by entering the site zip code at <http://www.srh.noaa.gov/forecast>; Pick the nearest or most relevant zip code and then select the 3 day history that will also show precipitation totals.

Photo Log of features of interest and monitoring points before, during, and/or after treatment

Photo #	Monitoring Point	Standard Condition	Date	Pre-, during, or post-treatment	Description
1	MP #1	4.1	2/16/16	Pre-	Road Surface Discharge Point (RSDP) #1- view of gully on Road 3 down road from the cutbank spring at the landing
2	MP #1	4.1	2/16/16	Pre-	RSDP#1 point of delivery into the Class III watercourse below Stream Crossing #3.
3	MP #2	4.1	2/16/16	Pre-	RSDP #2- View of gully coming down Road 3 and continuing onto Road 4, past Cultivation Area (CA) #1. Note fan of recently eroded and deposited sediment at the road junction. The arrow point at the probable, off-property source based on the observable flow path.
4	MP #2	4.1	2/16/16	Pre-	RSDP #2- View road runoff and deposited sediment on Road 4 next to CA #1. See Photo #1 for source of gully erosion and eroded sediment, pointed out by the arrow.
5	MP #2	4.1	2/16/16	Pre-	RSDP #2- View of gully formed on Road 4 leading towards CA #2. Road is insloped and needs drainage structures to disperse surface runoff.
6	MP #2	4.1	2/16/16	Pre-	RSDP #2- Discharge point onto a moderately sloped area with low risk of sediment delivery to surface waters.
7	MP #3	4.1	2/16/16	Pre-	View of the fillslope landslide feature on a legacy landing at the end of Road 3. Note the Class II watercourse potential to scour and undercut the channel banks.

Photo Log of features of interest and monitoring points before, during, and/or after treatment

Photo #	Monitoring Point	Standard Condition	Date	Pre-, during, or post-treatment	Description
None	MP #4	4.2	2/16/16	Pre-	SC #1- A Class III watercourse conveyed through an undersized 12-inch culvert.
8	MP #5	4.2	2/16/16	Pre-	SC #2- View of a Class II watercourse that has washed out the stream crossing fill with an old culvert remaining in the eroded road fill.
9	MP #6	4.2	2/16/16	Pre-	SC #3- View of a Class II watercourse conveyed through a partially washed fill crossing.
None	MP #7	4.2	2/16/16	Pre-	SC #4- The existing crossing on the Salyer Mad River Road was not observed during PWA's initial site visit. This culvert is the responsibility of Humboldt County Public Works.
10	MP #8	4.7 and 4.10	2/16/16	Pre-	Cultivation waste - View of geo-pots with exposed soil during the winter season that is subject to nutrient leaching. These soil pots should be tarped during the winter.

Photo Log of features of interest and monitoring points before, during, and/or after treatment

Photo #	Monitoring Point	Standard Condition	Date	Pre-, during, or post-treatment	Description

Photo Log of features of interest and monitoring points before, during, and/or after treatment					
Photo #	Monitoring Point	Standard Condition	Date	Pre-, during, or post-treatment	Description

Photo Log of features of interest and monitoring points before, during, and/or after treatment

Photo #	Monitoring Point	Standard Condition	Date	Pre-, during, or post-treatment	Description

Appendix C

Photo Documentation of Monitoring Points

Appendix C: Photo Documentation of Monitoring Points

4.1 Standard Condition #1: Site Maintenance, Erosion Control and Drainage Features

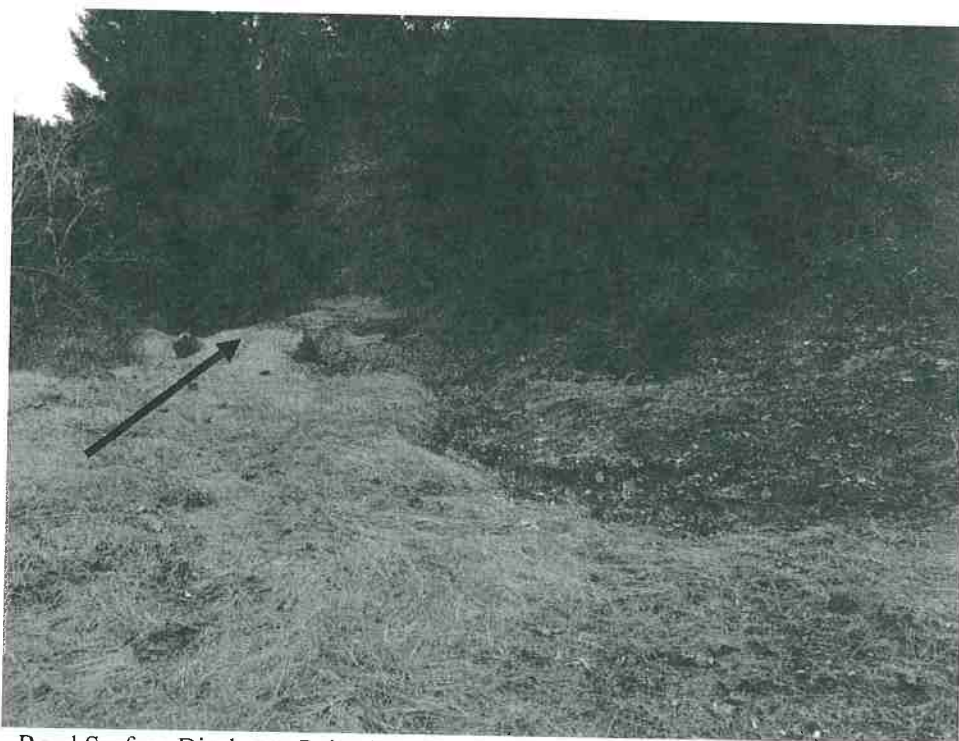


Photo 1, MP #1 – Road Surface Discharge Point (RSDP) #1- View of a gully on Road 3 between Stream Crossing (SC) #3 and the cutbank spring at the landing, which is causing the road surface erosion due to the lack of drainage features.



Photo 2, MP#1 - RSDP#1. Point of delivery (as indicated by arrow in Photo 1, above) into a Class III watercourse resulting from a lack of drainage structures.

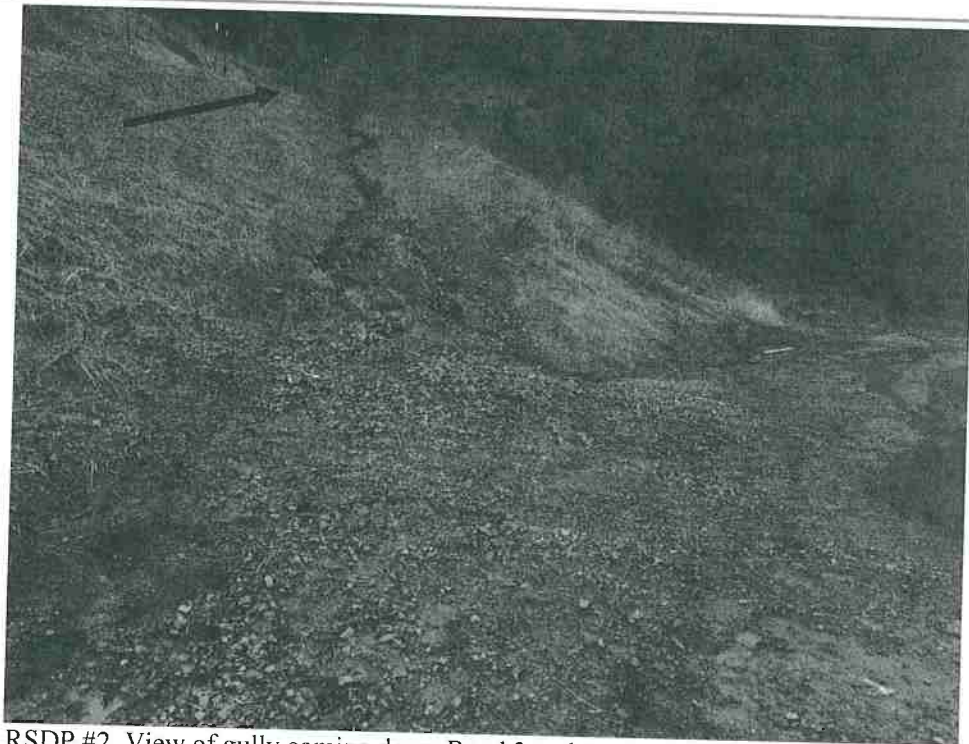


Photo 3, MP #2 - RSDP #2. View of gully coming down Road 3 and continuing onto Road 4, past Cultivation Area (CA) #1. The flow path appears to be originating primarily from the adjacent, upslope, and off parcel cultivation activities.



Photo 4, MP #2 – RSDP #2. View showing the runoff from Road 3 dispersing onto and saturating Road 4 next to CA #2.



Photo 5, MP #2 - RSDP #2. View of road runoff becoming concentrated and forming a gully along Road 4 downslope from CA #2.



Photo 6, MP #2 – RSDP #2 – The road surface discharge point off Road 4 that originated from Road 3 (Photos 3-5 above). This gully discharges onto an area with a low risk of sediment delivery to surface waters.



Photo 7, MP #3 –View of the landslide feature on a legacy landing with a probable blown crossing, at the end of Road 3.
Note the Class II watercourse potential to scour and undercut the channel banks.

4.2 Standard Condition #2: Stream Crossing Maintenance

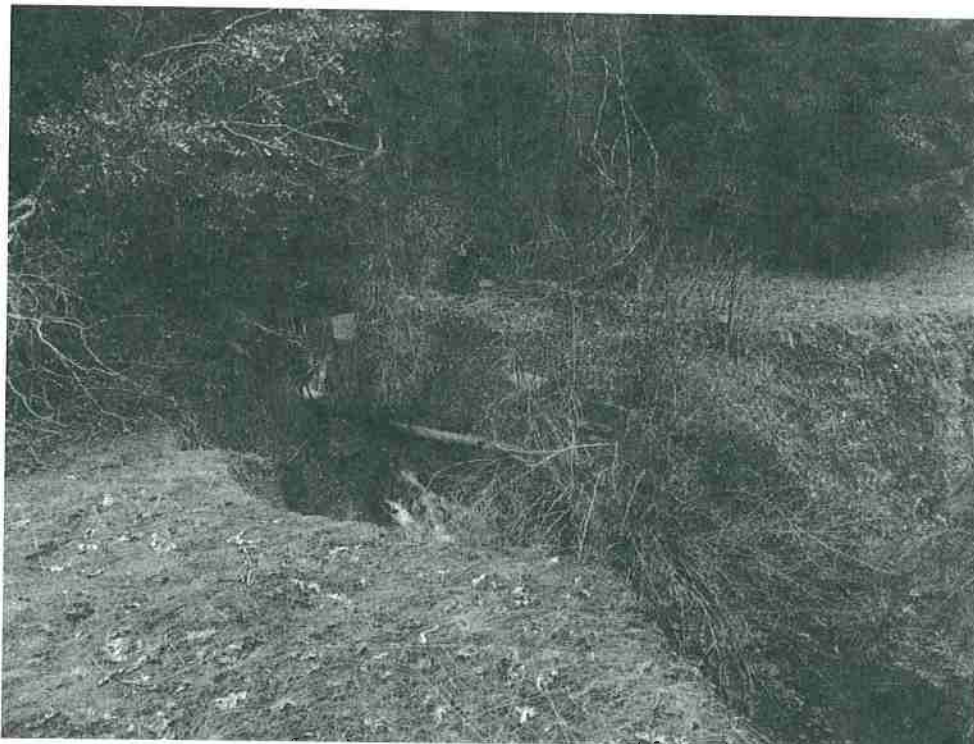


Photo 8, MP #5 – SC #2- View of a Class II watercourse that has washed out the crossing with an old culvert and pipe still remaining in the road fill.



Photo 9, MP #6 – SC #3- View of a Class II watercourse conveyed through a partially washed fill crossing.

4.7 Standard Condition #7: Fertilizers and Soil Amendments, and
4.10 Standard Condition #10: Cultivation-Related Wastes

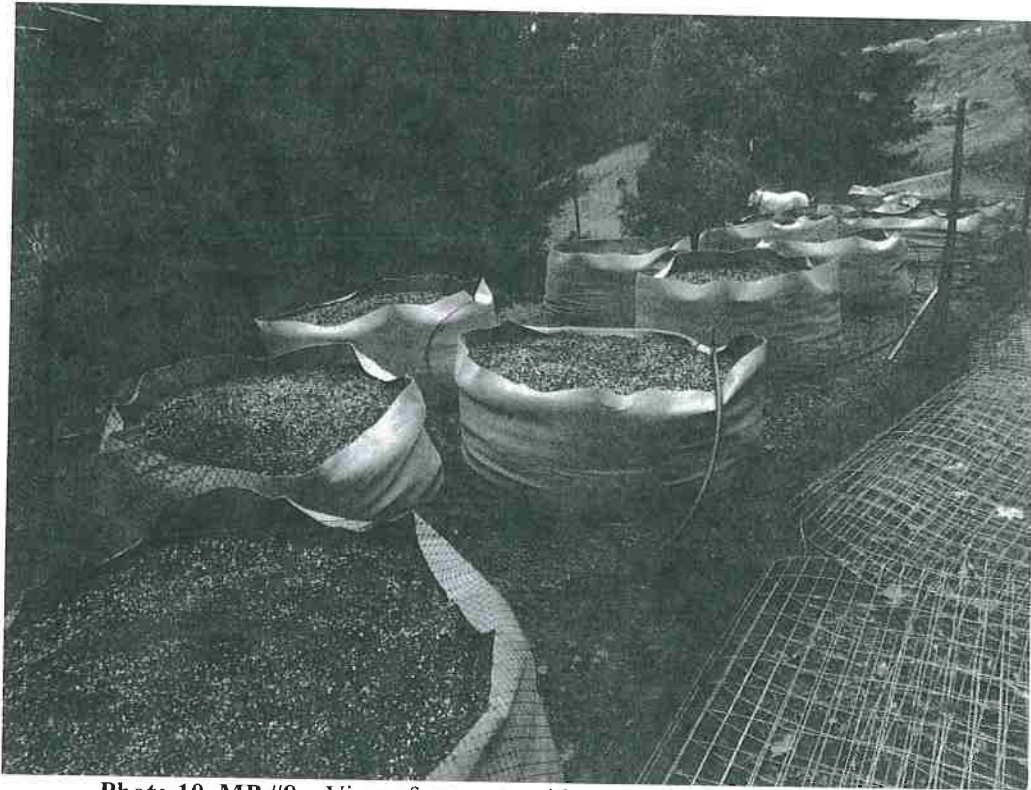


Photo 10, MP #8 – View of geo-pots with exposed soil during the winter.

Appendix D

PWA Water Log Sheets

Water Input to Storage
- Log Sheet -

[illegible]

Appendix E

PWA Fertilizer-Amendment Log Sheets

Fertilizer and Amendment Application Log Sheet

WD ID:

PWA ID:

Watershed:

Year:

Sheet #: _____ of _____

Product name

Amendment

Type
(circle type)

Nutrient content (N-P-K ratio)

Recommended application amount from product label (e.g. # of ounces per application)
--

Application
units (grams,
ounces, liters,
gallons, etc.)

**Recommended
application
schedule (daily,
weekly, etc.)**

Actual amount
applied in this
application
(same units)

Date applied (Mo/Day)

Location
(Cultivation area #,
Greenhouse #,
Hoophouse #, etc.)

Initials

Comments

Appendix F

PWA Pesticide-Herbicide Log Sheets Legal Pest Management Practices

Pesticide and Herbicide Application Log Sheet				WD ID:		PWA ID:		Watershed:	
Location:									
Product name	Pesticide or Herbicide (circle one)	Product type (circle type)	Recommended application amount from product label (e.g. # of ounces per application)	Application units (grams, ounces, liters, gallons, etc.)	Recommended application schedule (daily, weekly, etc.)	Actual amount (in same units) used per application	Date applied (mo/day)	Initials	Comments
	Pest./Herb.	liquid/solid							
	Pest./Herb.	liquid/solid							
	Pest./Herb.	liquid/solid							
	Pest./Herb.	liquid/solid							
	Pest./Herb.	liquid/solid							
	Pest./Herb.	liquid/solid							
	Pest./Herb.	liquid/solid							
	Pest./Herb.	liquid/solid							
	Pest./Herb.	liquid/solid							
	Pest./Herb.	liquid/solid							
	Pest./Herb.	liquid/solid							
	Pest./Herb.	liquid/solid							

LEGAL PEST MANAGEMENT PRACTICES FOR MARIJUANA GROWERS IN CALIFORNIA

PESTS OF MARIJUANA IN CALIFORNIA

Marijuana pests vary according to cultivar (variety), whether the plants are grown indoors or outdoors, and where the plants are grown geographically. The pests included in this review are based on two sources: a presentation given in 2013 by Whitney Cranshaw, an extension entomologist at Colorado State University, and a review article by John M. McPartland, a professor of family medicine at the University of Vermont.

HOW TO INTERPRET THE TABLES

Table 1 lists active ingredients not illegal to use on marijuana and the pests that these active ingredients target.

These active ingredients are exempt from **residue tolerance requirements**¹ and either exempt from **registration requirements**² or registered for a use that's broad enough to include use on marijuana. Residue tolerance requirements are set by U.S. EPA for each pesticide on each food crop and is the amount of pesticide residue allowed to remain in or on each treated crop with "reasonable certainty of no harm." Some pesticides are exempted from the tolerance requirement when they're found to be safe. Some of these pesticides are bacterial-based insect pathogens (e.g., *Bacillus thuringiensis*) or biofungicides (e.g., *Bacillus subtilis*, *Gliocladium virens*).

Active ingredients exempt from registration requirements are mostly food-grade essential oils such as peppermint oil or rosemary oil.

Tables 2 and 3 list pests of marijuana grown outdoors and indoors, and **Table 3** shows pests arranged by the portion of the plant they attack. An explanation of the column labels for Tables 2 and 3 follow.

PESTS. The tables show the most likely pests in California based on Cranshaw's presentation and McPartland's list and gleaned from California-based web sites and blogs. Some pests that drew attention on several blogs (e.g., hemp russet mite) may be

worse during drought years. Many have cyclic population fluctuations and others are mainstays of general greenhouse cultivation (e.g., whiteflies, thrips, and fungus gnats). We'll add weeds to this compendium when we have more information.

DAMAGE. For damage caused by greenhouse pests, we derived information from Cranshaw's presentation; for that of outdoor pests when there wasn't any overlap, McPartland's list was used and information from UC IPM for various crops. Accounts of damage by rodents is anecdotal.

IPM PRACTICES. Most of these are standard practices for pests on hosts other than marijuana. For more detailed explanations, see information compiled by the University of California Statewide IPM Program (UC IPM) at www.ipm.ucdavis.edu. You can enter a pest name in the search box (e.g., cutworm) and read about IPM practices for the pest on crops other than marijuana. For marijuana grown indoors, go to the UC IPM [home page](#), click on [Agricultural Pests](#) and scroll down the alphabetical list until you reach [ornamental nurseries](#).

Some practices were excluded because they apply to nearly all of the pests. For example, when targeting aphids, whiteflies, and thrips, growers can attract predaceous and parasitic arthropods by planting cover crops (e.g., California buckwheat) and insectary plants—especially those in the carrot, mustard, and sunflower families.

LEGAL PESTICIDES. These are covered above in the Table 1 description and are exempt from **residue tolerance requirements** and either exempt from **registration requirements** or registered for a use that is broad enough to include use on marijuana.

Table 4 shows marijuana pests by plant part. Not all of these pests are important, but their collective damage may affect the overall health of the plant.

REFERENCES

Cranshaw, Whitney. 2013. Challenges and opportunities for pest management of medical marijuana in Colorado. Presentation.

McPartland, J.M. 1996. *Cannabis* pests. J. Internatl. Hemp Assoc. 3(2): 49, 52–55.

¹ 40 CFR (Code of Federal Regulations)

² under FIFRA section 25(b) and 3 CCR section 6147

Table 1. Active ingredients that are exempt from residue tolerance requirements^a and either exempt from registration requirements^b or registered for a use broad enough to include use on marijuana.

ACTIVE INGREDIENT	PEST OR DISEASE
azadirachtin ^a	aphids, whiteflies, fungus gnats, leafminers, cutworms
<i>Bacillus subtilis</i> QST ^{a1}	root diseases, powdery mildew
<i>Bacillus thuringiensis</i> ^{a2} subsp. <i>aizawai</i> or <i>kurstaki</i>	moth larvae (e.g., cutworms, budworms, hemp borer)
<i>Bacillus thuringiensis</i> ^{a2} subsp. <i>israelensis</i>	fly larvae (e.g., fungus gnats)
<i>Beauveria bassiana</i> ^{a3}	whiteflies, aphids, thrips
cinnamon oil ^b	whiteflies
<i>Gliocladium virens</i> ^{a1}	root diseases
horticultural oils ^a (petroleum oil)	mites, aphids, whiteflies, thrips; powdery mildew
insecticidal soaps ^a (potassium salts of fatty acids)	aphids, whiteflies, cutworms, budworms
iron phosphate ^a ; sodium ferric EDTA ^a	slugs and snails
neem oil ^a	mites; powdery mildew
potassium bicarbonate ^a ; sodium bicarbonate ^a	powdery mildew
predatory nematodes ^a	fungus gnats
rosemary + peppermint essential oils ^b	whiteflies
sulfur ^a	mites, hemp flea beetles
<i>Trichoderma harzianum</i> ^{a1}	root diseases

^a 40 CFR (Code of Federal Regulations)

^b FIFRA §25(b) and 3 CCR §6147 [FIFRA = the Federal Insecticide, Fungicide, and Rodenticide Act; CCR = California Code of Regulations]

¹ Biofungicides

² Bacterial-based insect pathogen

³ Fungal-based insect pathogen

Table 2. PEST MANAGEMENT PRACTICES FOR MARIJUANA GROWN OUTDOORS

PEST	DAMAGE	IPM PRACTICES (monitoring; cultural, physical, mechanical, biological)	PESTICIDES
MITES & INSECTS			
two-spotted spider mites <i>Tetranychus urticae</i>	Suck plant sap; stipple leaves	<ul style="list-style-type: none"> Keep dust down by hosing off plants (if dust is a problem) Release predatory mites 	neem oil, horticultural oil, sulfur
hemp russet mites <i>Aculops cannabicola</i>	Suck plant sap; kill leaves and flowers	<ul style="list-style-type: none"> Release predatory mites 	neem oil, horticultural oil, sulfur
crickets (field & house) <i>Gryllus desertus</i> , <i>G. chinensis</i> , <i>Acheta domesticus</i>	Eat seedlings	<ul style="list-style-type: none"> Use floating row covers or cones on individual plants 	—
termites	Eat roots	<ul style="list-style-type: none"> Flood nests 	—
leafhoppers	Suck plant sap; weaken plants	<ul style="list-style-type: none"> Encourage natural enemies by planting nectar sources 	horticultural oil or insecticidal soaps for nymphs
aphids <i>Phorodon cannabis</i> , <i>Myzus persicae</i> , <i>Aphis fabae</i>	Suck plant sap; weaken plants <i>P. cannabis</i> (bhang aphid) vectors tobacco mosaic virus	<ul style="list-style-type: none"> Hang up yellow sticky cards (alates) Hose off plants 	azadirachtin, horticultural oil, insecticidal soaps, <i>Beauveria bassiana</i>
whiteflies <i>Trialeurodes vaporariorum</i> , <i>Bemisia tabaci</i> , <i>B. argentifolii</i>	Suck plant sap; weaken plants	<ul style="list-style-type: none"> Hang up yellow sticky cards Reflective plastic mulch 	azadirachtin, horticultural oil, insecticidal soaps, rosemary + peppermint oils, <i>Beauveria bassiana</i>
leafminers <i>Liriomyza</i> spp.	Bore into roots and leaves	<ul style="list-style-type: none"> Remove older infested leaves Use biocontrol: release <i>Diglyphus</i> parasitoids 	azadirachtin

PEST		DAMAGE	IPM PRACTICES (monitoring; cultural, physical, mechanical, biological)	PESTICIDES
LEPIDOPTERA	cutworms <i>Agrotis ipsilon</i> , <i>A. segetum</i> , <i>Spodoptera litura</i> , <i>S. exigua</i> , <i>Mamestra brassicae</i> (Noctuidae)	Eat seedlings	<ul style="list-style-type: none"> Use pheromone traps to detect adults. Remove weeds, which serve as a reservoir for cutworms and other noctuids 	Vegetative stage only: Use <i>Bacillus thuringiensis kurstaki</i> if egg-laying adults found, insecticidal soap; azadirachtin
	budworms <i>Helicoverpa armigera</i> , <i>H. zea</i> (Noctuidae)	Eat flowering buds	<ul style="list-style-type: none"> Shake plants to dislodge larvae Remove infested buds Plant corn as trap crop 	Vegetative stage only: Use <i>Bacillus thuringiensis kurstaki</i> , insecticidal soap
	hemp borers (= hemp moth) <i>Grapholita deliueana</i> (Tortricidae)	Bore through stalks (caterpillars)	<ul style="list-style-type: none"> Plow crop under in fall; remove plants still standing; remove nearby hemp and hop plants Use light traps at night for monitoring Use biocontrol: <i>Trichogramma</i> 	<i>Bacillus thuringiensis kurstaki</i>
COLEOPTERA	hemp flea beetles <i>Psylliodes attenuata</i> (Chrysomelidae)	Bore into stems (grubs); feed on seedlings and leaves of larger plants (beetles)	<ul style="list-style-type: none"> Use reflective mulches Plant trap crops (e.g., radish or Chinese mustard) 	sulfur
	scarab grubs (possibly other beetles)	Bore into stems	<ul style="list-style-type: none"> Use parasitic nematodes 	—
MAMMALS				
mice (e.g., house mice)		Eat young sprouts and seeds	<ul style="list-style-type: none"> Double wrap a 3'-tall chicken wire fence around plants Trap (minus rodenticides) Mount barn owl boxes 	Rodenticides (see footnote below)
roof rats , <i>Rattus rattus</i> wood rats , <i>Neotoma</i> spp.		Strip bark from stems to build nests		
pocket gophers , <i>Thomomys</i> spp.		Tunnel through planting areas; feed on plants; gnaw on irrigation lines		
Columbian black-tailed deer , <i>Odocoileus hemionus columbianus</i>		Knock over plants; leave dander, droppings, and ticks behind	<ul style="list-style-type: none"> Install deer fencing 	—
black bears , <i>Ursus americana</i>		Knock over plants	<ul style="list-style-type: none"> Install electric fencing 	—

Rodenticides that are not DPR-restricted materials or federally restricted use pesticides *and* are registered for a broad enough use to include use in or around marijuana cultivation sites. If using a rodenticide always read and follow the label and check to make sure that the target rodent is listed. Second-generation anticoagulant products are DPR-restricted materials not labeled for field use and as such, should never be used in or around marijuana cultivation sites.

Table 3. PEST MANAGEMENT PRACTICES FOR MARIJUANA GROWN INDOORS
(e.g., greenhouses, sheds, and grow rooms)

PEST	DAMAGE	IPM PRACTICES (monitoring; cultural, physical, mechanical, biological)	PESTICIDES
DISEASES			
powdery mildew <i>Sphaerotheca macularis</i>	Grow on leaves as white and gray powdery patches	<ul style="list-style-type: none"> Use fans to improve air circulation 	horticultural oil; neem oil; sodium bicarbonate, potassium bicarbonate; <i>Bacillus subtilis</i>
pythium root rots <i>Pythium</i> spp.	Attack root tips and worsens when plants grow in wet soil	<ul style="list-style-type: none"> Avoid hydroponic production or wet soil conditions 	Incorporate biocontrol agents into root-growing media (e.g., <i>Gliocladium virens</i> , <i>Trichoderma harzianum</i> , <i>Bacillus subtilis</i>)
MITES & INSECTS			
two-spotted spider mite <i>Tetranychus urticae</i>	Suck plant sap; stipple leaves	<ul style="list-style-type: none"> Disinfest cuttings before introducing to growing area Release predatory mites 	neem oil, horticultural oil, sulfur
leafhoppers	Suck plant sap; weaken plants	<ul style="list-style-type: none"> Encourage natural enemies by planting nectar sources 	horticultural oil or insecticidal soaps for nymphs
whiteflies <i>Trialeurodes vaporariorum</i> , <i>Bemisia tabaci</i> , <i>B. argentifolii</i>	Suck plant sap; weaken plants	<ul style="list-style-type: none"> Hang up yellow sticky cards Use biocontrol: <i>Encarsia formosa</i> 	azadirachtin, <i>Beauveria bassiana</i> , cinnamon oil, horticultural oil
thrips <i>Heliothrips haemorrhoidalis</i> , <i>Frankliniella occidentalis</i> , <i>Thrips tabaci</i>	Stipple leaves and vector viruses	<ul style="list-style-type: none"> Hang up yellow or blue sticky cards 	
dark-winged fungus gnats (Diptera: Sciaridae) <i>Bradysia</i> spp.	Damage roots and stunt plant growth	<ul style="list-style-type: none"> Avoid overwatering Use growing media that deters gnat development Hang up yellow sticky cards Use biocontrol: soil-dwelling predatory mites 	<i>Bacillus thuringiensis israelensis</i> (BTI); predatory nematodes; azadirachtin soil drenches

Table 4. PESTS OF MARIJUANA BY PLANT PART

Seedlings	Flower & Leaf (grown outdoors)	Flower & Leaf (grown indoors)	Stalk & Stem	Root
cutworms	hemp flea beetle	spider mites	hemp borer	hemp flea beetle
birds	hemp borer	aphids	rats	white root grubs
hemp flea beetle	budworms	whiteflies		root maggots
crickets	leafminers	thrips		termites & ants
slugs		leafhoppers		fungus gnats
rodents				wireworms

Appendix G

Hazardous Materials Storage Guidelines

Appendix G. Hazardous Materials Storage Guidelines

Proper storage of hazardous materials (e.g., flammable liquids or gasses, many agricultural chemicals, oxidizers, acids, caustic substances) is essential for maintaining safe operations and for protection of the environment. Commercial operations that store hazardous materials are required to prepare a Hazardous Materials Business Plan (HMBP) and maintain Material Safety Data Sheets (MSDS) for each hazardous chemical that they store or use. County health agencies may require HMBPs to be submitted for their review. The HMBP information must be communicated to employees annually and be kept in a location that is readily accessible by employees. MSDSs explain how to medically treat a person that has been exposed to a hazardous substance and how to safely cleanup a spill.

Generally, incompatible hazardous materials must be stored in separate locations, with distinct secondary containment vessels for each type of material. Secondary containment is required for hazardous liquids and must be sized to contain a spill volume equivalent to the largest hazardous material container or 10% of the total volume, whichever is greater. Flammable and combustible hazardous materials must be separated from oxidizers by a distance of no less than 20 feet. The following guidelines should be followed when handling and storing hazardous materials.

Always label containers with the substance inside for both hazardous and non-hazardous materials. For flammable hazardous materials, make certain that an appropriate fire extinguisher is available nearby the storage area. Dry powder fire extinguishers are the most versatile. Water filled fire extinguishers should not be used on certain types of hazardous material fires (e.g. water-reactive metals, strong acids, petroleum).

Acids (e.g., hydrochloric acid, pool cleaner, citric acid) must be segregated from:
Reactive metals such as sodium, potassium, magnesium, etc.
Flammable and combustible materials.
Chemicals which could generate toxic or flammable fumes when mixed.
Bases.

Bases (e.g., Portland cement, lime, lye, or drain cleaner) must be segregated from:
Acids, metals, organic peroxides and easily ignitable materials.
Solvents.
Oxidizing acids and oxidizers.

Oxidizers (e.g. ammonium nitrate, ammonium phosphate, oxygen gas) must be segregated from:
Combustible and flammable liquids and gasses (e.g. oxygen-acetylene torches) by at least 20 feet of separation.
Reducing agents such as zinc, alkali metals, and formic acid.

Flammable materials (e.g., gasoline, fuses, gunpowder, acetylene cylinders) must be segregated from:

Oxidizers, caustic materials, acids, and bases.

It is good housekeeping practice to store compatible hazardous materials exclusively away from agricultural chemicals. Although uncommon, some organic agricultural amendments may be caustic, ignitable, or corrosive. Segregation of hazardous materials from non-hazardous materials eliminates the potential for cross-contamination of materials and exposure of workers to hazardous fumes or residues.

Guidelines for proper storage of hazardous materials and regulatory oversight (California Code of Regulations Title 22) are provided by the California Department of Toxic Substances Control (DTSC). The regulations are located in Social Security, Division 4.5, Environmental Health Standards for the Management of Hazardous Waste.

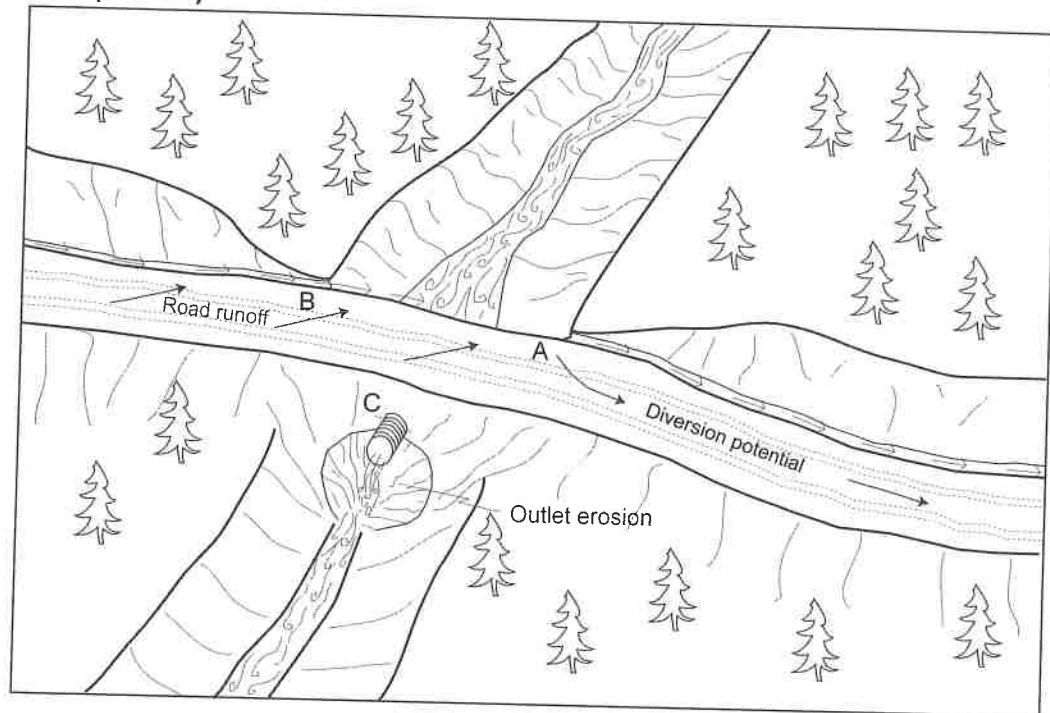
Appendix H

PWA Typical Drawings

Typical Problems and Applied Treatments for a Non-fish Bearing Upgraded Stream Crossing

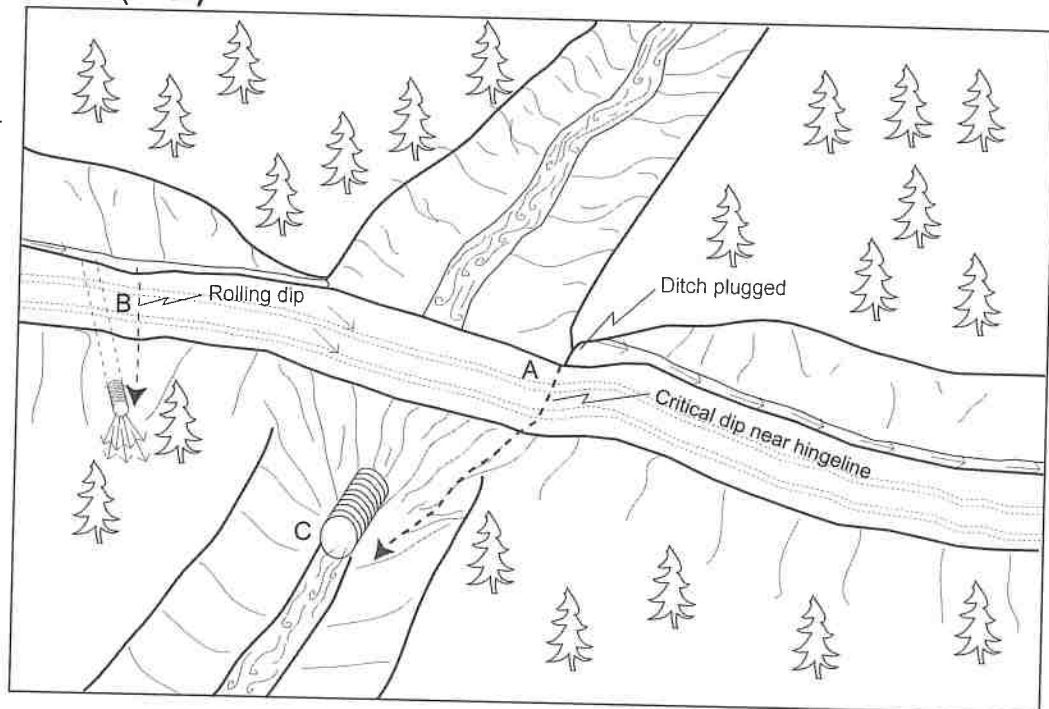
Problem condition (before)

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



Treatment standards (after)

- A - No diversion potential with critical dip installed near hingeline
- B - Road surface and ditch disconnected from stream by rolling dip and ditch relief culvert
- C - 100-year culvert set at base of fill

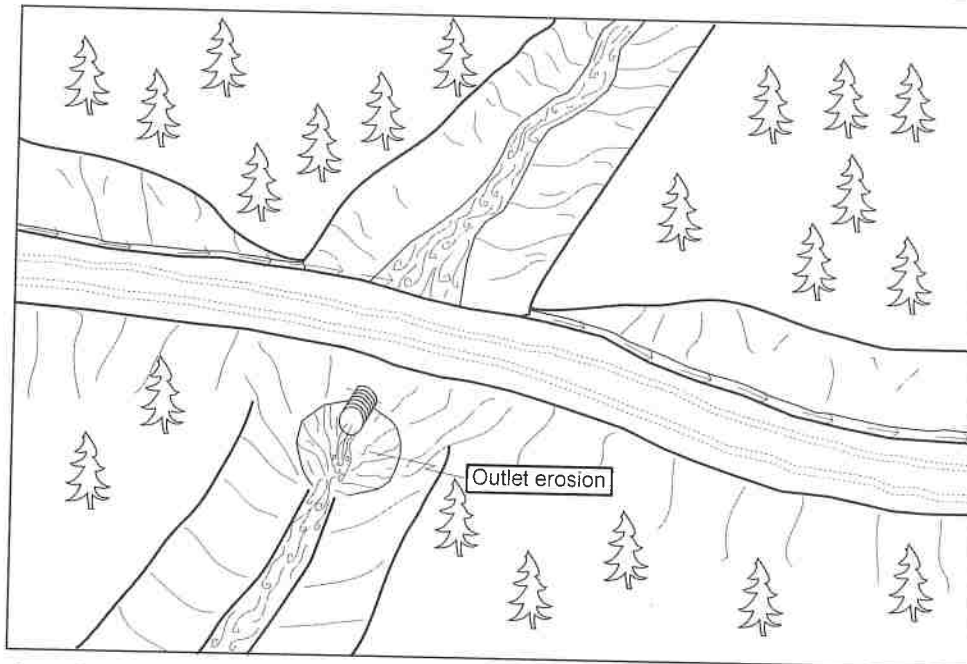


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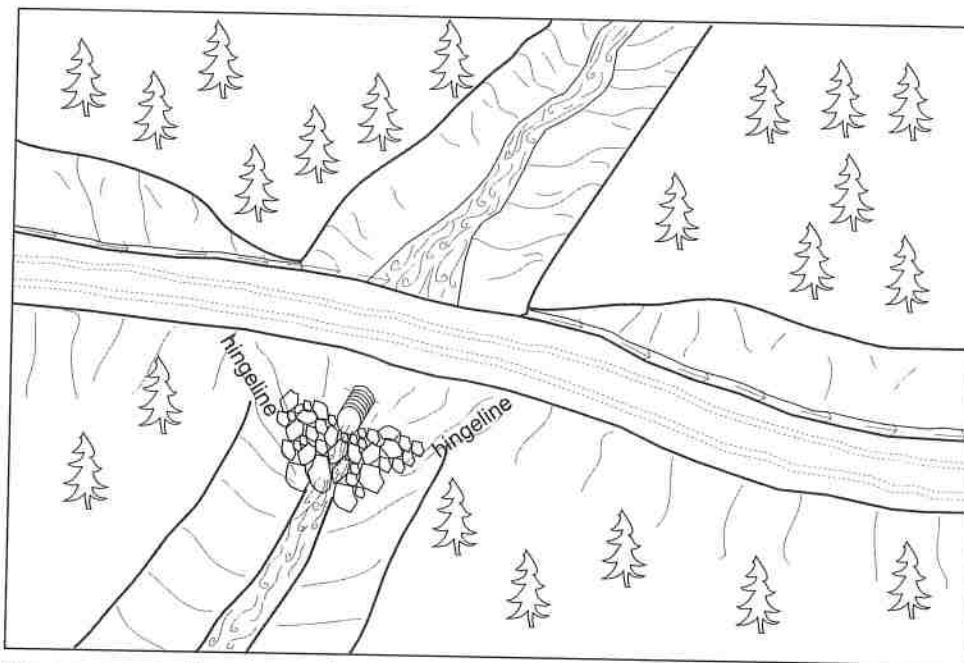
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PWA Typical Drawing #1a

Armoring Fill Faces to Upgrade Stream Crossings



Problem: Culvert set high in outboard fill has resulted in scour of the outboard fill face and natural channel.
Conditions: The existing stream crossing has a culvert sufficient in diameter to manage design stream flows and has a functional life.



Action: The area of scour is backfilled with rip-rap to provide protection in the form of energy dissipation for the remaining fill face and channel.

Treatment Specifications:

- 1) Placement of rip-rap should be between the left and right hingelines and extend from a keyway excavated below the existing channel base level at the base of the fill slope up and under the existing culvert.
- 2) Rock size and volume is determined on a site by site basis based on estimated discharge and existing stream bed particle size range (See accompanying road log).

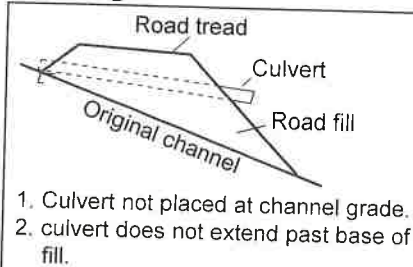
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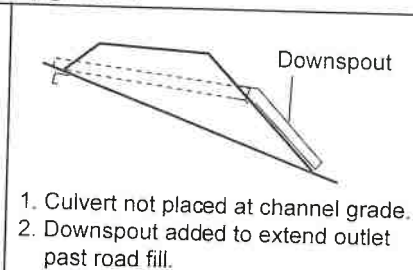
PWA Typical Drawing #1b

Typical Design of a Non-fish Bearing Culverted Stream Crossing

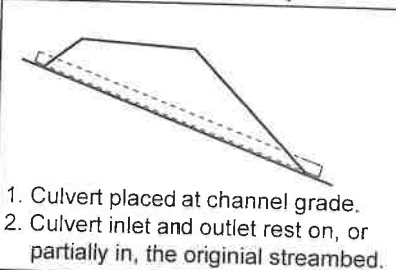
Existing



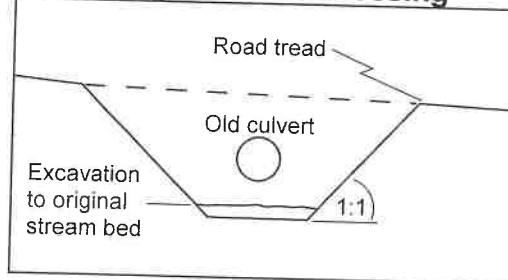
Upgraded



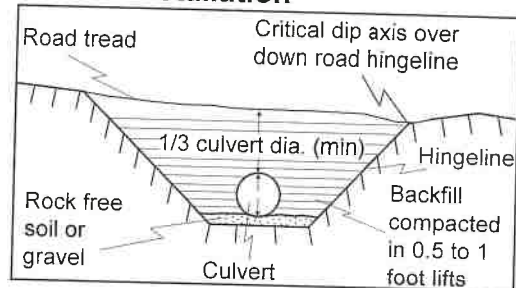
Upgraded (preferred)



Excavation in preparation for upgrading culverted crossing



Upgraded stream crossing culvert installation



Note:

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 peak storm 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, and prevent bank erosion and plugging by debris.
2. Culverts shall be placed at the base of the fill and 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.
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. First one end then the other end of the culvert shall be covered and secured. The center is covered last.
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 foot 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 designed 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 implemented will be evaluated on a site by site basis. Erosion control measures 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 rains.
5. Excess or unusable soil will be stored in long term spoil 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 downstream channel during the construction process.
7. Straw bales and/or silt fencing will be employed where necessary to control runoff within the construction zone.

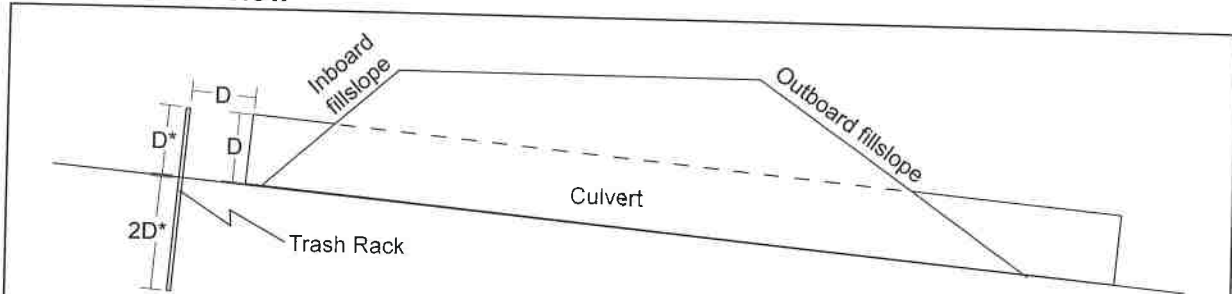
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Typical Drawing #2

Typical Design of a Single-post Culvert Inlet Trash Rack

Cross section view



D - Culvert diameter

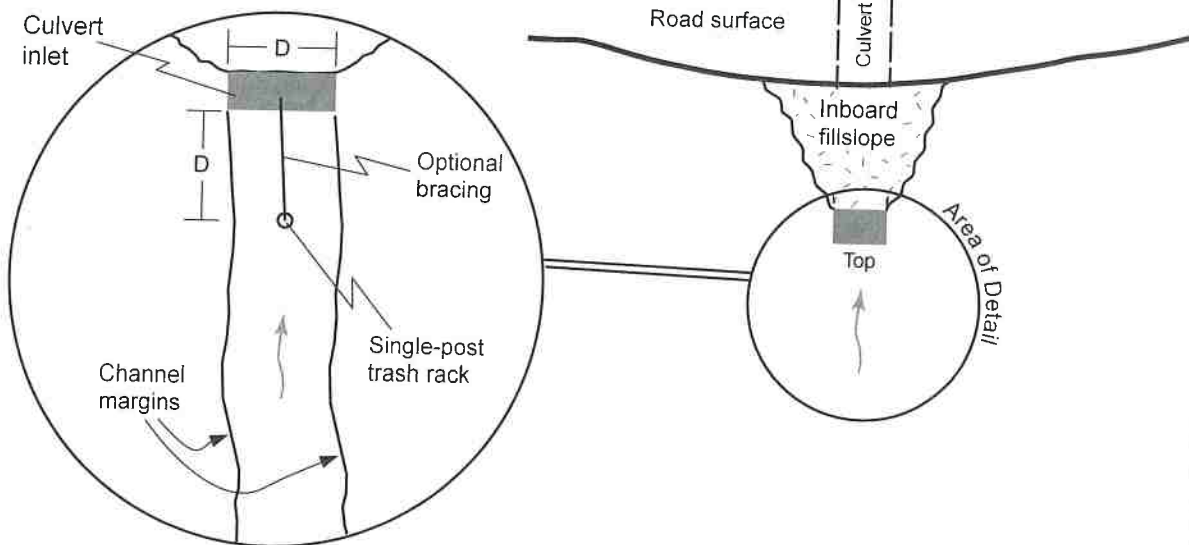
D* - If the culvert is designed for the 100-year peak storm flow, the trash rack height above the streambed should equal D.

If the culvert is undersized, then the trash rack needs to be extended vertically above the streambed to match or exceed the expected headwall height.

Plan view

Notes:

1. Many materials can be used for a single-post trash rack including old railroad track, galvanized pipe, and fence posts.
2. The diameter of single-post trash racks should be sized based on the size of expected woody debris. As a basic rule of thumb, the diameter of the trash rack should be equal to the diameter of the expected woody debris up to 4 inches.

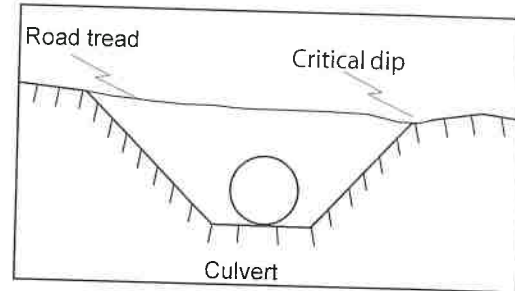
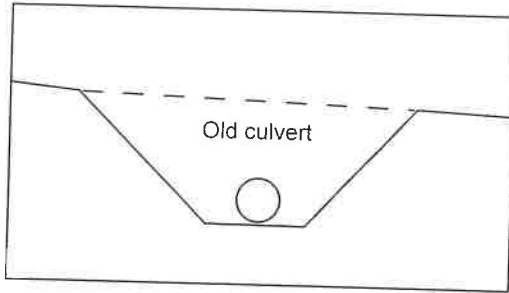


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Typical Drawing #3

Typical Design of Upgraded Stream Crossings



Stream crossing culvert Installation

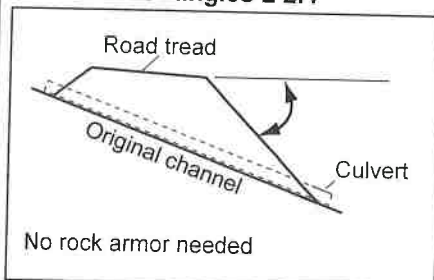
1. Culverts shall be aligned with natural stream channels to ensure proper function, and prevent bank erosion and plugging by debris.
2. Culverts shall be placed at the base of the fill and the grade of the original streambed or downspouted past the base of the fill.
3. Culverts shall be set slightly below the original stream grade so that the water drops several inches as it enters the pipe.
4. To allow for sagging after burial, a camber shall be between 1.5 to 3 inches per 10 feet culvert pipe length.
5. 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.
6. First one end and then the other end of the culvert shall be covered and secured. The center is covered last.
7. 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 foot lifts until 1/3 of the diameter of the culvert has been covered. A gas powered tamper can be used for this work.
8. Inlets and outlets shall be armored with rock or mulched and seeded with grass as needed.
9. Trash protectors shall be installed just upstream from the culvert where there is a hazard of floating debris plugging the culvert.
10. Layers of fill will be pushed over the crossing until the final designed road grade is achieved, at a minimum of 1/3 to 1/2 the culvert diameter.

Note:

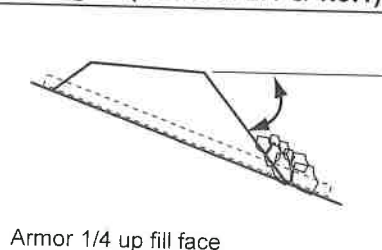
Road upgrading tasks typically include upgrading stream crossings by installing larger culverts and inlet protection (trash barriers) to prevent plugging. Culvert sizing for the 100-year peak storm flow should be determined by both field observation and calculations using a procedure such as the Rational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

Armoring fill faces

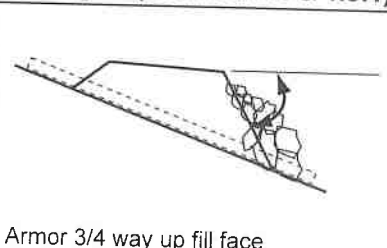
Fill angles $\leq 2:1$



Fill angles (between 2:1 & 1.5:1)



Fill angles (between 2:1 & 1.5:1)



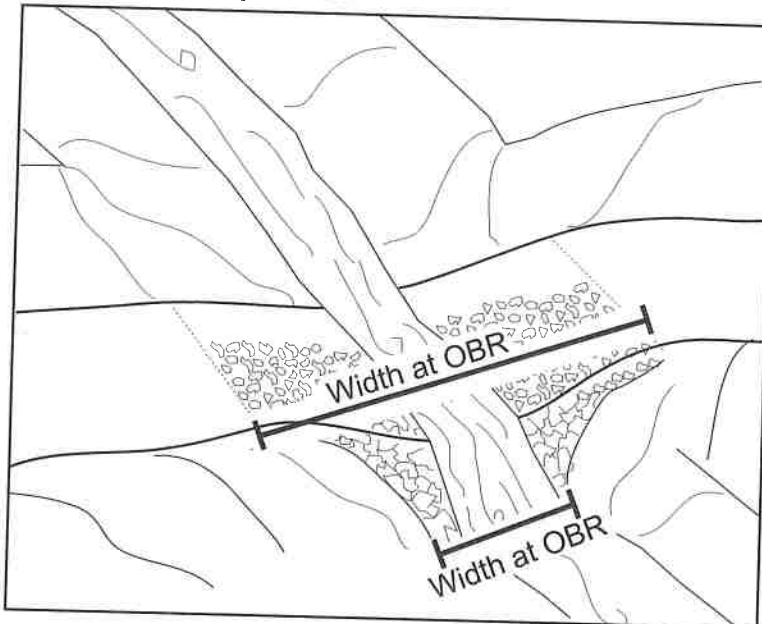
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PWA Typical Drawing #4

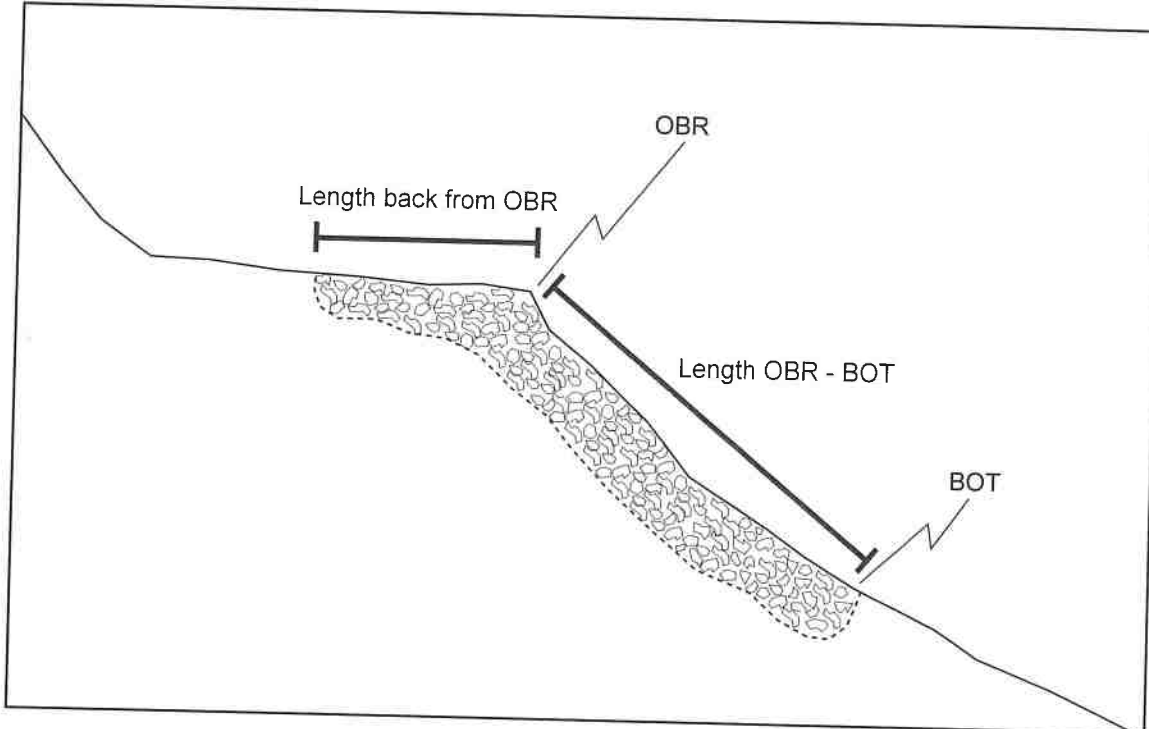
Typical Dimensions Referred to for Armored Fill Crossings

Widths in oblique view



OBR - Outboard edge of road

Lengths in profile view

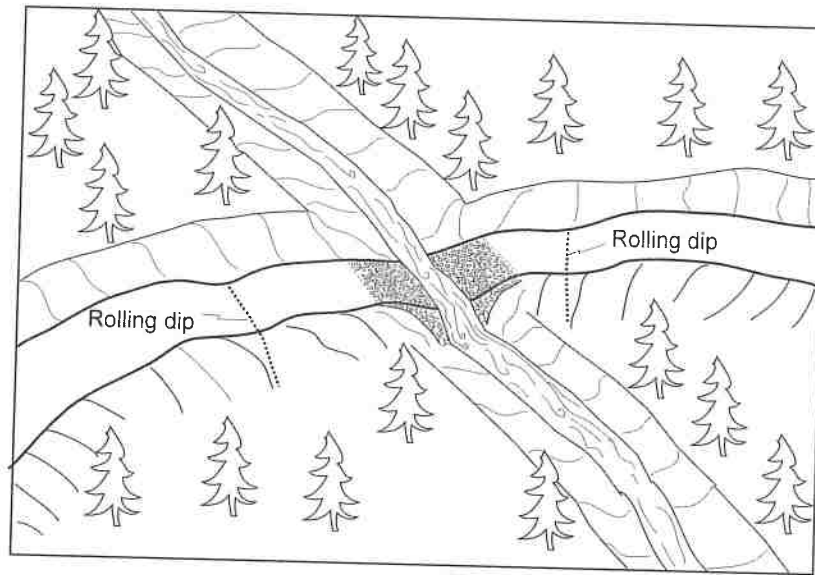


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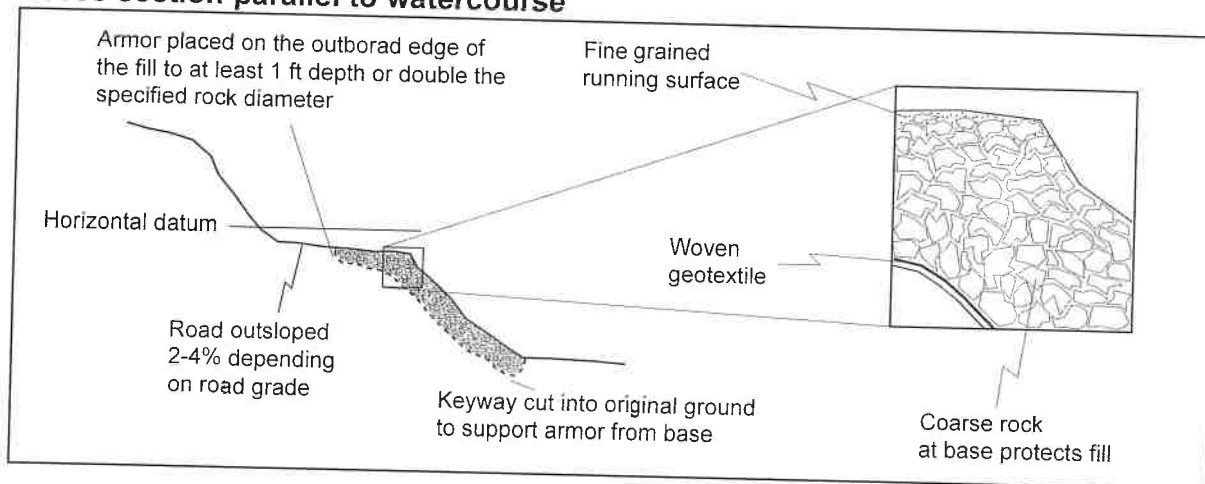
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Typical Drawing #5

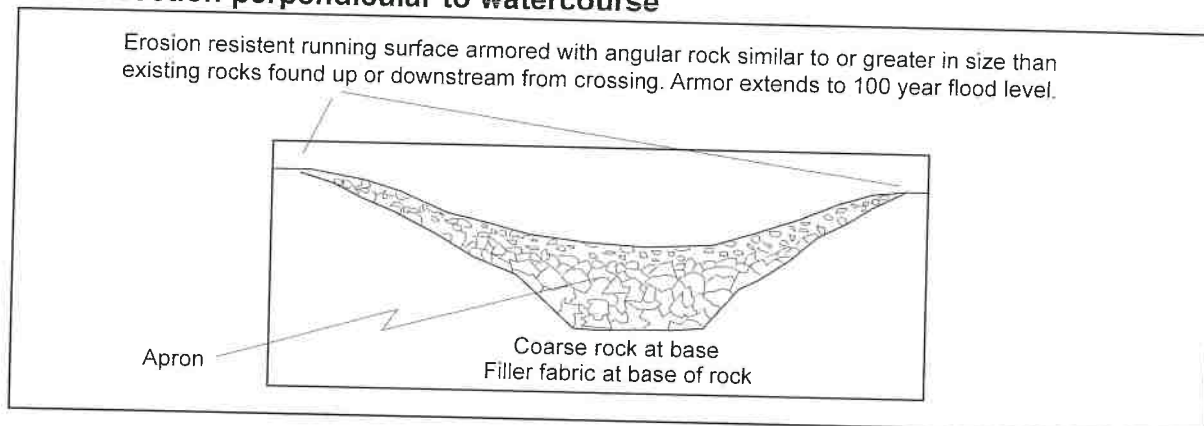
Typical Armored Fill Crossing Installation



Cross section parallel to watercourse



Cross section perpendicular to watercourse

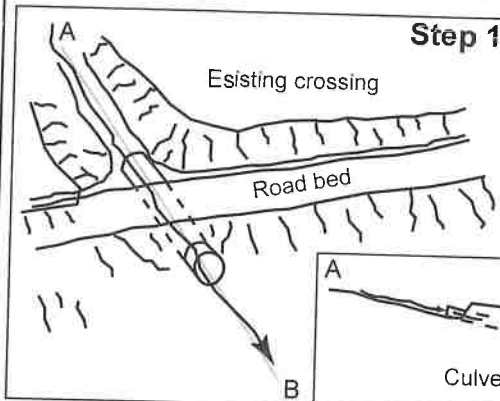


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Typical Drawing #6

Ten Steps for Constructing a Typical Armored Fill Stream Crossing

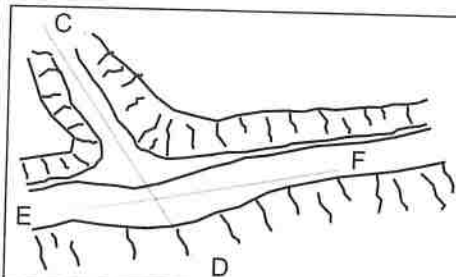
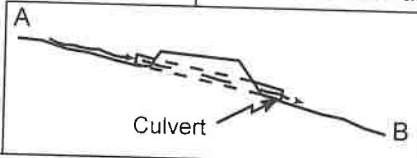


Step 1

1. The two most important points are:

A) **The rock must be placed in a "U" shape across the channel to confine flow within the armored area.** (Flow around the rock armor will gully the remaining fill. Proper shape of surrounding road fill and good rock placement will reduce the likelihood of crossing failure).

B) **The largest rocks must be used to buttress the rest of the armor in two locations:** (i) The base of the armored fill where the fill meets natural channel. (This will buttress the armor placed on the outboard fill face and reduce the likelihood of it washing downslope). (ii) The break in slope from the road tread to the outer fill face. (This will buttress the fill placed on the outer road tread and will determine the "base level" of the creek as it crosses the road surface).

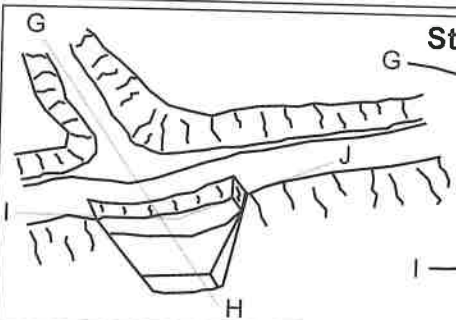


Steps 2 - 3 Lowering

2. **Remove any existing drainage structures** including culverts and Humboldt logs.

3. **Construct a dip** centered at the crossing that is large enough to accommodate the 100-year peak storm flow and prevent diversion (C-D, E-F).

Step 4 Digging Keyway

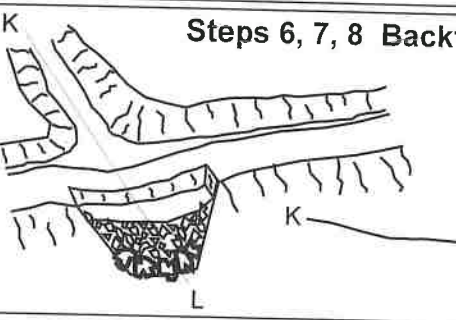


Keyway dug to confine rock

4. **Dig a keyway** (to place rock in) that extends from the outer 1/3 of the road tread down the outboard road fill to the point where outboard fill meets natural channel (up to 3 feet into the channel bed depending on site specifics) (G-H, I-J).

5. **Install geofabric (optional)** within keyway to support rock in wet areas and to prevent winnowing of the crossing at low flows.

Steps 6, 7, 8 Backfilling Keyway



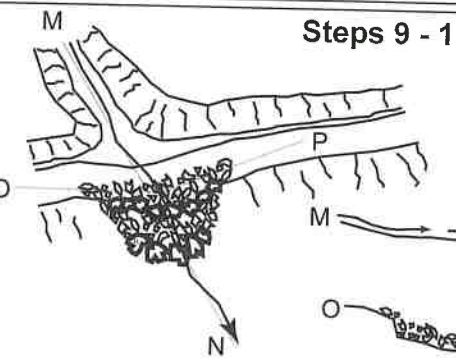
Largest rock buttressing fill face armor

6. **Put aside the largest rock** armoring to create 2 buttresses in the next step.

7. **Create a buttress using the largest rock** (as described in the site treatments specifications) at the base of fill. (This should have a "U" shape to it and will define the outlet of the armored fill.)

8. **Backfill the fill face** with remaining rock armor making sure the final armored area has "U" shape that will accommodate the largest expected flow (K-L).

Steps 9 - 10 Final armored fill

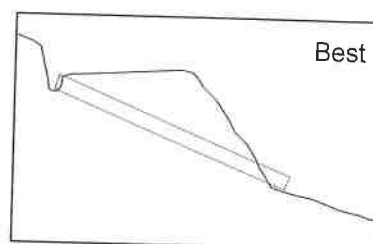
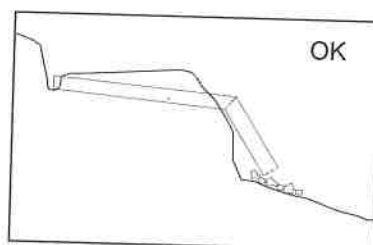
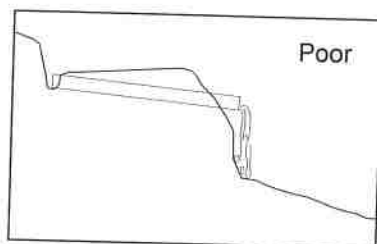
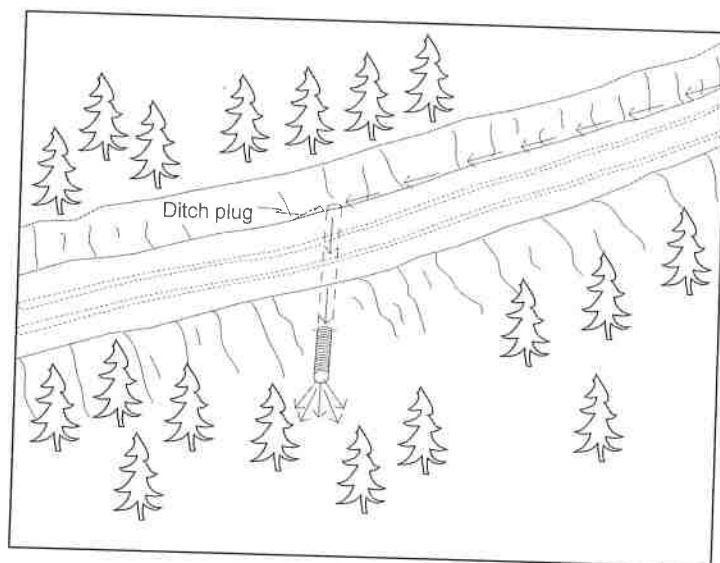


9. **Install a second buttress** at the break in slope between the outboard road and the outboard fill face. (This should define the base level of the stream and determine how deep the stream will backfill after construction). (M-N)

10. **Back fill the rest of the keyway** with the unsorted rock armor making sure the final armored area has a "U" shape that will accommodate the largest expected flow (O-P).

Typical Drawing #7

Typical Ditch Relief Culvert Installation



Ditch relief culvert installation

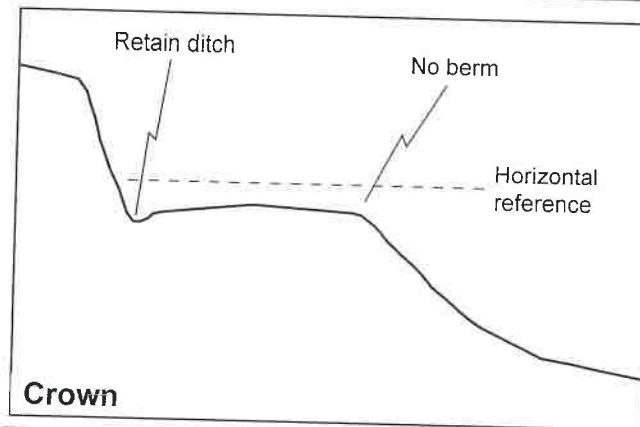
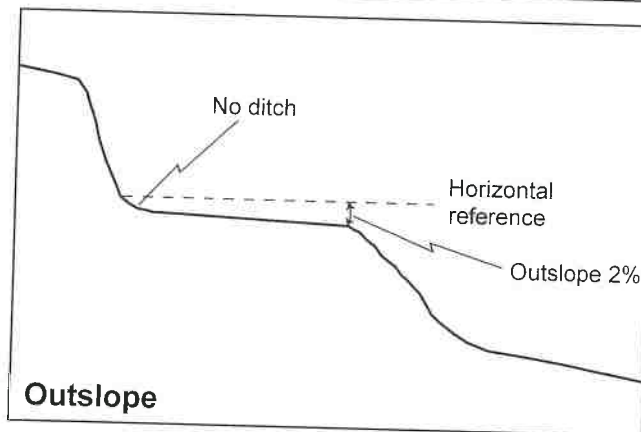
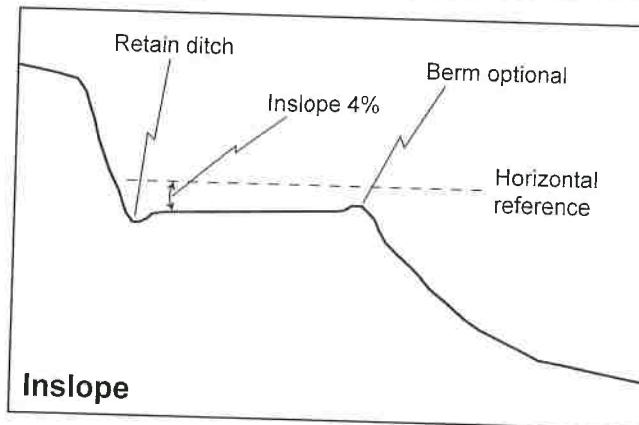
- 1) The same basic steps followed for stream crossing installation shall be employed.
- 2) Culverts shall be installed at a 30 degree angle to the ditch to lessen the chance of inlet erosion and plugging.
- 3) Culverts shall be seated on the natural slope or at a minimum depth of 5 feet at the outside 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.

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Typical Drawing #8

Typical Designs for Using Road Shape to Control Road Runoff



Outsloping Pitch for Roads Up to 8% Grade		
Road grade	Unsurfaced roads	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

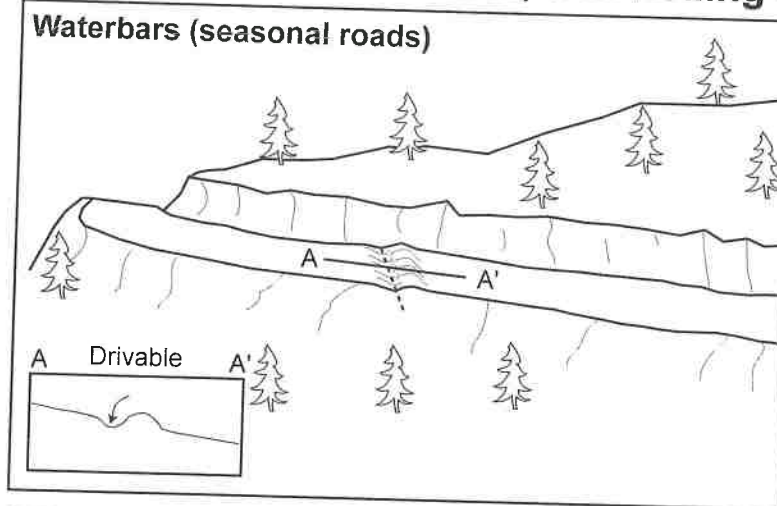
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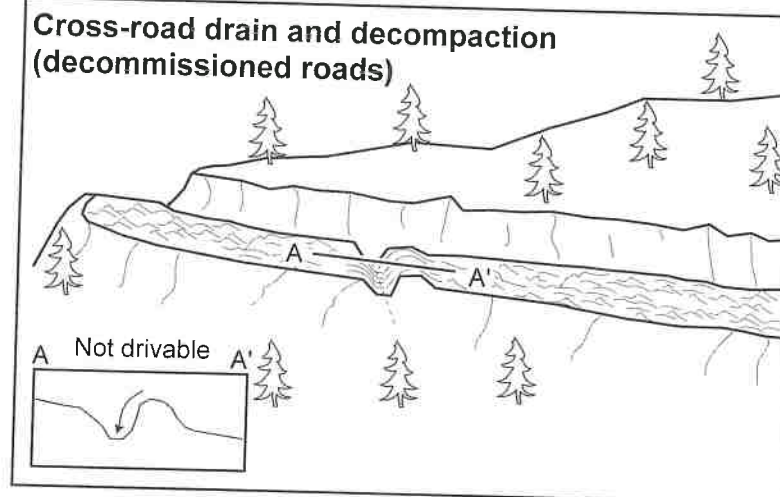
Typical Drawing #9

Typical Methods for Dispersing Road Surface Runoff with Waterbars, Cross-road Drains, and Rolling Dips

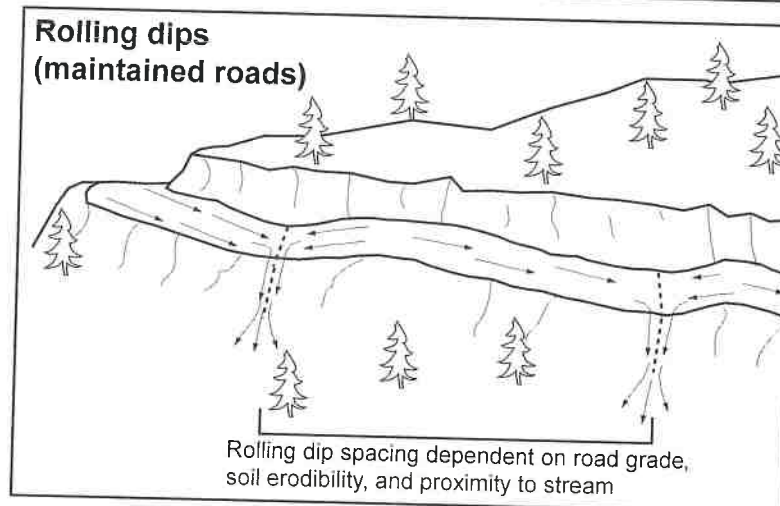
Waterbars (seasonal roads)



Cross-road drain and decompaction (decommissioned roads)



Rolling dips (maintained roads)



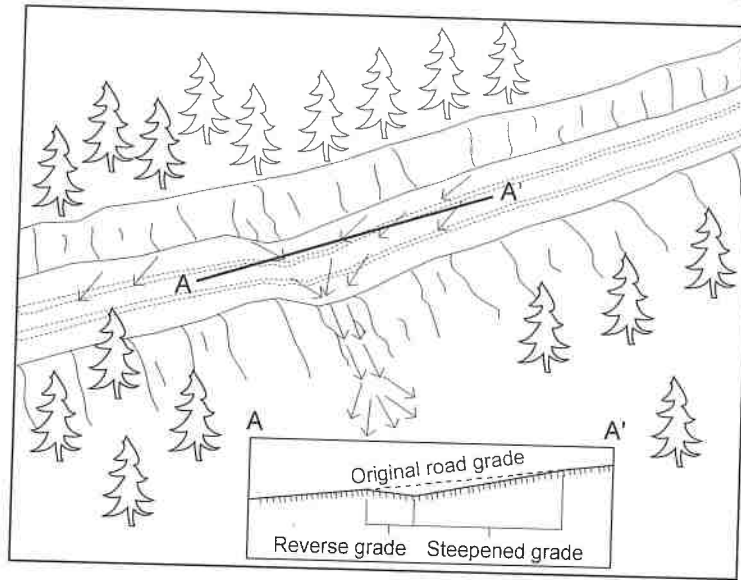
Rolling dip spacing dependent on road grade, soil erodibility, and proximity to stream

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Typical Drawing #10

Typical Road Surface Drainage by Rolling Dips



Rolling dip installation:

1. Rolling dips will be installed in the roadbed 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 to 45 degree angles to the road alignment with cross road grade of at least 1% 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 as per guidelines established in the rolling dip dimensions table.
6. Material will be progressively excavated from the roadbed, 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 below).
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 above).
9. The rise in the reverse grade will be carried for about 10 to 20 feet and then return 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 by road grade

Road grade %	Upslope approach distance (from up road start to trough) ft	Reverse grade distance (from trough to crest) ft	Depth at trough outlet (below average road grade) ft	Depth at trough inlet (below average road grade) ft
<6	55	15 - 20	0.9	0.3
8	65	15 - 20	1.0	0.2
10	75	15 - 20	1.1	0.01
12	85	20 - 25	1.2	0.01
>12	100	20 - 25	1.3	0.01

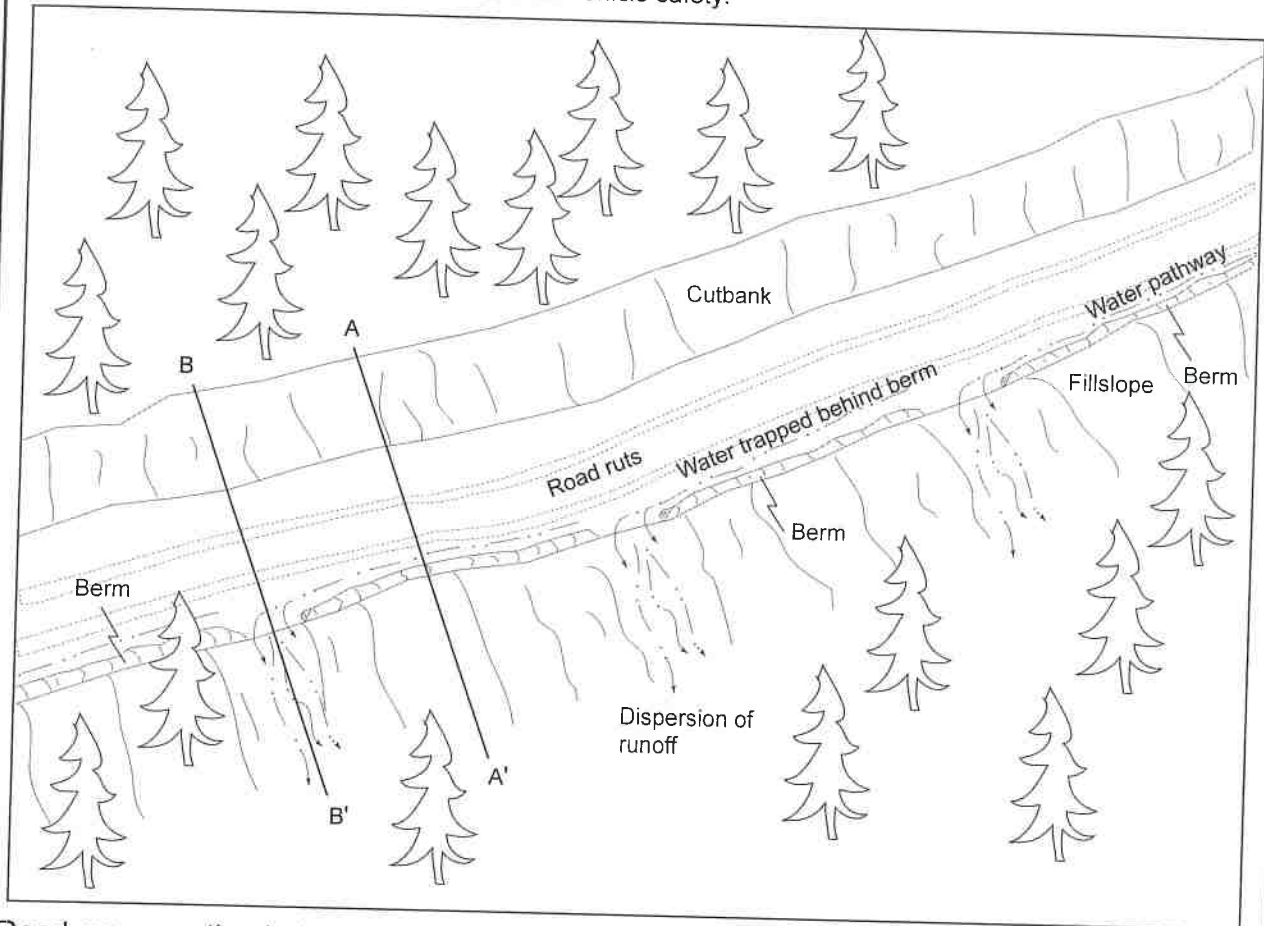
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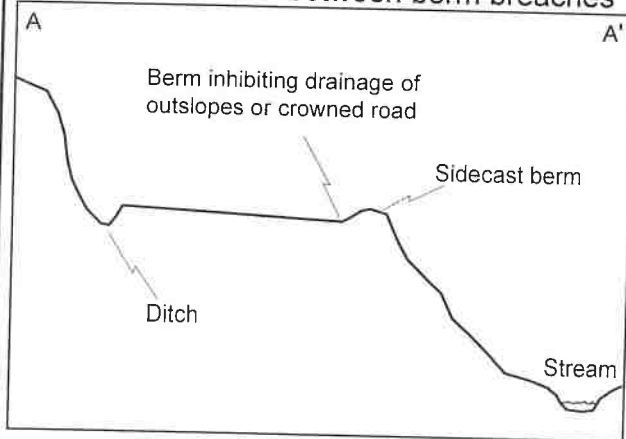
Typical Drawing #11

Typical Sidecast or Excavation Methods for Removing Outboard Berms on a Maintained Road

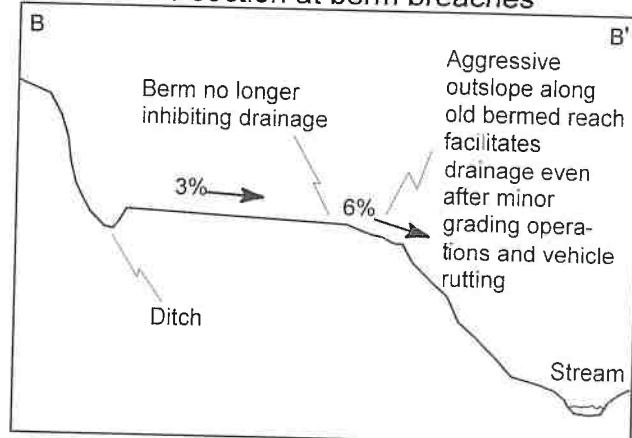
1. On gentle road segments berms can be removed continuously (see B-B').
2. On steep road segments, where safety is a concern, the berm can be frequently breached (see A-A' & B-B').
Berm breaches should be spaced every 30 to 100 feet to provide adequate drainage of the road system while maintaining a semi-continuous berm for vehicle safety.



Road cross section between berm breaches



Road cross section at berm breaches



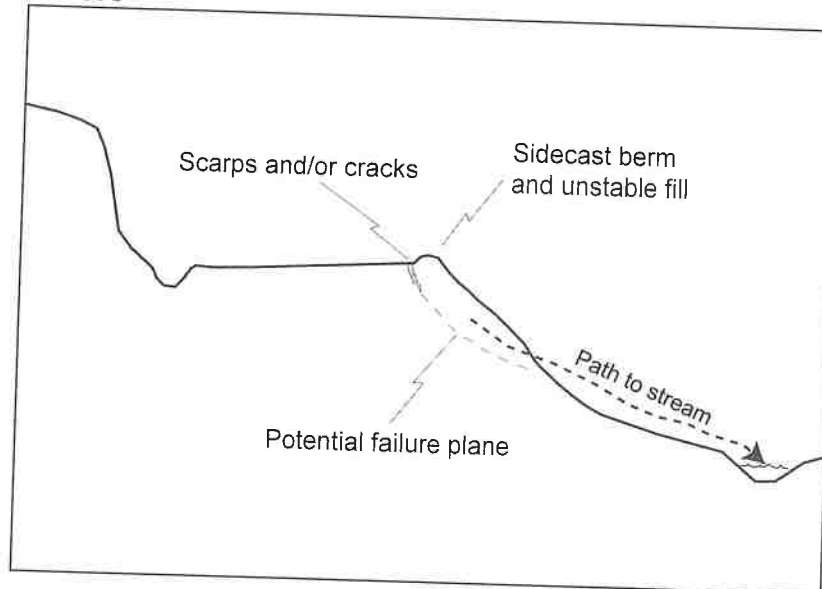
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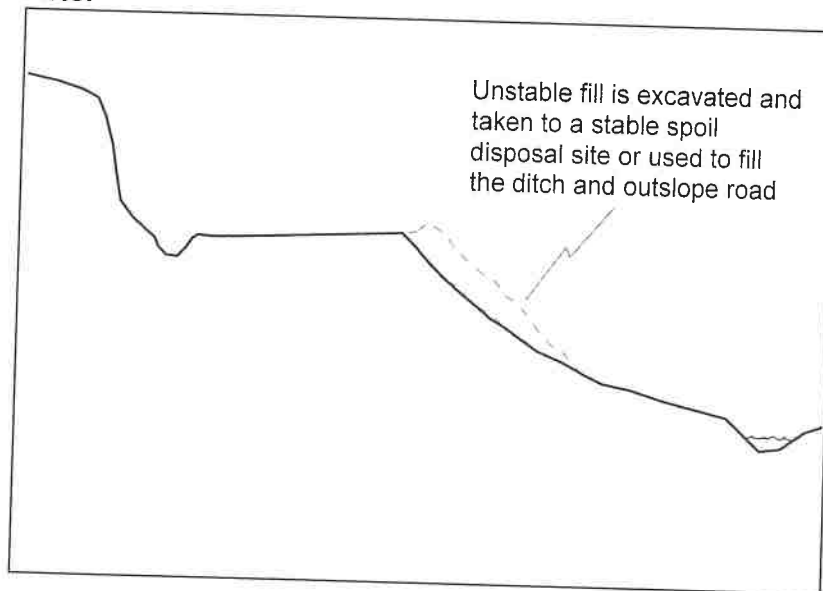
Typical Drawing #12

Typical Excavation of Unstable Fillslope on an Upgraded Road

Before



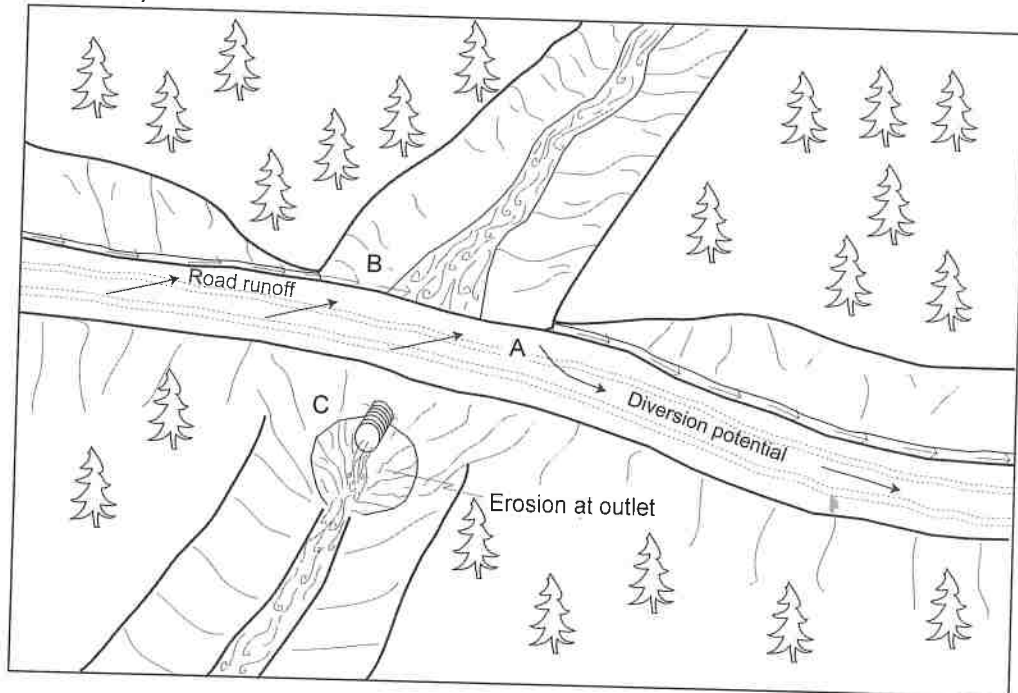
After



Typical Problems and Applied Treatments for a Decommissioned Stream Crossing

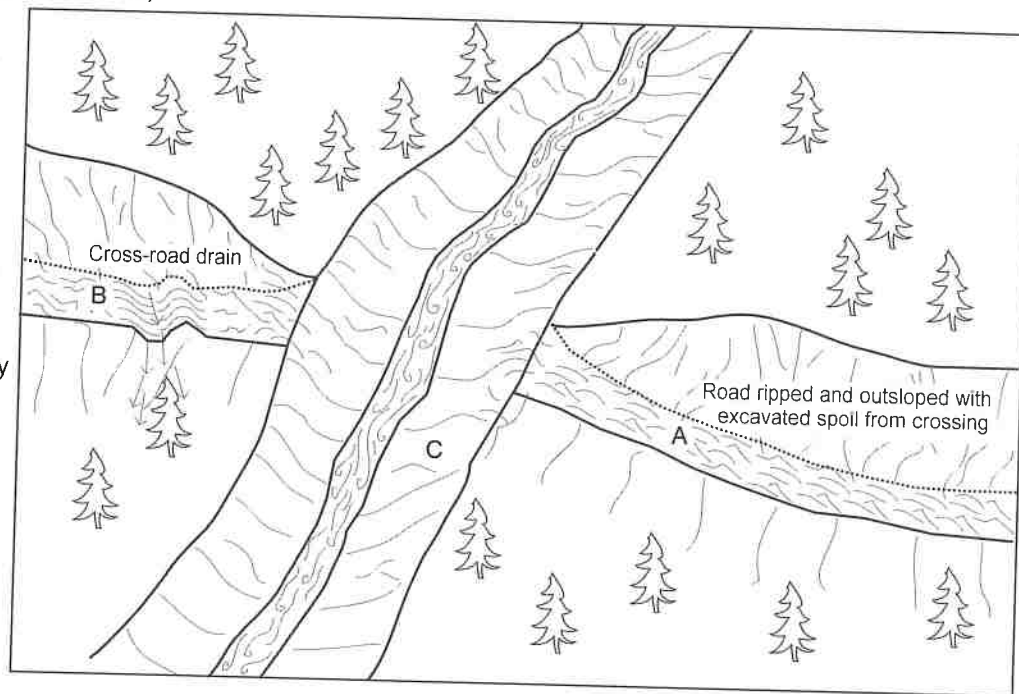
Problem condition (before)

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



Treatment standards (after)

- A - Diversion prevented by road surface ripping and outsloping using excavated spoils
- B - Road surface and ditch disconnected from stream by road surface decompaction and cross-road drains
- C - Stream crossing fill completely excavated



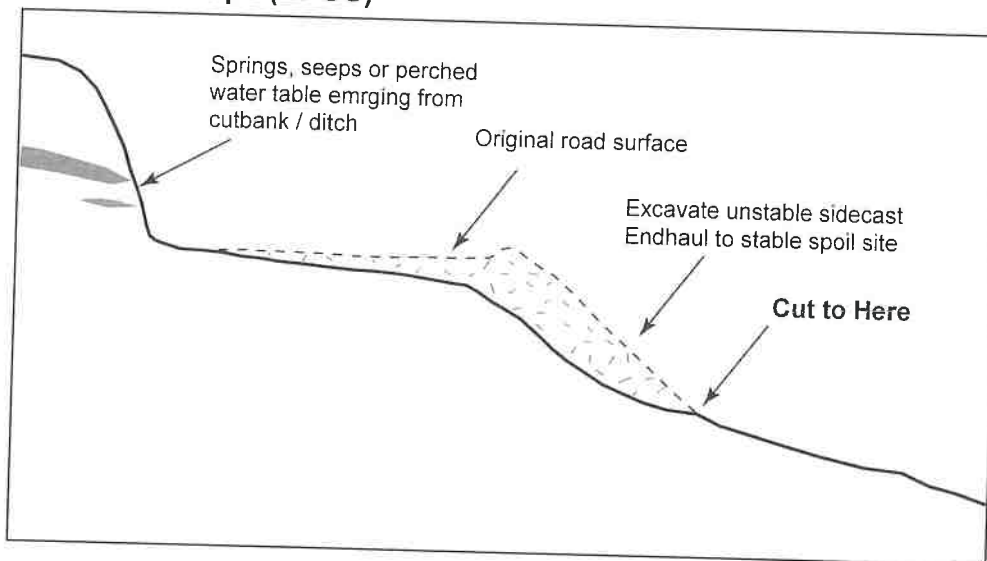
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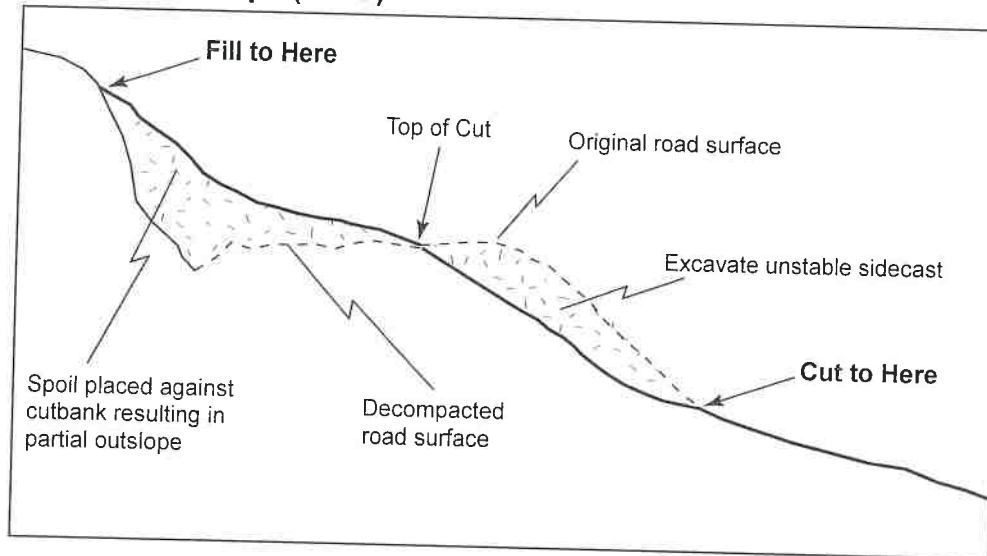
Typical Drawing #14

Typical Design for Road Decommissioning Treatments Employing Export and In-Place Outsloping Techniques

Export outslope (EPOS)

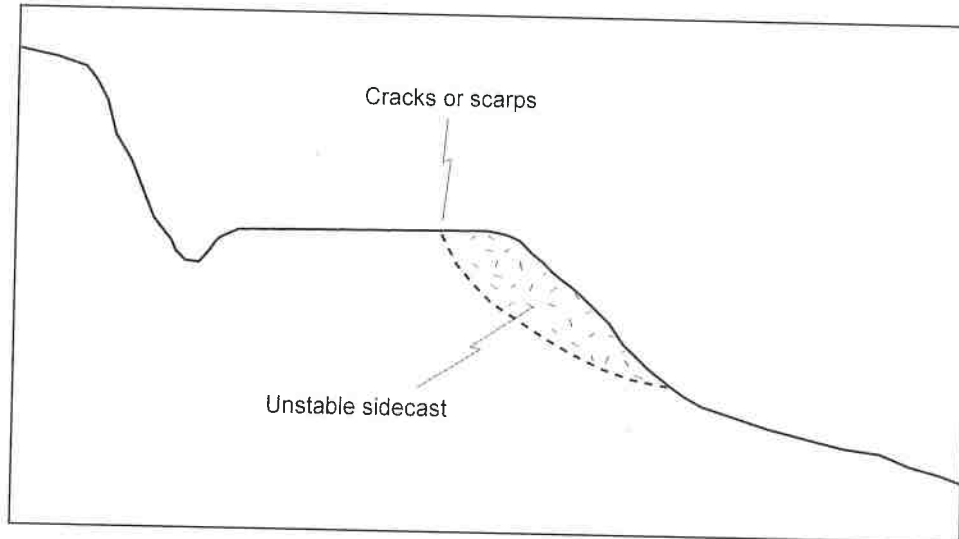


In-place outslope (IPOS)

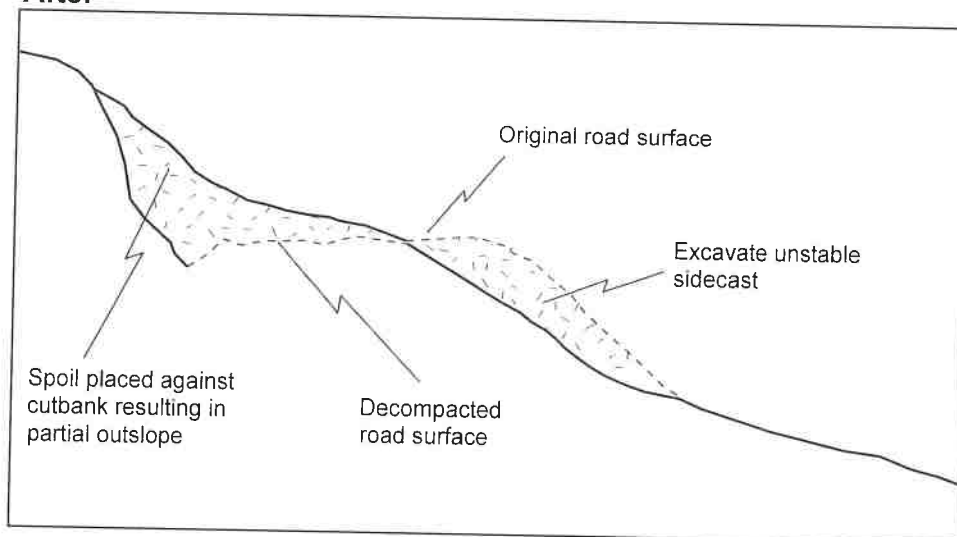


Typical Excavation of Unstable Fillslope on a Decommissioned Road

Before



After



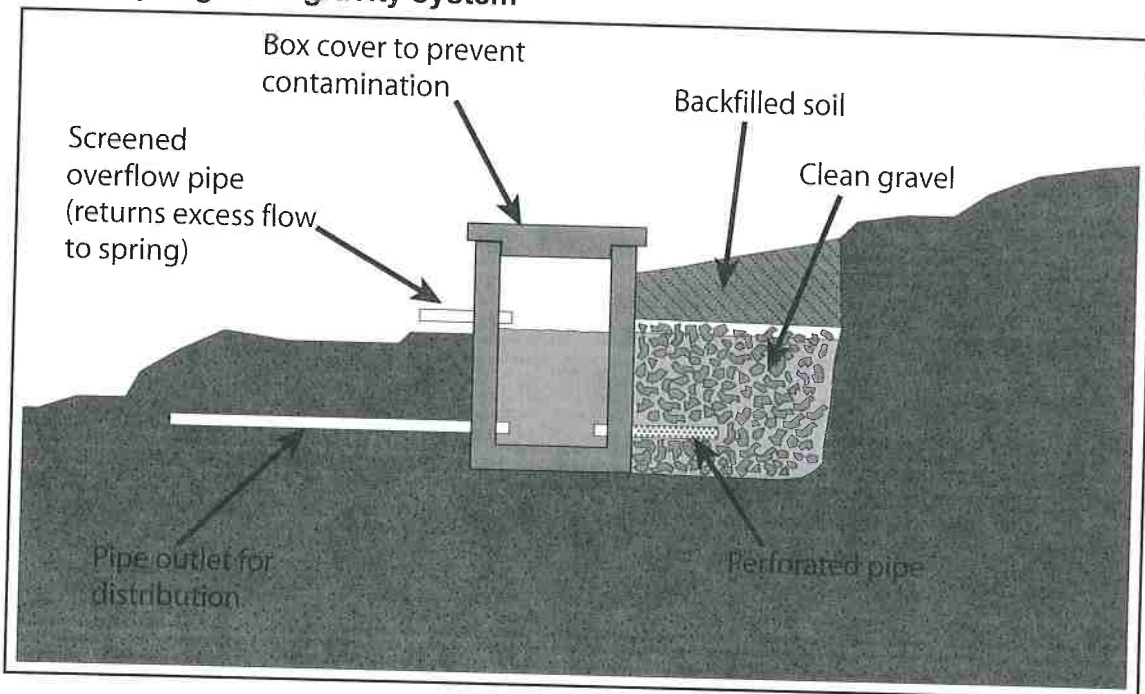
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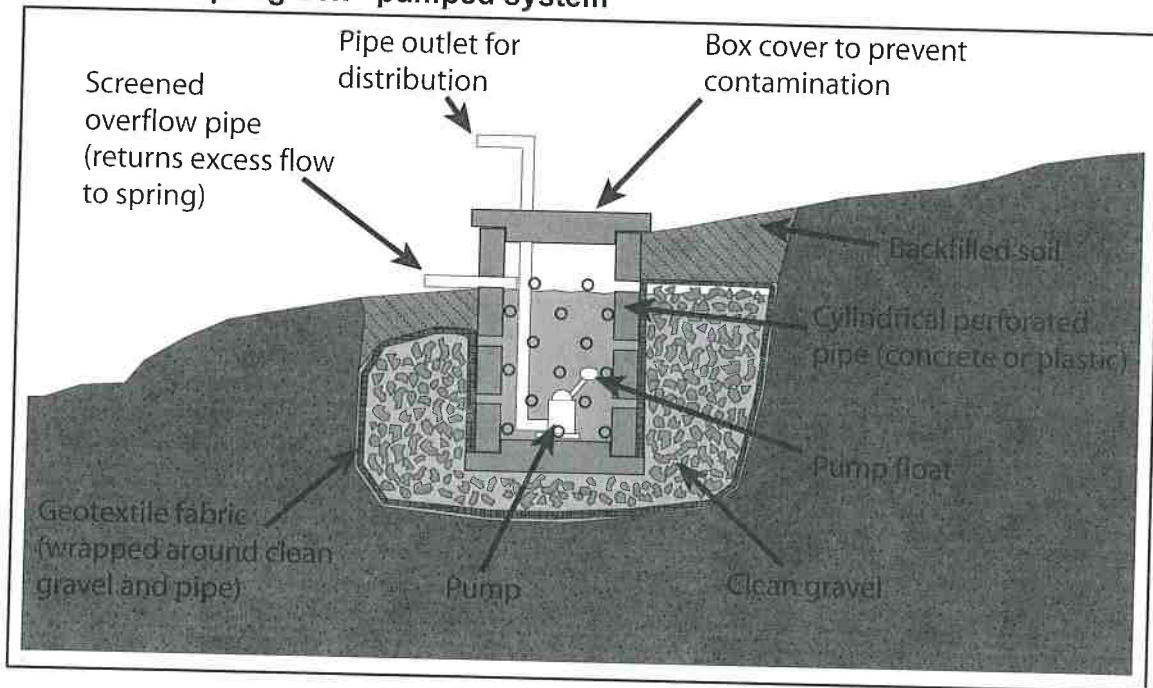
Typical Drawing #16

Typical design drawings of spring boxes

Piped spring box - gravity system



Perforated spring box - pumped system



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PWA Typical Drawing #20