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PLANNING DEPARTMENT

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STAFF REPORT

April 6, 2016

From: Carson Anderson, Senior Planner

To: Planning Commission

Re: Countywide Water Resource Policy Changes per the Northwest California Resource Conservation and Development Council -- Follow-up Discussion and Potential Recommendations to the Board of Supervisors

At its December 10, 2015 meeting the Planning Commission heard a presentation from Mark Lancaster and Sandra Perez of the Northwest California Resource Conservation and Development Council/Five Counties Salmonid Conservation Program concerning its recommendations to the County on supplementing the North Coast Integrated Regional Water Management Plan. That presentation called attention to the issues associated with the County's current water policies and provided a list desirable potential updates to the Open Space and Conservation Element of the General Plan, Zoning Code, and Subdivision Ordinance. The Commission is being asked to review the proposed changes and make a recommendation to the Board of Supervisors to take them under consideration for adoption. Following is a synopsis, for the Commission's consideration, of the policy action items touched upon in that presentation.

1. Develop a Water Resources Element as part of the General Plan;
2. Develop a County Ordinance establishing greywater re-use standards for non-human and/or incidental human contact (viz., irrigation, fire protection);
3. Encourage rainwater cachement actions (rooftop rainwater for non-potable use), and streamline building permit requirement and related permit costs; provide standardized plans for the public to use;
4. Conduct a surface water use assessment of any surface water diversion proposed for a discretionary development proposal and assess cumulative demand and effects on surface water beneficial issues;
5. Require water conservation design standards for all discretionary development activities not served by community water systems;
6. Amend the County Zoning Ordinance to require buffer zones from streams;
7. Encourage use of the Trinity River as a water source in place of water diversions from Trinity River tributaries;
8. Water resources stewardship education of the general public should be promoted by County (e.g., online resource library);
9. Update the water resources discussion in the Conservation Element by adding the policies to maintain beneficial uses of water while protecting existing water rights, adopt performance-based stream setback standards, develop incentives to encourage conservation and stream restoration practices by existing water users, and establish effective water resource conservation incentives;
10. Work with water purveyors in developing capital improvement plans that direct future growth where sufficient water resources can be provided economically, efficiently and sustainably, and incentivize water projects using water from the mainstem of the Trinity River (rather than its tributaries) where environmentally/economically appropriate:

11. Require a major expansion, and new performance standards, as part of the Critical Water Resources (CWR) Overlay zoning, and;
12. Amend County Subdivision Ordinance. Eliminate time extension allowance for dry weather period water supply testing to assure all beneficial uses can adequately be protected.

1. Develop a Water Resources Element as part of the General Plan

Staff Discussion
A clear rationale for a separate general plan element is to give greater focus to reducing potential conflicts between development pressures and meeting beneficial uses of water in the face of current threats to water supply (e.g., prolonged drought and wildland fire)—factors that were not fully understood at the time the County's current water policies were adopted (April 1973). At present, a fairly small number of county jurisdictions in Northern California have taken this route. These include, among others, Butte and Plumas Counties (see Exhibit A – Butte County Water Resources Element).

Another approach, which may be somewhat easier to implement given the current organization structure of the General Plan, is to break out water resources as a detailed sub-section in the General Plan. During the past decade or more, counties have offered a more detailed discussion of water resources as part of their conservation elements (e.g., Shasta County General Plan – which groups ten topics as part of its "Resources Group", including agricultural land, timberland, minerals, energy, and water resources among others). Often the jurisdiction has commissioned water resource plans to guide the enactment of planning policy (viz., Shasta County).

A discussion of what is considered desirable water resources content for a Conservation Element is provided in the State Office of Planning & Research (OPR) *General Plan Guidelines* (2003). Steps taken as part of the analysis include inventorying existing water demands, supply and providers; assessing future water demands promulgated by General Plan policy land use policy build-out; describing programs for water conservation; inventorying existing ordinances implementing water management issues among other topics. A good deal of this work and related data collecting is likely available to the County based on studies completed by the Northwest California Resource Conservation and Development Council, the Five Counties Salmon Conservation Program, and may also be found in the background analysis for the North Coast Integrated Regional Water Management Plan.

2. Develop County Ordinance establishing greywater re-use standards for non-human and /or incidental human contact (viz., irrigation, fire protection)

3. Encourage rainwater cachement actions (rooftop rainwater for non-potable use, and streamline building permit requirement and related permit costs; provide standardized plans for the public to use

Staff Discussion
Both the Trinity County Building & Safety and Environmental Health Departments have commented that the County does not have official policies either promoting or discouraging greywater use. Commonly, the public is referred to the provisions in Title 24, Part 5 of the California Administrative Code, which outlines greywater review and permitting requirements (Exhibit B – 1997 "Revised California Graywater Standards"), per the California Plumbing Code. The 5C Program's "Stormwater Management Guide" (available online) also provides detailed guidance. Staff recommends that the County adopt these state standards as its own ordinance.

A challenge the County faces is that in requiring redundant systems that accommodate both blackwater and greywater installation of a septic system or hook-up to a community wastewater system, related code enforcement problems have arisen (e.g., County approval conditions not being complied with that require conveyance of greywater away from building to say a garden area). Residents often do not understand the need to install the required back-up systems. Such redundancy is required for public health code reasons to prevent the spillage were the greywater system to break down, and also preserves the rights of future property owners who may not wish to operate a greywater system.

Staff is studying water conservation policies in other jurisdictions, and at the Commission's direction, can bring back further details for future policy consideration. Some examples follow:

Water use "Forbearance" agreements entered into with the North Coast Regional Water Quality Control Board (NCRWQCB) provide another means of incentivizing rainwater cachement actions because a lower "permit" fee schedule is offered.

As part of the Mendocino Water Resources and Water Conservation Plan, Mendocino City would require all new development to incorporate proven water conservation technology (e.g., appropriate plumbing fixtures, appliances, water cachement infrastructure, drought-tolerant landscaping) while preserving, as open space, existing natural drainage areas, floodplain and aquifer recharge areas that provide the best sites for groundwater recharge.

The San Luis Obispo Countywide Water Conservation Program is an additional example. Its key strategy is requiring new development to be water neutral through a combination of waste water prevention programs, agricultural water offset programs, agricultural policy and education, turf removal incentive programs, and plumbing retrofits.

4. Conduct a surface water use assessment of any surface water diversion proposed for a discretionary development proposal and assess cumulative demand and effects on surface water beneficial issues

Staff Discussion

Much of this is already the County's discretionary operating policy. CEQA analysis is required for all projects that are not specifically exempt. The CEQA checklist contains several questions related to impacts to water quality, drainage, stormwater runoff, groundwater depletion, and increased risk due to flood hazard (Checklist Item IX, a) through i). At the time of project review, comments received from other departments and outside agencies highlight whether water resource impacts are likely, and these sometimes point to the potential for cumulative impacts. Hydrologic studies are routinely required by the Environmental Health Department for new development in locations known to have soil with slow water percolation characteristics. Consistent with this policy recommendation, stepped up efforts should be made, to catalog, cross reference and track compliance outcomes of projects with the potential to cause adverse surface water impacts (e.g., projects approved with water resource-related mitigation measures).

Appendix B, Section II, Item B and Section III, Item E of the NCRWQCB Order Number R1-2015-0023 also contain detailed surface water resource protection guidance related to commercial cannabis cultivation (Exhibit C). Water "forbearance" agreements can be a means to address and reduce surface water diversion impacts associated with commercial cannabis cultivation uses. In addition, data collected through the NCRWQCB "Waiver" program, and shared, will ultimately enable the County to more readily assess cumulative impacts.

5. Require water conservation design standards for all discretionary development activities not served by community water systems

Staff Discussion
The rationale is to ensure adequate water supply (e.g., wells, streams), to protect wildlife and not hamper fire-fighting capabilities. This concern is being addressed, in part, by the County's current discretionary operating policy through conditions of approval generated by the CEQA review process; however, adopting the policy would ensure a more systematic process. The scope of potential measures includes water cachement, water efficient plumbing and landscape irrigation features, the use of composting and gabions in landscaped areas to help retain moisture, avoid runoff, and allow more water to percolate into the ground to replenish groundwater resources. The effort could also potentially include providing incentives for the installation of other water efficient infrastructure.

6. Amend the County Zoning Ordinance to require buffer zones from streams

Staff Discussion
This measure is intended to protect the beneficial uses of the water. Although not fully reflected in the County's Zoning Code,[1] this is informal Planning and Building & Safety practice currently, and reflects policy contained in the County Subdivision Ordinance (e.g., septic system separation distances of 50 to 100 feet from streams and sensitive habitat areas), as well as CA Fish & Wildlife and the RWQCB permitting criteria. Staff supports the adoption of reasonable buffer requirements combined with reasonable exception criteria.

7. Encourage use of the Trinity River as a water source in place of water diversions from Trinity River tributaries

Staff Discussion
Although seemingly counterintuitive, this measure is intended to protect beneficial uses along tributaries where water supply is potentially threatened during times of drought. It also serves to protect fish spawning habitat that is more commonly found in the river's tributaries rather than along the mainstem. Staff is seeking further input from the Northwest California Resource Conservation and Development Council (NWCRC&DC), and on screening criteria on when this is appropriate, and what limitations should be placed on such actions. Representatives of the NWCRC&DC' s Five Counties Salmonid Conservation Program (5C) will be asked to address the matter at the Commission's meeting.

8. Water resources stewardship education of the general public should be promoted by County (e.g., online resource library)

Staff Discussion
Staff supports the recommendation and thinks it can implement this cost-effectively by adding information to the County website and by creating a flyer available at the public counter at Building & Safety/Planning with a list of web links. The 5C and NWCRG&DC websites already offer good online resources for this. Staff will continue looking at what other jurisdictions are doing and can periodically update the list of web links as part of an online resource library and publications for flyers.

[1] The CWR Overlay Zone requires a minimum 100-foot setback from any stream, and drilled to a minimum depth of 50 feet (Ordinance 315 Section 29.2, C).

*9. and 10. SPECIFIC RECOMMENDED CHANGES TO GENERAL PLAN POLICIES***

Current Text

GOAL 1: Conservation Element Goal protect streams and surrounding habitats to maintain and improve all beneficial uses of water for present and future generations.

Objective #1: Preserve existing water quantity and quality of streams and lakes by careful planning of future development.

Proposed

Policy 1.1: All future ministerial and discretionary activities should at a minimum maintain beneficial uses of water while protecting existing water rights.

Policy 1.2: Adopt numeric and performance-based stream setback standards that are consistent with California Forest Practices Act stream zones and permitted management activities (provided, however, that legal and/or permitted activities approved by the County in the past are protected in perpetuity). In lieu setbacks may be utilized when incentive-based restoration results in an overall improvement in beneficial uses of water.

Policy 1.3: Develop incentives to encourage existing water users to conserve water, restore stream habitat, reduce impermeable surfaces and/or restore stream habitats.

Policy 1.4: Establish effective incentives to encourage conservation such as but not limited to- reducing regulatory review of projects, transfer of density credits, in lieu stream buffer standards, reduction of development fees and costs. Incentivize water use calculation by providing credits to those providing such data.

Current Text

GOAL 2: Work with water districts, mutual water companies and other water purveyors to assure reliable water supplies for present and future generations.

Objective #2 Assist water districts, mutual water companies and other water purveyors in developing capital improvement plans that re realistic and based on sound planning and development patterns.

Proposed

Policy 2.1: Direct future growth where sufficient water resources can be provided economically and sustainably.

Policy 2.2: Support districts, as resources allow, in all efforts to improve water delivery efficiency, upgrade infrastructure, maximize the efficient use of water and reclaim or conserve water.

Policy 2.3: Support expansion of community and individual water projects to the mainstem Trinity River where economically and environmentally practical.

** It should be noted that a further overall goal contained in the 1973 Conservation Element is to develop a comprehensive program to sustain multiple uses of watershed lands.

Staff Discussion
Staff is seeking clarification regarding what the appropriate performance standards should be for governing stream setback standards (as proposed in Policy 1.2). Chapter 14 of the California Forest Practices Act contains a wide, detailed set of requirements for the protection of water quality using federal anti-degradation requirements based upon water quality tiers. Representatives of the NWCRC&DC's Five Counties Salmonid Conservation Program (5C) have been asked to provide clarification on this topic at the Commission meeting.

Threshold criteria for when the expansion of water projects along the mainstem Trinity River is appropriate. Determining what a tipping point would be in terms of cumulative impacts would be guided in part by input from the NWCRC&DC and 5C.

11. SPECIFIC RECOMMENDED CHANGES TO CRITICAL WATER RESOURCES (CWR) OVERLAY SECTION OF ZONING CODE

Staff Discussion
According to the NWCRC&DC and 5C, currently the CWR overlay applies to isolated areas in the County, chiefly in Hayfork outside the water district service area, and also Douglas City, Browns Creek and Little Browns Creek, Democrat Gulch, and the lower, upper, and east branches of East Weaver Creek. As an interim measure, the NWCRC&DC recommendation is to extend the current CWR proof of water standards for all future subdivision actions to the entire county. In the longer term, the county would research and define more inclusive boundaries for an expanded CWR zone.

In addition, the current CWR standards would be contained in Zoning Ordinance Section 30 (General Provisions and Exceptions) and in Section 16.48.124 of the Subdivision Ordinance (proof of water provisions).

a) Significant expansion of CWR zone overlay area

b) Proof of water availability shall be demonstrated by means of a hydrological study approved by the County for new subdivisions not served by an existing community water service district. Data for the study shall be gathered during the dry season, prior to start of the rainy season. Water sources on all parcels shall be collectively evaluated for overall impact to local groundwater supplies.

c) Require implementation of water resource conservation best management practices to preserve sufficient stream flows for downstream beneficial uses (per the California Constitution and Porter-Cologne Act).

d) Recommended best management practices (BMPs) include the requirement that greywater systems are in place prior to final approval of a building septic tanks permit; use of stormwater collection and storage per the 5C Programs online Stormwater Management Guide, and; use of Trickle Fill (passive diversion) devices (these allow diversion during times of sufficient flow)

e) When existing parcels are not currently served by an existing operating community water system and request ministerial and discretionary permits or development entitlements requiring additional water the installation of onsite water storage facilities shall be required as a condition of approval (per a minimum domestic standard of 2,500 gallons of storage per parcel—above what may be required for fire protection storages requirements set for the in the Safety Element of the General Plan.

f) Require implementation of water resource conservation best management practices to preserve sufficient stream flows for downstream beneficial uses.

g) Develop financial incentives to promote water conservation by the public, such as rebate programs. Possible options being to levy a Planning Department surcharge on top of Building permits fees that gets rebated if property owner satisfactorily demonstrates that such voluntary conservation BMP's were properly implemented

12. SPECIFIC RECOMMENDED CHANGES TO SUBDIVISION ORDINANCE

a) Eliminate time extension allowance for dry weather period testing to assure all beneficial uses can adequately be protected

b) Modify Sections 16.48.123 and 16.48.124 to prevent unsafe subdivision actions due to inadequate water supply Provisions for subdividers within a service area of a public water system to be able to comply by demonstrating proof of community water system service. Encourage the use of Trinity River water rather than its tributaries when practical (protect fish habitat and avoid overdraft of stream water resources)

Staff Discussion

Staff supports, in principle, the proposed recommended changes to the Subdivision Ordinance. The county should reserve, however, the right to consider exceptions to a blanket elimination of dry weather testing, when evidentiary circumstances justify it. Staff will provide further detail on this point at the meeting and will invite comment by NWCRC&DC/5C representatives.

Exibit A

8 WATER RESOURCES ELEMENT

A clean, safe and reliable water supply is critical to Butte County's environment and economy. Photo courtesy of Tovey Giezentanner, General Plan 2030 Citizens Advisory Committee member.

Water is one of Butte County's most important natural resources. Precipitation, surface water and groundwater contribute to Butte County's residential, commercial, agricultural, environmental, habitat and recreational uses. Population growth, continued water demands from agricultural and industrial uses, and water needs for environmental uses are all crucial needs that compete for the county's water supply.

The Water Resources Element provides information about water supply, water quality, stormwater management and water service in Butte County. This Element contains goals, policies and actions designed to protect, maintain and restore water resources.

This Element is organized into two sections as follows:

- **Background Information.** Provides a brief overview of the existing water supply and water demands in Butte County and how they are currently managed. An expanded discussion about Butte County's water resources is available in Chapter 12 (Water Resources) of the Butte County General Plan 2030 Setting and Trends Report.
- **Goals, Policies and Actions.** Provides additional guidance to the County related to decisions about water resources.

A. Background Information

Butte County is located in the Sacramento River Hydrological Region, which includes the Sacramento River, the longest river system in the State of California and its tributaries, including the Pit, Feather, Yuba, Bear and American Rivers. The Sacramento River Hydrological Region is the main water supply for much of California's urban and agricultural areas. Major water supplies in the region are provided through the development of surface storage reservoirs.

1. Water Sources

The primary water source in Butte County is surface water, which serves 69 percent of the county's water needs, followed by groundwater, serving 31 percent of the water needs. Based on 2000 data, the Butte County water demand is approximately 90 percent agricultural followed by wildlife at 5 percent and residential at 5 percent.[1]

a. Surface Water

Surface water resources in Butte County lie within the Sacramento River watershed. Primary waterways include the Feather River and its several

[1] Camp, Dresser & McKee, 2001, *Butte County Water Inventory and Analysis.*

Lake Oroville. Photo courtesy of Tony Rushing, General Plan 2030 Citizens Advisory Committee member.

tributaries, as well as Butte Creek and Big Chico Creek. The majority of the county's surface water supply is used for local agriculture.

The majority of the surface water supply used by Butte County residents and businesses originates in the Feather River watershed and accumulates in Lake Oroville as part of the State Water Project. Local irrigation districts' surface water rights are provided through the California water rights priority system, which recognizes the right to the use of water based on a first-in-time, first-in-line basis.

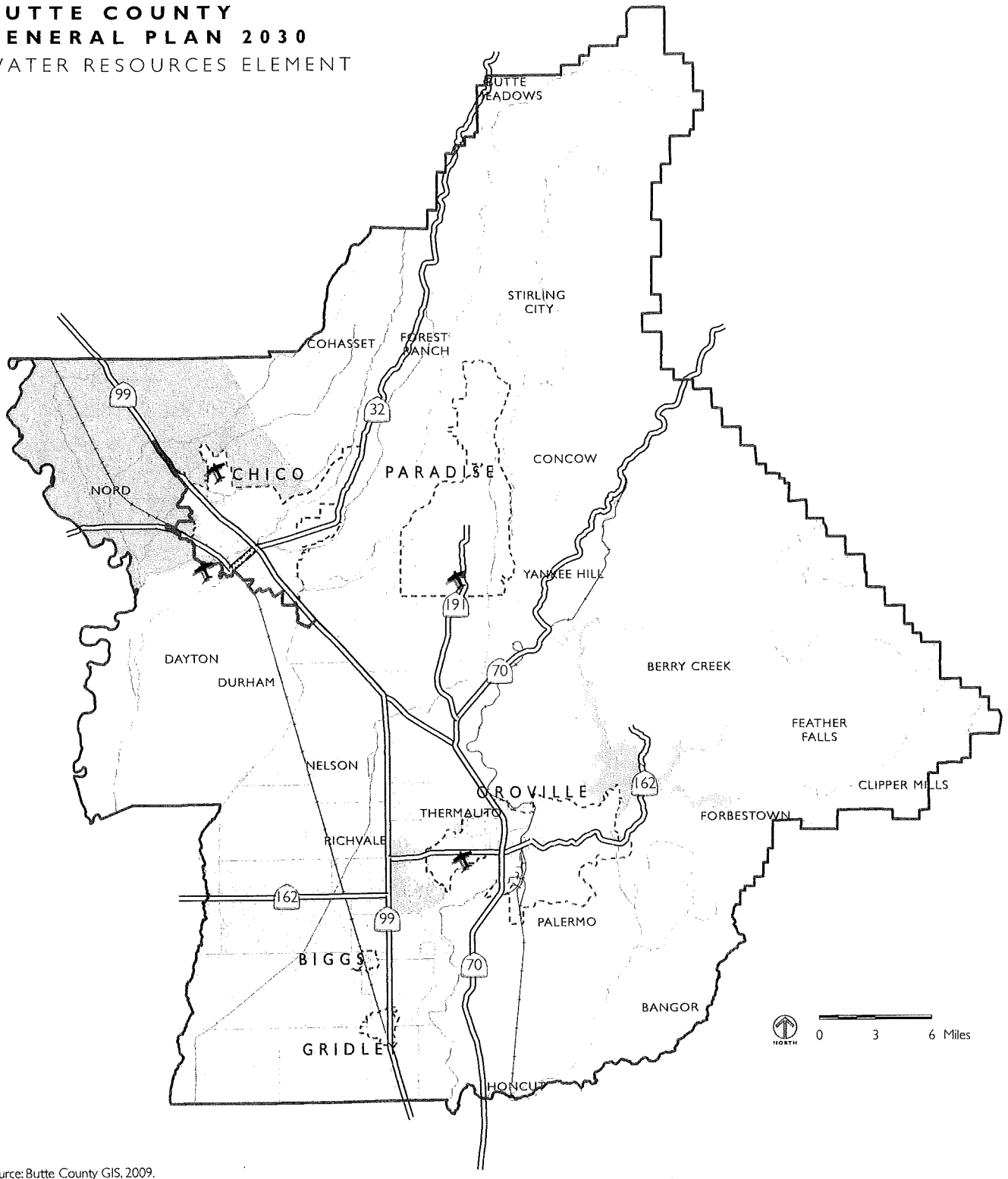
Prior to the development of the Oroville Dam, Butte County negotiated with the State of California to receive an allocation of water for growth and future needs within the county as a State Water Project Contractor. Butte County

sells a portion of their State Water Project Table A allocation to the Del Oro Water Company and California Water Company – Oroville.

b. Groundwater

Approximately 75 percent of the residential water supply is extracted from groundwater. The availability of groundwater in an area depends largely upon its geologic, hydrologic and climatic conditions. In Butte County, reserves of groundwater are found in the thick sedimentary deposits of the Sacramento Valley and the mountainous areas to the east and north. Groundwater is found in perched, unconfined and confined zones in the valley portion of Butte County. Perched groundwater zones are most common in shallow, consolidated soils with low permeability. Major portions of groundwater are unconfined or semi-confined, occurring in floodplain and alluvial fan deposits. High permeability in these soils yields large amounts of water to shallow domestic and irrigation wells. The Tuscan Formation contains an important deep aquifer that is theorized to underlie most of the valley area. Confined water occurs in the Tuscan and Laguna Formations, and in the younger alluvium, where it is overlain by flood basin deposits. Although moderate amounts of water are yielded from the fine-grained strata of the Laguna Formation, permeable sand and gravel zones are infrequent and minor in extent and thickness. The highest producing wells in alluvial uplands occur when older alluvium or the deeper Tuscan volcanic rocks are tapped. Groundwater can also be found in more limited amounts in mountainous areas of the county within volcanic, metamorphic and granitic rock with a total volume of water stored estimated to be less than 2 percent of the rock volume.

Figure W-1 maps the Sacramento Valley groundwater basin and its subbasins, which are found within the western portion of Butte County; groundwater in the eastern portion of the county is found in more limited amounts within volcanic, metamorphic and granite rock.



Source: Butte County GIS, 2009.
Note: Groundwater in the eastern portion of the county is found in limited amounts within volcanic, metamorphic, and granite rock.

Sacramento Valley Groundwater Basins
- East Side Basin
- East Butte Subbasin
- Vina Subbasin
- West Butte Subbasin

- Airports
- Greenline
- Highways
- Railroad
- Major Roads
- Sphere of Influence
- City/Town Limits
- County Boundary

FIGURE W-1
GROUNDWATER BASINS AND SUBBASINS

The major sources of groundwater recharge in Butte County are precipitation, infiltration from streams, subsurface inflow and deep percolation of applied irrigation water in agricultural areas.

Throughout a large portion of Butte County, fresh water reportedly extends to a depth of 800 to 1,350 feet below the ground surface, though groundwater levels can change due to extraction and natural processes. Change in groundwater storage is dependent on the annual rate of groundwater extraction and the annual rate of groundwater recharge, which commonly fluctuate within a given year and from year-to-year. During periods of drought, groundwater in storage typically declines, but it increases during periods of above normal precipitation. Groundwater storage also declines during the summer as groundwater is extracted for municipal and agricultural use, and recovers as extraction slows and seasonal precipitation increases recharge. There has been very little change in groundwater levels in most areas of the valley since the 1970s and 1980s. However, groundwater has declined over the past several years in specific areas, and long-term comparison of groundwater levels from the 1950s and 1960s with today's levels indicates a trend of slightly declining groundwater levels in some areas of the West Butte and Vina subbasins.

The Butte County Department of Water and Resource Conservation has monitored groundwater quality since 2002 in response to the Butte County Groundwater Conservation Ordinance, Chapter 33 of the Butte County Code, which is described in detail in Section A.3, below. These efforts, in addition to monitoring by other State and federal agencies, such as the State Water Resources Control Board and the federal Toxic Substances Control Board, indicate that Butte County's groundwater is of high quality, free of saline intrusion and generally in good health.

Groundwater quality in the Middle Sacramento Valley area was investigated from June through September 2006 by the United States Geological Survey under the California Groundwater Ambient Monitoring and Assessment

(GAMA) program. The investigation included analysis of water quality data from 108 wells throughout Butte, Colusa, Glenn, Sutter, Tehama, Yolo and Yuba Counties. All volatile organic compounds (VOCs), pesticides and their degradates, percholorate and radioactive constituents were found to be at levels below health-based thresholds.

Nitrate contamination of groundwater in the Chico area, caused primarily by discharges from individual septic systems, has been a longstanding concern for the County. The Nitrate Compliance Plan, which was adopted by the Board of Supervisors on September 25, 2001, includes strict density requirements for new septic systems, allowing for conventional septic systems only in narrowly defined circumstances.

2. Water Supply and Demand

In 2001, Butte County conducted a comprehensive inventory of its water resources and evaluated its overall water supply in the document entitled Butte County Water Inventory and Analysis. The County updated the Butte County Water Inventory and Analysis in 2008. The Butte County Water Inventory and Analysis indicates that the majority of the water demand in Butte County occurs in the valley areas due to the concentration of urban populations and farming. Agricultural water needs constitute 71 percent of the total demand in all of Butte County, including the incorporated municipalities.[2]

The Butte County Water Inventory and Analysis indicates that there is no water supply shortfall during normal years, but that shortages occur during dry conditions in specific areas. Drought period shortages are concentrated in the southwestern portion of the County, where supply is limited by groundwater fluctuations during drier summer months, heavier agricultural use and the geology of the aquifer.

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[2] Butte County Integrated Water Resources Plan, http://www.buttecounty.net/Water%20and%20Resource%20Conservation/Butte%20IWRP/IWRP.aspx accessed on July 30, 2009.

Users in certain parts of the county rely on groundwater pumping as an alternative to importing water from outside the county. According to investigations by the United States Geological Survey documented in the 1977 Safety Element of the previous Butte County General Plan, the areas of heaviest groundwater withdrawal extend about 2 miles north and south of Chico and in a 1-mile radius around Gridley. Groundwater pumping can lead to land subsidence; however, there are no known incidents of subsidence in Butte County to date.

3. Butte County Water Resource Management Efforts

Butte County is involved in many on-going efforts to protect and conserve its water resources. This section discusses organizations, processes and programs with which the County is involved that aim to manage its water resources quality and supply.

- **Butte County Water Commission.** The Water Commission meets regularly to discuss water issues in the County and provide recommendations to the Board of Supervisors for actions related to water resources. There are nine members of the Water Commission who serve four-year terms. Water Commissioners are appointed by the Butte County Board of Supervisors. Each Supervisor district has a Water Commission representative that is nominated by the Supervisor from that district. The remaining four members are appointed at large, of which two are landowners of property served by district water and two are landowners served by private wells. The Water Commission is charged with specific responsibilities in regard to implementing the Groundwater Conservation Ordinance and Groundwater Management Ordinance and providing a venue for public input on water issues.
- **Butte County Department of Water and Resource Conservation (BCDWRC).** The mission of the BCDWRC is to manage and conserve water and other resources for the citizens of Butte County. BCDWRC is involved in a wide range of activities focused on water resources monitoring and planning. The Department has developed some of the key

water resource planning documents for the County, including a Groundwater Management Plan, as required by AB 3030 regulations, and a countywide IWRP. BCDWRC also provides support for implementation of Chapter 33 and Chapter 33A of the Butte County Code, the Groundwater Conservation and Management Ordinance. Other important roles include managing Butte County's 27,500 acre-feet of State Water Project allocation and associated local water supply contracts, assessing countywide water supply and demand for current and future users, developing and expanding the well-monitoring grid, partnering on resource conservation issues with the Butte County Resource Conservation District, participating in watershed planning activities with local watershed groups, and managing the groundwater flow model developed by the Butte Basin Water Users Association.

- **Butte County Public Health Department, Environmental Health Division (BCEH).** BCEH's mission includes protecting the environment for the benefit of current and future generations through public education guidance and regulatory oversight. BCEH cooperates with the well drilling industry and employs Best Industry Practices (BIPs) to place and construct water production and water monitoring wells in Butte County. BCEH is also responsible for protecting water resources by regulating the storage of hazardous materials, the proper disposal of wastewater and the proper disposal of all solid wastes within Butte County. BCEH has regulatory oversight for many of the smaller water providers in the county.
- **Well Drillers Advisory Group.** The Well Drillers Advisory Group is an informal group of licensed well drillers and pump contractors that meets quarterly to develop policy recommendations for implementation of Chapter 23B of the Butte County Code, Well Construction Standards.
- **Butte Basin Water Users Association (BBWUA).** The BBWUA was formed in 1992, partially in response to the 1987 to 1992 drought. The organization addressed planning and management of both groundwater and surface water resources.

- **Butte County Groundwater Conservation Ordinance (Chapter 33).** In November 1996, Butte County voters approved the Groundwater Conservation Ordinance, which is intended to conserve groundwater by regulating water transfers outside of the county that have a groundwater component. It requires a permit for both exportation of groundwater outside the county and groundwater pumping as a substitute for surface water exported outside the county. It prohibits permits for water transfers outside of the county if the proposed activity would adversely affect the groundwater resources within the county, including causing or increasing overdraft of the groundwater, causing or increasing saltwater intrusion, exceeding the safe yield of the aquifer or related subbasins within the county, causing subsidence, or resulting in uncompensated injury to overlying groundwater users or other users.

- **Butte County Groundwater Management Ordinance (Chapter 33A).** This ordinance includes the development and monitoring of basin management objectives (BMOs) associated with groundwater levels, groundwater quality and land subsidence. The BMO concept is a unique approach in Butte County's groundwater management planning. The BMOs consist of locally-developed guidelines for groundwater management that describe actions to be taken by well owners in response to well-monitoring data.

- **Butte County Integrated Water Resources Plan (IWRP).** The IWRP provides recommendations for water management policies, as well as programs and projects to implement those policies. The policies focus on local water resource issues and cooperative water management with other entities. The IWRP sets the stage for many of the County's water planning efforts.

- **Groundwater Modeling.** As noted above, the BCDWRC manages a detailed hydrologic model of the groundwater basin that was developed by the BBWUA. The BCDWRC has transferred the data to a revised model that is more widely used throughout the State. The revised groundwater model may be used to evaluate the effects of groundwater withdrawal or

land use changes within subbasins in the county and provide a comprehensive water resources planning tool.

- **Four-County Memorandum of Understanding (MOU).** Butte County participates in an MOU with the Counties of Colusa, Glenn, Tehama and Sutter to promote regional coordination, collaboration and communication about many shared water resources.

In addition to the resource management efforts listed above, the County coordinates closely with federal and State agencies, urban water agencies, irrigation districts, water districts, advocacy groups and other non-profit organizations.

4. Water Service Providers

Much of Butte County's residential, commercial and agricultural water needs are met through a network of local water providers, including municipal water departments, mutual water companies, investor-owned utilities, irrigation districts, systems serving a small number of connections and special districts. Municipal water departments, such as the Cities of Gridley and Biggs, provide water service to municipal residents, generally distributed in pipes along roads in the service area.

Mutual water companies are private corporations that perform water supply and distribution functions similar to public water districts. Investor-owned utilities are also involved in water supply activities, sometimes as an adjunct of hydroelectric power development. Irrigation districts ensure the delivery of sufficient water supplies for agricultural uses, though they may serve some residential and commercial uses. Irrigation district water is often conveyed in open ditch canals. Other special districts provide water service to residents of the unincorporated district area, who in turn are assessed by the district for their services.

Figure W-2 maps the service area boundaries of the various water systems and irrigation districts in Butte County. Not all mapped water agencies provide service throughout their service areas. In these and other areas without water service, on-site wells may provide water to individual parcels.

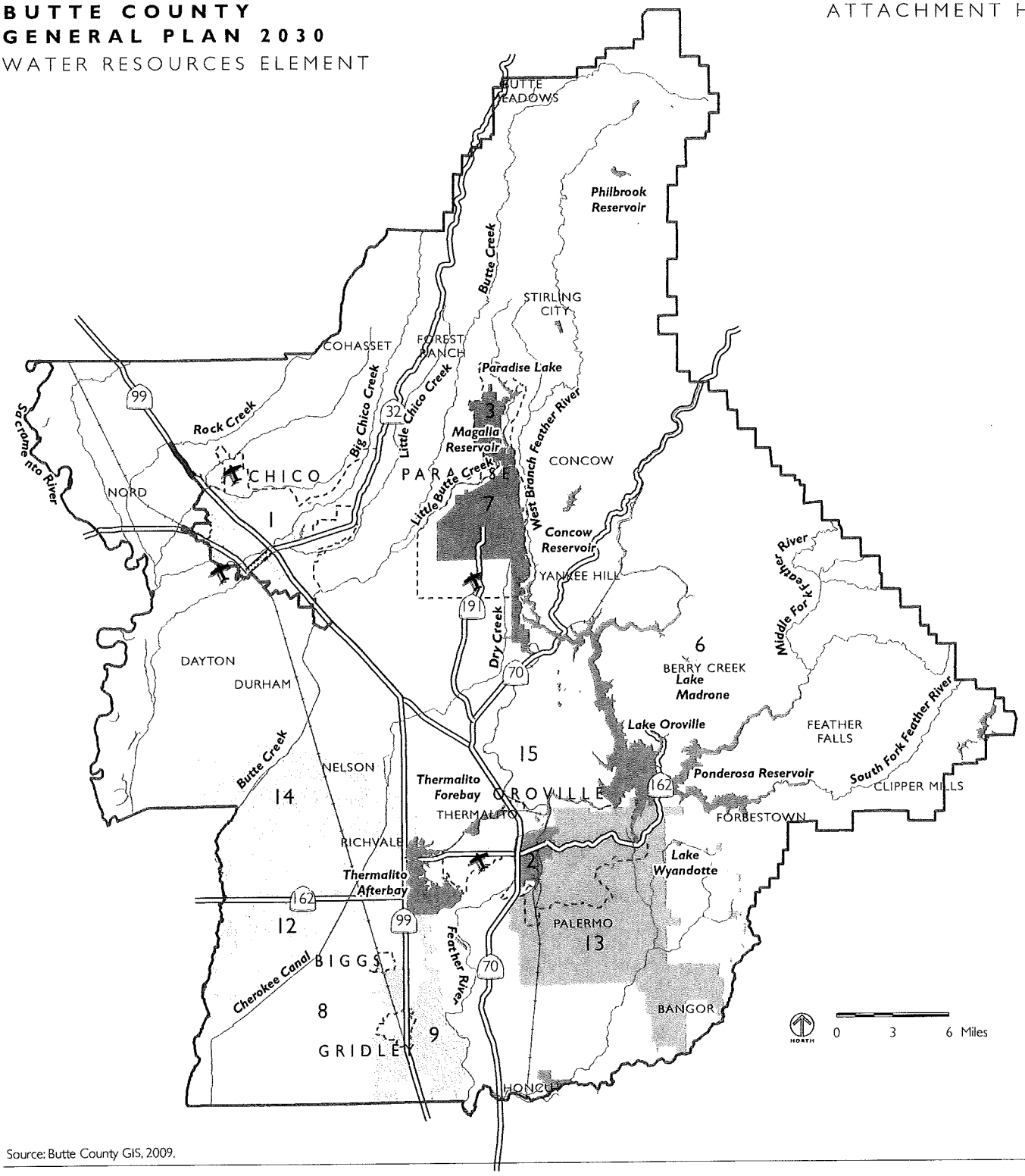
South Feather Water and Power Agency's Kelly Ridge Powerhouse penstock. Photo courtesy of the Butte County Department of Development Services.

5. Storage Facilities

In addition to some natural wetlands, there are numerous developed impoundments that store some of the county's abundant surface water for water supply and provide flood protection. Oroville Dam and Reservoir on the Feather River is the second-largest water storage facility in California and is the initial and largest reservoir of the State Water Project. In addition to Lake Oroville, other water storage facilities in Butte County include the Thermalito Afterbay, Thermalito Forebay, Paradise Reservoir and Magalia Reservoir, as well as a number of other smaller water storage reservoirs.

6. Stormwater Management

As required by Phase II of the National Pollutant Discharge Elimination System (NPDES) of the United States Environmental Protection Agency (US EPA), Butte County operates under a Small Municipal Separate Storm Sewer Systems (Small MS4) stormwater permit. The County's Stormwater Management Program was developed as part of the permitting process and established stormwater-related priorities and activities for the period between



Source: Butte County GIS, 2009.

1	California Water District - Chico	7	Paradise Irrigation District	13	South Feather Water & Power Agency		Greenline
2	California Water District - Oroville	8	Biggs-West Gridley Water District	14	Western Canal Water District		Highways
3	Del Oro Water Company	9	Butte Water District	15	Thermalito Water & Sewer District		Railroad
4	Durham Irrigation District	10	Durham Mutual Water Company		Major Streams		Sphere of Influence
5	Gran Mutual Water Company	11	Ramirez Water District		Lakes and Reservoirs		City/Town Limits
6	Lake Madrone Water District	12	Richvale Irrigation District		Airports		

FIGURE W-2

WATER PROVIDERS AND SERVICE AREA BOUNDARIES

2003 and 2008. The County was required to meet the goals of the Stormwater Management Program by July 2008. The County intends to regularly update the Stormwater Management Program.

The following goals were accomplished by the Butte County Stormwater Management Program:

- The building permit application process requires that land owners provide a signed statement to the Butte County Department of Development Services indicating that their projects disturbed less than 1 acre of undeveloped land, or, in the case of projects disturbing more than 1 acre, that they would comply with the State Construction Storm Water Program.
- Placards were installed to communicate the message that dumping into a County storm drain could pollute the groundwater or a nearby creek.
- The Clean Water Business Program was established, as well as an alliance with the Chico Urban Stream Alliance's Clean Water Business Partner program.
- Informational materials, including brochures and articles on stormwater issues, were distributed at public events and made available at government offices.

In addition, the County adopted the Butte County Stormwater Management and Discharge Control Ordinance under Chapter 50 of the Butte County Code. The ordinance provides the County with the legal authority to enforce various stated goals regarding water pollution to protect and enhance public health and the environment.

7. Streambank Stability and Riparian Resources

Streambank instability is a potential hazard along rivers and streams in Butte County. A streambank may be considered unstable if the slopes surrounding the stream are excessively steep and present a potential landslide hazard or if erosion is occurring at a relatively high rate. Seismically-induced ground

shaking also poses a threat to streambank stability, especially in areas where surrounding slopes are steep or where there is a large standing body of water below. Fire-related erosion can also lead to streambank instability when protective vegetation that anchors the land surrounding streams and in the watershed is lost to fire.

Human activity and development are other important causes of streambank instability. Best management practices have been developed and environmental regulations adopted to stabilize the banks, and to minimize near and in-channel disruptions, of streams and rivers in Butte County.

The Health and Safety and Conservation and Open Space Elements also discuss other issues associated with erosion, streambank stability and riparian resources.

Concow Reservoir. Photo courtesy of the Butte County Department of Development Services.

B. Goals, Policies and Actions

Goal W-1 **Maintain and enhance water quality.**

Policies

W-P1.1 County planning and programs shall be integrated with other watershed planning efforts, including best management practices, guidelines and policies of the Central Valley Regional Water Quality Control Board (CVRWQCB).

W-P1.2 The County shall cooperate with State and local agencies in efforts to identify and eliminate or minimize all sources of existing and potential point and non-point sources of pollution to ground and surface waters, including leaking fuel tanks, discharges from storm drains, auto dismantling, dump sites, sanitary waste systems, parking lots, roadways and logging and mining operations.

W-P1.3 Regulations that protect water quality from the impacts from agricultural activities shall be maintained.

W-P1.4 Where appropriate, new development shall be Low Impact Development (LID) that minimizes impervious area, minimizes runoff and pollution and incorporates best management practices.

W-P1.5 Pest-tolerant landscapes shall be encouraged to minimize the need for pesticides.

W-P1.6 Educational programs and outreach shall be continued to promote water quality protection and limit pollution from pesticides and nutrients in urban and domestic settings.

W-P1.7 Agriculture, logging, mining, recreational vehicle use and other open space uses shall follow best management practices to minimize erosion and protect water resources.*

W-P1.8 The County supports conversion from septic systems to public sewer service, where feasible.

W-P1.9 The County supports the establishment of a system for proper disposal of expired medications.

Actions

W-A1.1 Evaluate the expansion of the monitoring and reporting efforts of Butte County's Department of Water and Resource Conservation.

W-A1.2 Revise domestic well standards and programs to require water quality testing for the initial drilling of new domestic wells.

W-A1.3 Develop standards to determine where Low Impact Development techniques are appropriate.

Goal W-2 **Ensure an abundant and sustainable water supply to support all uses in Butte County.**

Policies

W-P2.1 The County supports solutions to ensure the sustainability of community water supplies.

W-P2.2 The County shall continue the Four-County Memorandum of Understanding (MOU) with Colusa, Glenn, Tehama and Sutter Counties, and shall continue to foster regional cooperation with other counties and water purveyors.

W-P2.3 Water resources shall be planned and managed in a way that relies on sound science and public participation.

W-P2.4 The County's State Water Project allocation should be fully utilized within Butte County.

W-P2.5 The expansion of public water systems to areas identified for future development on the General Plan land use map is encouraged.

W-P2.6 The County supports water development projects that are needed to supply local demands.

W-P2.7 The Butte County Water Commission and the Department of Water and Resource Conservation shall continue to be utilized as important partners in the water resource planning process.

W-P2.8 The County supports Area of Origin water rights, the existing water right priority system and the authority to make water management decisions locally to meet the county's current and future needs, thereby protecting Butte County's communities, economy and environment.

W-P2.9 Applicants for new major development projects, as determined by the Department of Development Services, shall demonstrate adequate water supply to meet the needs of the project, including an evaluation of potential cumulative impacts to surrounding groundwater users and the environment.*

Actions

W-A2.1 Implement and periodically update the Integrated Water Resources Plan to ensure the sustainability of water resources within the county.

W-A2.2 Develop criteria to implement Policy W-P2.9, including thresholds for the size of development project that triggers the need for an analysis of water supply and standards to demonstrate adequate water supply and evaluate impacts to surrounding groundwater users.

W-A2.3 Encourage and cooperate with water purveyors to support the delivery of surface water for the economic development of agriculture.

Goal W-3 **Effectively manage groundwater resources to ensure a long-term water supply for Butte County.**

Policies

W-P3.1 The County shall continue to ensure the sustainability of groundwater resources, including groundwater levels, groundwater quality and avoidance of land subsidence, through a basin management objective program that relies on management at the local level, utilizes sound scientific data and assures compliance.

W-P3.2 Groundwater transfers and substitution programs shall be regulated to protect the sustainability of the County's economy, communities and ecosystem, pursuant to Chapter 33 of the Butte County Code.

W-P3.3 The County shall protect groundwater recharge and groundwater quality when considering new development projects.*

Actions

W-A3.1 Seek funding for and conduct comprehensive, countywide mapping of water resources and groundwater recharge areas.

W-A3.2 Evaluate gaps in existing federal, State and local standards, and develop additional standards as needed to preserve groundwater recharge and protect groundwater quality.

W-A3.3 Cooperate with local water purveyors to seek funds to conduct a study to evaluate options to convey the County's State Water Project Table A allocation to areas not currently served by this source, such as the Chico area.

W-A3.4 Seek funds and develop programs that improve the scientific understanding of regional aquifer systems and potential factors related to the sustainability of the county's water resources.

W-A3.5 Continue to seek funding for and conduct scientific analysis of the costs and water supply impacts of increased groundwater pumping.

Goal W-4 **Promote water conservation as an important part of a long-term and sustainable water supply.**

Policies

W-P4.1 Agricultural and urban water use efficiency shall be promoted.

W-P4.2 Water conservation efforts of local Resource Conservation Districts, the Natural Resource Conservation Service and irrigation districts should be coordinated.

W-P4.3 The County shall work with municipal and industrial water purveyors to implement water conservation policies and measures.

W-P4.4 Opportunities to recover and utilize wastewater for beneficial purposes shall be promoted and encouraged.

W-P4.5 The use of reclaimed wastewater for non-potable uses shall be encouraged, as well as dual plumbing that allows graywater from showers, sinks and washers to be reused for landscape irrigation in new developments.

W-P4.6 New development projects shall adopt best management practices for water use efficiency and demonstrate specific water conservation measures.*

W-P4.7 County facilities shall adopt water conservation measures and when appropriate retrofit existing facilities to improve water conservation.

Actions

W-A4.1 Develop a countywide graywater ordinance that includes best management practices for the reuse of graywater for non-potable uses.

W-A4.2 Identify appropriate water use efficiency best management practices.

Goal W-5 **Protect water quality through effective stormwater management.**

Policies

W-P5.1 The County shall continue outreach activities to inform residents and workers that illegal discharge into storm drains negatively impacts groundwater and surface water quality.

W-P5.2 New development projects shall identify and adequately mitigate their water quality impacts from stormwater runoff.*

W-P5.3 Pervious pavements shall be allowed and encouraged where their use will not hinder mobility.

W-P5.4 Temporary facilities shall be installed as necessary during construction activities in order to adequately treat stormwater runoff from construction sites.*

W-P5.5 Stormwater collection systems shall be installed concurrently with construction of new roadways to maximize efficiency and minimize disturbance due to construction activity.

Goal W-6 Improve streambank stability and protect riparian resources.

Policies

W-P6.1 Any alteration of natural channels for flood control shall retain and protect riparian vegetation to the extent possible while still accomplishing the goal of providing flood control. Where removing existing riparian vegetation is unavoidable, the alteration shall allow for reestablishment of vegetation without compromising the flood flow capacity.

W-P6.2 Where streambanks are already unstable, as demonstrated by erosion or landslides along banks, tree collapse, or severe in-channel sedimentation, proponents of new development

Exibit B

Revised Graywater Standards

On March 18, 1997, the Building Standards Commission approved the revised California Graywater Standards (attached Appendix G). The most significant change in the standards is that gray water systems can now be used in commercial, industrials, and multifamily projects, as well as single-family residences.

Other changes include: (1) that only one irrigation zone is now required (rater than the previous two); (2) filters are to be sized appropriately to maintain the filtration rate rather than the previously prescribed 1-inch filter; and (3) a new procedure for estimating gray water discharge has been added for commercial, industrial, and institutional projects.

APPENDIX G

GRAYWATER SYSTEMS

Title 24, Part 5, California Administrative Code

G 1 Graywater Systems (General)

(a) The provisions of this Appendix shall apply to the construction, installation, alteration and repair of graywater systems for subsurface landscape irrigation. The graywater system shall not be connected to any potable water system without an air gap ~~(a space or other physical device which prevents backflow)~~ and shall not result in any surfacing of the graywater. Except as otherwise provided for in this Appendix, the provisions of the Uniform Plumbing Code (UPC) shall be applicable to graywater installations.

(b) The type of system shall be determined on the basis of location, soil type, and ground water level and shall be designed to accept all graywater connected to the system from the building. The system shall discharge into subsurface irrigation fields and may include surge tank(s) and appurtenances, as required by the Administrative Authority.

(c) No graywater system, or part thereof, shall be located on any lot other than the lot which is the site of the building or structure which discharges the graywater; nor shall any graywater system or part thereof be located at any point having less than the minimum distances indicated in Table G-1.

(d) No permit for any graywater system shall be issued until a plot plan with appropriate data satisfactory to the Administrative Authority has been submitted and approved. When there is insufficient lot area or inappropriate soil conditions for adequate absorption of the graywater, as determined by the Administrative Authority, no graywater system shall be permitted. The Administrative Authority is a city or county.

(e) No permit shall be issued for a graywater system which would adversely impact a geologically sensitive area, as determined by the Administrative Authority.

(f) Private sewage disposal systems existing or to be constructed on the premises shall comply with Appendix I of this code or applicable local ordinance. When abandoning underground tanks, Section 722.0 of the UPC shall apply. Also, appropriate clearances from graywater systems shall be maintained as provided in Table G-1. The capacity of the private sewage disposal system, including required future areas, shall not be decreased by the existence or proposed installation of a graywater system servicing the premises.

(g) Installers of graywater systems shall provide an operation and maintenance manual, acceptable to the Administrative Authority, to the owner of each system. Graywater systems require regular or periodic maintenance.

(h) The Administrative Authority shall provide the applicant a copy of this Appendix.

G 2 Definitions

Graywater is untreated waste water which has not come into contact with toilet waste. Graywater includes waste water from bathtubs, showers, bathroom wash basins, clothes washing machines, and laundry tubs, or an equivalent discharge as approved by the

Administrative Authority. It does not include waste water from kitchen sinks, photo lab sinks, dishwashers, or laundry water from soiled diapers.
Surfacing of graywater means the ponding, running off, or other release of graywater from the land surface.

G 3 Permit

It shall be unlawful for any person to construct, install or alter, or cause to be constructed, installed or altered any graywater system in a building or on premises without first obtaining a permit to do such work from the Administrative Authority.

G 4 Drawings and Specifications

The Administrative Authority may require any or all of the following information to be included with or in the plot plan before a permit is issued for a graywater system:
(a) Plot plan drawn to scale completely dimensioned, showing lot lines and structures, direction and approximate slope of surface, location of all present or proposed retaining walls, drainage channels, water supply lines, wells, paved areas and structures on the plot, number of bedrooms and plumbing fixtures in each structure, location of private sewage disposal system and 100 percent expansion area or building sewer connecting to public sewer, and location of the proposed graywater system.
(b) Details of construction necessary to ensure compliance with the requirements of this Appendix together with full description of the complete installation including installation methods, construction and materials as required by the Administrative Authority.
(c) A log of soil formations and ground water level as determined by test holes dug in close proximity to any proposed irrigation area, together with a statement of water absorption characteristics of the soil at the proposed site as determined by approved percolation tests. In lieu of percolation tests, the Administrative Authority may allow the use of Table G-2, an infiltration rate designated by the Administrative Authority, or an infiltration rate determined by a test approved by the Administrative Authority.
(d) A characterization of the graywater for commercial, industrial, or institutional systems, based on existing records or testing.

G 5 Inspection and Testing

(a) Inspection
(1) All applicable provisions of this Appendix and of Section 103.5 of the UPC shall be complied with.
(2) System components shall be properly identified as to manufacturer.
(3) Surge tanks shall be installed on dry, level, well-compacted soil if in a drywell, or on a level, three inch concrete slab or equivalent, if above ground.
(4) Surge tanks shall be anchored against overturning
(5) If the irrigation design is predicated on soil tests, the irrigation field shall be installed at the same location and depth as the tested area.
(6) Installation shall conform with the equipment and installation methods identified in the approved plans.

(7) Graywater stub-out plumbing may be allowed for future connection prior to the installation of irrigation lines and landscaping. Stub-out shall be permanently marked "GRAYWATER STUB-OUT, DANGER UNSAFE WATER."

(b) Testing

(1) Surge tanks shall be filled with water to the overflow line prior to and during inspection. All seams and joints shall be left exposed and the tank shall remain watertight.

(2) A flow test shall be performed through the system to the point of graywater irrigation. All lines and components shall be watertight.

G-6 Procedure for Estimating Graywater Discharge

(a) Single Family Dwellings and Multi-Family Dwellings

The Administrative Authority may utilize the graywater discharge procedure listed below, water use records, or calculations of local daily per person interior water use:

1. The number of occupants of each dwelling unit shall be calculated as follows:

First Bedroom	*2 occupants*
Each additional bedroom	*1 occupant*

2. The estimated graywater flows of each occupant shall be calculated as follows:

Showers, bathtubs and wash basins	*25 GPD/occupant*
Laundry	*15 GPD/occupant*

3. The total number of occupants shall be multiplied be the applicable estimated graywater discharge as provided above and the type of fixtures connected to the graywater system.

(b) Commercial, Industrial, and Institutional Projects

The Administrative Authority may utilize the graywater discharge procedure listed below, water use records, or other documentation to estimate graywater discharge:

1. The square footage of the building divided by the occupant load factor from UPC Table 10-A equals the numbers of occupants.

2. The number of occupants times the flow rate per person (minus toilet water and other disallowed sources) from UPC Table I-2 equals the estimated graywater discharge per day.

The graywater system shall be designed to distribute the total amount of estimated graywater discharged daily.

G 7 Required Area of Subsurface Irrigation

Each irrigation zone shall have a minimum effective irrigation area for the type of soil and infiltration rate to distribute all graywater produced daily , pursuant to Section G-6, without surfacing. The required irrigation area shall be based on the estimated graywater discharge, pursuant to Section G-6, size of surge tank, or a method determined by the Administrative Authority.

If a mini-leachfield irrigation system is used, the required square footage shall be determined from Table G-2, or equivalent, for the type of soil found in the excavation.

The area of the irrigation field shall be equal to the aggregate length of the perforated pipe sections within the irrigation zone times the width of the proposed mini-leachfield trench.

No irrigation point shall be within five vertical feet of the highest known seasonal groundwater nor where graywater may contaminate the groundwater or ocean water. The applicant shall supply evidence of ground water depth to the satisfaction of the Administrative Authority.

G 8 Determination of Irrigation Capacity

(a) In order to determine the absorption quantities of soils other than those listed in Table G-2, the proposed site may be subjected to percolation tests acceptable to the Administrative Authority or determined by the Administrative Authority.

(b) When a percolation test is required, no mini-leach field system or subsurface drip irrigation system shall be permitted if the test shows the absorption capacity of the soil is less than 60 minutes/inch or more rapid than 5 minutes/inch, unless otherwise permitted by the Administrative Authority.

(c) The irrigation field size may be computed from Table G-2, or determined by the Administrative Authority or a designee of the Administrative Authority.

G 9 Surge Tank Construction (Figure 1)

(a) Plans for surge tanks shall be submitted to the Administrative Authority for approval. The plans shall show the data required by the Administrative Authority and may include dimensions, structural calculations, and bracing details.

(b) Surge tanks shall be constructed of solid, durable materials, not subject to excessive corrosion or decay and shall be watertight.

(c) Surge tanks shall be vented as required by Chapter 9 of this Code and shall have a locking, gasketed access opening, or approved equivalent, to allow for inspection and cleaning.

(d) Surge tanks shall have the rated capacity permanently marked on the unit. In addition, "GRAYWATER IRRIGATION SYSTEM, DANGER - UNSAFE WATER" shall be permanently marked on the surge tank.

(e) Surge tanks installed above ground shall have an overflow, separate from the line connecting the tank with the irrigation fields. The overflow shall have a permanent connection to a sewer or to a septic tank, and shall be protected against sewer line backflow by a backwater valve. The overflow shall not be equipped with a shut-off valve.

(f) The overflow and drain pipes shall not be less in diameter than the inlet pipe. The vent size shall be based on the total graywater fixture units, as outlined in UPC Table 7-5 or local equivalent. Unions or equally effective fittings shall be provided for all piping connected to the surge tank.

(g) Surge tanks shall be structurally designed to withstand anticipated loads. Surge tank covers shall be capable of supporting an earth load of not less than 300 pounds per square foot when the tank is designed for underground installation.

(h) Surge tanks may be installed below ground in a dry well on compacted soil, or buried if the tank design is approved by the Administrative Authority. The system shall be

designed so that the tank overflow will gravity drain to a sanitary sewer line or septic tank. The tank must be protected against sewer line backflow by a backwater valve.

(i) Materials

(1) Surge tanks shall meet nationally recognized standards for non potable water and shall be approved by the Administrative Authority.

(2) Steel surge tanks shall be protected from corrosion, both externally and internally, by an approved coating or by other acceptable means.

G 10 Valves and Piping (Figure 1)

Graywater piping discharging into a surge tank or having a direct connection to a sanitary drain or sewer piping shall be downstream of an approved waterseal type trap(s). If no such trap(s) exists, an approved vented running trap shall be installed upstream of the connection to protect the building from any possible waste or sewer gasses. Vents and venting shall meet the requirements in Chapter 9 of the UPC. All graywater piping shall be marked or shall have a continuous tape marked with the words "DANGER - UNSAFE WATER." All valves, including the three-way valve, shall be readily accessible and shall be approved by the Administrative Authority. A backwater valve, installed pursuant to this Appendix, shall be provided on all surge tank drain connections to the sanitary drain or sewer piping.

G 11 Irrigation Field Construction

The Administrative Authority may permit subsurface drip irrigation, mini-leach field or other equivalent irrigation methods which discharge graywater in a manner which ensures that the graywater does not surface. Design Standards for subsurface drip irrigation systems and mini-leach field irrigation systems follow:

(a) Standards for a subsurface drip irrigation system are:

(1) Minimum 140 mesh (115 micron) filter with a capacity of 25 gallons per minute, or equivalent, filtration, sized appropriately to maintain the filtration rate, shall be used. The filter back-wash and flush discharge shall be caught, contained and disposed of to the sewer system, septic tank, or with approval of the Administrative Authority, a separate mini-leach field sized to accept all the back wash and flush discharge water. Filter backwash water and flush water shall not be used for any purpose. Sanitary procedures shall be followed when handling filter back-wash and flush discharge of graywater.

(2) Emitters shall have minimum flow path of 1200 microns and shall have a coefficient of manufacturing variation (Cv) of no more than seven percent. Irrigation system design shall be such that emitter flow variation shall not exceed plus or minus ten percent. Emitters shall be recommended by the manufacture for subsurface use and graywater use, and shall have demonstrated resistance to root intrusion. For emitter ratings refer to: Irrigation Equipment Performance Report, Drip Emitters and Micro-Sprinklers, Center for Irrigation Technology, California State University, 5730 N. Chestnut Avenue. Fresno, California 93740-0018.

(3) Each irrigation zone shall be designed to include no less than the number of emitters specified in Table G-3, or through a procedure designated by the Administrative Authority. Minimum spacing between emitters is 14 inches in any direction.

(4) The system design shall provide user controls, such as valves, switches, timers, and other controllers as appropriate, to rotate the distribution of graywater between irrigation zones.

(5) All drip irrigation supply lines shall be polyethylene tubing or PVC class 200 pipe or better and schedule 40 fittings. All joints shall be properly solvent-cemented, inspected and pressure tested at 40 psi, and shown to be drip tight for five minutes, before burial. All supply lines will be buried at least eight inches deep. Drip feeder lines can be poly or flexible PVC tubing and shall be covered to a minimum depth of nine inches.

(6) Where pressure at the discharge side of the pump exceeds 20 pounds per square inch (psi), a pressure reducing valve able to maintain downstream pressure no greater than 20 psi shall be installed downstream from the pump and before any emission device.

(7) Each irrigation zone shall include a flush valve/anti-siphon valve to prevent back siphonage of water and soil.

(b) Standards for a mini-leach field system are:

(1) Perforated sections shall be a minimum 3-inch diameter and shall be constructed of perforated high density polyethylene pipe, perforated ABS pipe, perforated PVC pipe, or other approved materials, provided that sufficient openings are available for distribution of the graywater in the trench area. Material, construction and perforation of the piping shall be in compliance with the appropriate absorption field drainage piping standards and shall be approved by the Administrative Authority.

(2) Clean stone, gravel, or similar filter material acceptable to the Administrative Authority, and varying in size between 3/4 inch to 2 inches shall be placed in the trench to the depth and grade required by this Section. Perforated sections shall be laid on the filter material in an approved manner. The perforated sections shall then be covered with filter material to the minimum depth required by this Section. The filter material shall then be covered with landscape filter fabric or similar porous material to prevent closure of voids with earth backfill. No earth backfill shall be placed over the filter material cover until after inspections and acceptance.

(3) Irrigation fields shall be constructed as follows:

	Minimum	*Maximum*
Number of drain lines per irrigation zone	*1*	---
Length of each perforated line	---	*100 feet*
Bottom width of trench	*6 inches*	*18 inches*
Total depth of trench	*17 inches*	*18 inches*
Spacing of lines, center to center	*4 feet*	---
Depth of earth cover of lines	*9 inches*	---
Depth of filter material cover of lines	*2 inches*	---
Depth of filter material beneath lines	*3 inches*	---
Grade of perforated lines	*level*	*3 inches/100 feet*

G 12 Special Provisions

(a) Other collection and distribution systems may be approved by the Administrative Authority as allowed by Section 301 of the UPC.
(b) Nothing contained in this Appendix shall be construed to prevent the Administrative Authority from requiring compliance with stricter requirements than those contained herein, where such stricter requirements are essential in maintaining safe and sanitary conditions or from prohibiting graywater systems. The prohibition of graywater systems or more restrictive standards may be adopted by the Administrative Authoriy by ordinance after a public hearing.

G 13 Health and Safety

(a) Graywater may contain fecal matter as a result of bathing and/or washing of diapers and undergarments. Water containing fecal matter, if swallowed, can cause illness in a susceptible person. Therefore, graywater shall be not be contacted by humans, except as required to maintain the graywater treatment and distribution system.
(b) Graywater shall not include laundry water from soiled diapers.
(c) Graywater shall not be applied above the land surface or allowed to surface and shall not be discharge directly into or reach any storm sewer system or any water of the United States.
(d) Graywater shall not be used for vegetable gardens.

Table G-1 Location of Graywater System.

Minimum Horizontal Distance (in feet) From	Surge Tank (feet)	Irrigation Field (feet)
Buildings or Structures (1)	*5ft (2)*	*8ft (3)*
Property line adjoining private property	*5ft*	*5ft (4)*
Water supply wells (5)	*50ft*	*100ft*
Streams and lakes (5)	*50ft*	*50ft*
Seepage pits or cesspools	*5ft*	*5ft*
Disposal field & 100% expansion area	*5ft*	*4ft (6)*
Septic tank	*0ft*	*5ft (7)*
On-site domestic water service line	*5ft*	*5ft (8)*
Pressure public water main	*10ft*	*10ft (9)*
Water ditches	*50ft*	*50ft*

Notes: *When mini-leach fields are installed in sloping ground, the minimum horizontal distance between any part of the distribution system and ground surface shall be fifteen feet.*

(1) Including porches and steps, whether covered or uncovered, but does not include car ports, covered walks, driveways and similar structures.
(2) The distance may be reduced to zero feet for above ground tanks if approved by the Administrative Authority.
(3) The distance may be reduced to two feet.
(4) For subsurface drip irrigation systems, 2 feet from property line.
(5) Where special hazards are involved, the distance may be increased by the Administrative Authority.
(6) Applies to the mini-leach fields type system only. Plus two feet for additional foot of depth in excess of one foot below the bottom of the drain line.
(7) Applies to mini-leach field only.
(8) A two foot separation is required for subsurface drip systems.
(9) For parallel construction or for crossings, approval by the Administrative Authority shall be required.

Table G-2 Mini-Leach Field Design Criteria of Six Typical Soils.

Type of Soil	Minimum sq. ft. of irrigation area per 100 gallon of estimated graywater discharge per day	Maximum absorption capacity, minutes per inch of irrigation area for a 24-hour period
1. Coarse sand or gravel	*20*	*5*
2. Fine sand	*25*	*12*
3. Sandy loam	*40*	*18*
4. Sandy clay	*60*	*24*
5. Clay with considerable sand or gravel	*90*	*48*
6. Clay with small amount of sand or gravel	*120*	*60*

Table G-3 Subsurface Drip Design Criteria of Six Typical Soils.

Type of Soil	Maximum emitter discharge (gal/day)	Minimum number of emitters per gpd of graywater production
1. Sand	*1.8*	*0.6*
2. Sandy loam	*1.4*	*0.7*
3. Loam	*1.2*	*0.9*
4. Clay loam	*0.9*	*1.1*
5. Silty clay	*0.6*	*1.6*
6. Clay	*0.5*	*2.0*

Use the daily graywater flow calculated in Section G-6 to determine the number of emitters per line.

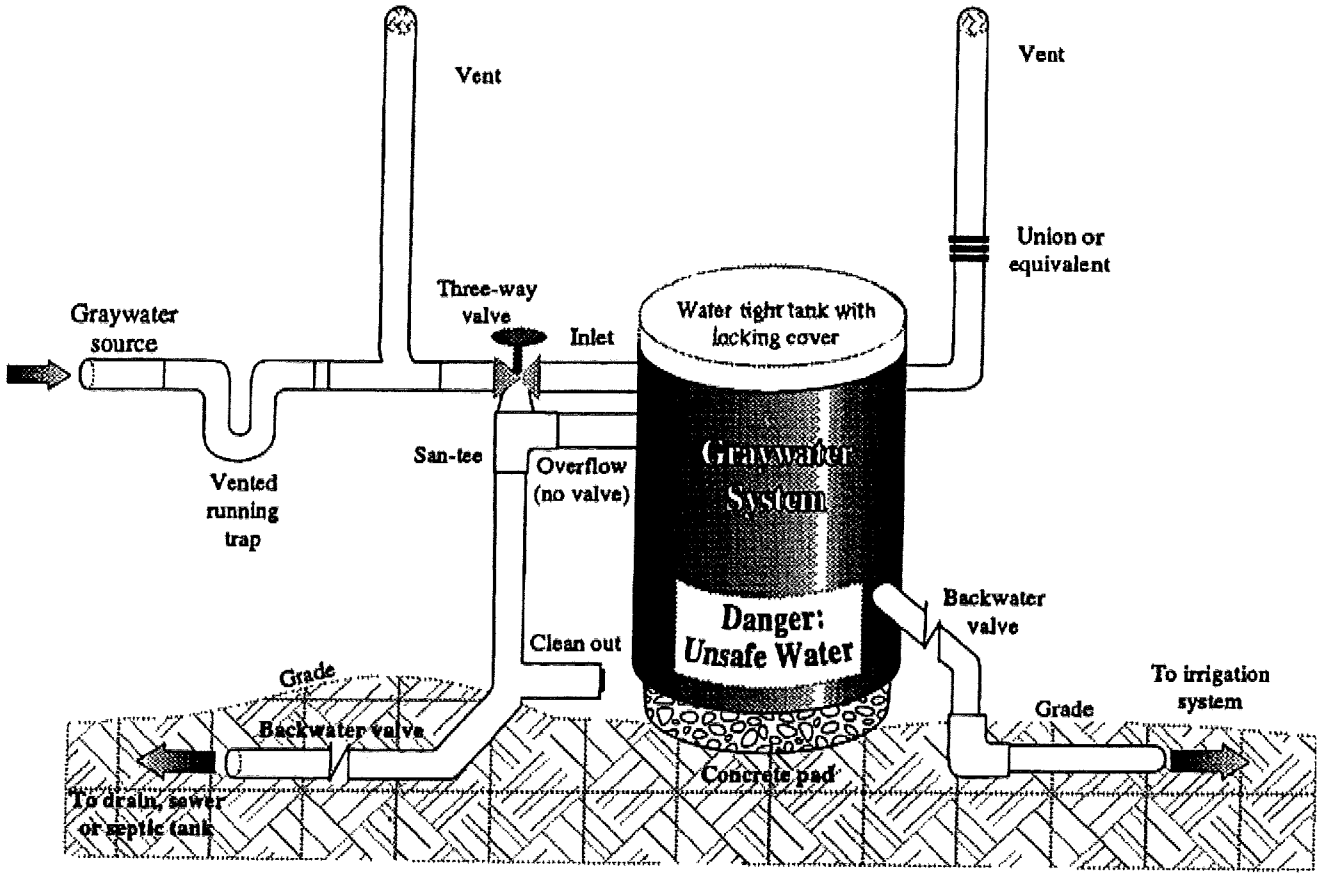


Figure 1-Graywater System Single Tank-Gravity (conceptual)

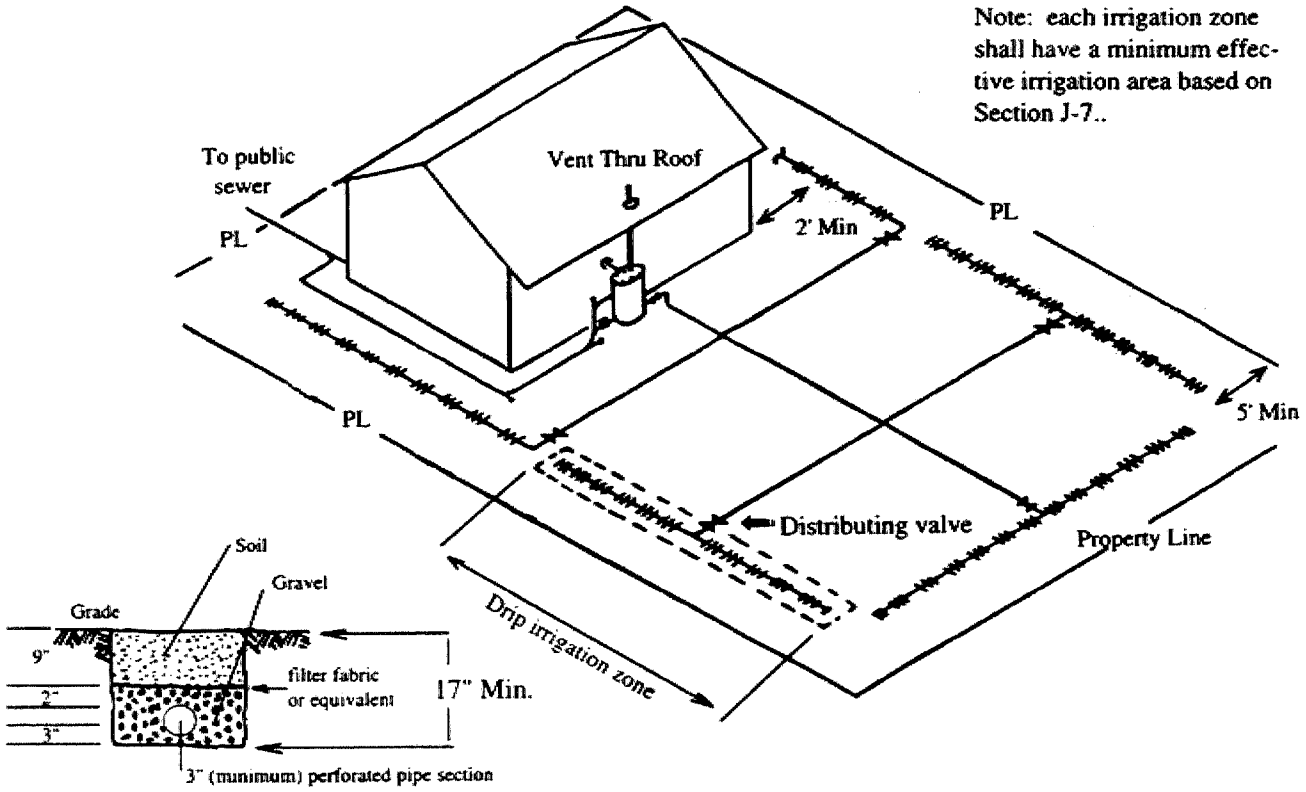


Figure 2-Graywater System Irrigation Layout (conceptual)

Exhibit C

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) forecast[1] 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.

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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 Ponded 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 techniques[2] 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 Circulare 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 fords[3], armored fills with culverts[3], and bridges[3].
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 bank[2]. 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 culvers, 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 applicable[4].
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/blobdload.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 Policy[5].

[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.snydernet.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

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