Local

Riverside County General Plan

The multipurpose open space element of the Riverside County General Plan (County of Riverside 2003) provides policies regarding water conservation, water quality, and groundwater recharge within the County of Riverside. The following policies are applicable to the proposed MDP facilities:

Open Space Policy 2.2: Where feasible, decrease stormwater runoff by reducing pavement in development areas, and by design practices, such as permeable parking bays, and porous parking lots with bermed storage areas for rainwater detention.

Open Space Policy 3.3: Minimize pollutant discharge into storm drainage systems and natural drainage and aquifers.

Open Space Policy 4.3: Ensure that adequate aquifer water recharge areas are preserved and protected.

Open Space Policy 4.4: Incorporate natural drainage systems into developments where appropriate and feasible.

Open Space Policy 4.5 Retain stormwater at or near the site of generation for percolation into the groundwater to conserve it for future uses and to mitigate adjacent flooding.

Open Space Policy 5.3: Based upon site, specific study, all development shall be set back from the floodway boundary a distance adequate to address the following issues:

- Public safety;
- Erosion;
- Riparian or wetland buffer;
- Wildlife movement corridor or linkage; and
- Slopes.

Open Space Policy 6.1: During the development review process, ensure compliance with the Clean Water Act's Section 404 in terms of wetlands mitigation policies and policies concerning fill material in jurisdictional wetlands.

City of Wildomar

The City of Wildomar has incorporated Riverside County's General Plan. Therefore, the above policies related to water conservation, water quality, and groundwater recharge also applies to the City of Wildomar.

City of Lake Elsinore General Plan

The hydrology and water quality section of the City of Lake Elsinore General Plan (City of Lake Elsinore 2011) provides policies to address potential flood hazards and water quality from implementation of the MDP facilities. The following policies are applicable to future proposed MDP facilities:

Policy 4.3: Require Best Management Practices through project conditions of approval development to meet the Federal NPDES permit requirements.

Policy 5.1: Continue to ensure that new construction in floodways and floodplains conforms to all applicable provisions of the National Flood Insurance Program in order to protect buildings and property from flooding.

Policy 5.2: Utilize the Capital Improvement Program for storm drainage projects and maintenance and improvement of local storm drain systems including channels, pipes, and inlets to ensure capacity for maximum runoff flows.

Lake Elsinore Municipal Code (LEMC) – Title 14, Chapter 14.08

Chapter 14.08 of the LEMC is the "City of Lake Elsinore Stormwater/Urban Runoff Management and Discharge Controls Ordinance". The purpose of this chapter is to ensure the future health, safety, and general welfare of City citizens by reducing pollutants in stormwater discharges to the maximum extent practicable, regulating illegal connections and discharges to the storm drain system, and regulating non-stormwater discharges to the storm drain system. The intent of this chapter is to protect and enhance the water quality of City watercourses, water bodies, groundwater, and wetlands in a manner pursuant to and consistent with the federal CWA (33 U.S.C. 1342). This chapter requires compliance with LEMC erosion and sediment control requirements, the identification of BMPs and compliance with the Municipal NPDES Permit and the NPDES Permit for Industrial/Commercial and Construction Activity.

Lake Elsinore Municipal Code (LEMC) – Chapter 15, Chapter 15.64

The purpose of Chapter 15.64 (Flood Damage Prevention) of the LEMC is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by legally enforceable regulations applied uniformly throughout the community to all publicly and privately owned land within flood-prone, mudslide (i.e., mudflow) or flood-related erosion areas. This chapter includes regulations to:

- Restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities;
- Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;

- Control the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
- Control filling, grading, dredging, and other development which may increase flood damage; and
- Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

Elsinore Valley Municipal Water District

The EVMWD is a public nonprofit agency that was created on December 23, 1950, under the Municipal Water District Act of 1911. EVMWD provides water, wastewater, and reclaimed water service to the City of Lake Elsinore, the cities of Canyon Lake and Wildomar, portions of the city of Murrieta, and unincorporated portions of Riverside County. EVMWD is a special district, whose powers include provision of public water service, water supply development and planning, wastewater treatment and disposal, and recycling. Currently, EVMWD has more than 35,000 water, wastewater, and agricultural service connections. EVMWD is a subagency of the Western Municipal Water District, a member agency of the Metropolitan Water District of Southern California (Metropolitan).

Lake Elsinore and San Jacinto Watersheds Authority

The LESJWA is a joint powers authority created by the Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Bond Act of 2000 funding (also known as Proposition 13) and entrusted with state and local funds to improve water quality in the region and satisfy other water resources protection needs. Its jurisdiction covers a 700-square mile area running from the San Jacinto Mountains west through Canyon Lake and ends in Lake Elsinore. Members of LESJWA include EVMWD, the cities of Lake Elsinore and Canyon Lake, the County of Riverside, and SAWPA.

4.8.3 Comments Received in Response to the Notice of Preparation

Comment letters were received from the Department of Transportation on September 27, 2011, and by Linda Ridenour on October 11, 2011, in response to the NOP. The contents of these letters are included in Appendix A.

4.8.4 Significance Threshold Criteria

The District has not established local CEQA significance thresholds as described in Section 15064.7 of the CEQA Guidelines. The NOP for the PEIR included the IS (Environmental Checklist) to show the areas being analyzed in the PEIR (refer to Appendix A of this PEIR). Accordingly, and based on the IS, the Project would have a significant impact on hydrology and water quality if the Project would:

- Violate or conflict with any adopted water quality standards or waste discharge requirements.
- Result in substantial discharges of typical stormwater pollutants *(e.g. sediment from construction activities, hydrocarbons, and metals from motor vehicles, nutrients and pesticides from landscape*

maintenance activities, metals of other pollutants from industrial operation,) or substantial changes to surface water quality including, but not limited to, temperature, dissolved oxygen, pH, or turbidity.

- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level *(e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)*.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of a watercourse or wetland, in a manner which would result in substantial erosion or siltation on or off site.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.
- Create or contribute runoff water, which would exceed the capacity of existing or planned stormwater drainage systems.
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow.

4.8.5 Environmental Impacts Before Mitigation

Would the Project violate or conflict with any adopted water quality standards or waste discharge requirements?

Currently, stormwater runoff follows the natural drainage pattern of taking water from the mountains/foothills and into Lake Elsinore. The Project will do the same for stormwater; the water will be confined to channels and underground pipes to reduce the risk of flooding, erosion and siltation in the Project area to below the 100-year level. The Project would establish a comprehensive drainage system within the Project boundary, to provide flood protection to existing development and future buildout in accordance with land uses identified in Riverside County, City of Lake Elsinore, and City of Wildomar General Plans. MDP facilities would convey existing stormwater emanating from foothill/mountains, residential, commercial, and industrial areas into Lake Elsinore, the MDP facilities will not generate new sources of stormwater. MDP facilities will be constructed by the District, County of Riverside, City of Lake Elsinore, City of Wildomar, or by future development projects within the Project boundary.

The RWQCB has established water quality standards for all surface waters within its region. Water quality standards are defined under the CWA to include both the beneficial uses of specific water bodies and the levels of water quality that must be met and maintained to protect those uses. Water quality

standards for all surface waters overseen by the RWQCB are documented in the Basin Plan (2008). Beneficial uses consist of all the various ways that water can be used for the benefit of people and/or wildlife. Five beneficial uses have been designated for surface water bodies in the vicinity of the Project (refer to Table 4.8-1, Beneficial Uses for Receiving Waters in Proximity to the Project).

Meeting the water quality standards is the responsibility of development projects in the County and cities of Lake Elsinore and Wildomar, as required by the MS4 Permits. The proposed MDP facilities will reduce flooding from stormwater and urban runoff currently experienced within the Project boundary. The proposed drainage facilities themselves will not generate or create a significant increase in runoff or stormwater pollutants. Proposed detention basins will allow for some sediment transported in stormwater runoff to settle out over time, and will attenuate peak-flow rates from storm events. Proposed water quality basins will reduce stormwater pollutant discharges by reducing peak flows, allowing for settlement, infiltration and/or use of filter media. Proposed storm drains and channels would route stormwater from the canyons around potential pollutant sources in residential and commercial areas. Activities relating to the construction of the MDP facilities will be regulated by the RWQCB under the NPDES MS4 permit program at the time future development projects are approved within the Project boundary (Mitigation Measure (**MM**) **HYDRO-1**). The District is the Principal Permittee, the County of Riverside and cities of Lake Elsinore and Wildomar are Co-Permittees in the NPDES program, which is designed to reduce pollutant loads in urban runoff. According to the NPDES permit requirements, all new development projects and substantial rehabilitation efforts are required to incorporate BMPs (**MM HYDRO-1**). Implementation of BMPs in accordance with NPDES Municipal Stormwater Management Program helps to protect surface water quality in Lake Elsinore.

The MDP may result in the transport of sediment and pollutants into local drainage systems during construction. These impacts are considered short-term. In particular, MDP facilities built during the rainy season could impact water quality as a result of runoff and sediment transport during construction activities. Construction and operation of a number of MDP facilities may require dewatering of pipeline trenches in order to place infrastructure underground. Dewatering of groundwater may result in potential impacts to surface water quality if not performed in accordance with applicable discharge permits. In order to reduce the discharge of expected pollutants into receiving waters during construction of the proposed MDP facilities, project proponents (i.e., the District or City of Lake Elsinore or City of Wildomar) may be required to prepare a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the SWRCB Construction General Permit (**MM HYDRO-1**). The Construction General Permit requires the development and implementation of a SWPPP to identify an effective combination of erosion control and sediment control BMPs to minimize or eliminate the discharge of pollutants into receiving waters during construction. In addition, BMPs for managing sources of non-stormwater discharges and waste are required to be identified in the SWPPP (**MM HYDRO-1**). Example of construction BMPs includes silt fencing, gravel bag berms, fiber rolls, and street sweeping.

In the long term, the MDP facilities may require maintenance to remove vegetation that could clog or hamper stormwater flow. Herbicides could be used in maintenance activities to control vegetation that might grow in open channels. **MM HYDRO-2** shall be implemented to ensure additional sources of pollution (i.e. nitrogen and phosphorus) are not introduced into Lake Elsinore, which would affect the ability of the Beneficial Uses and TMDLs to be met for Lake Elsinore.

Overall, there are several regulations that are already in place that regulate the water quality of the stormwater that will be conveyed by the Project, but not generated by the Project. The RWQCB could regulate portions of the Project under the Porter-Cologne Act or Section 401 of the CWA related to impacts that might occur to existing resources during construction of the MDP facilities. Stormwater pollution prevention measures may be identified and must be followed to reduce or eliminate discharge of pollutants to surface water from stormwater and non-stormwater discharges from, not only the construction of the MDP facilities, but the implementation of future approved development projects within the Project boundary, as well.

The MS4 Permits require the District to conduct public education, monitoring, illicit connection/illegal discharge detection and removal, maintenance activities, and coordination with other MS4 operators to ensure that pollutants discharging from MS4 systems are mitigated to the maximum extent practicable. Future MDP facilities constructed would be required to comply with this permit.

In addition, any proposed facilities that impact waters of the United States or waters of the state will be regulated by the RWQCB under Section 401 of the CWA or the Porter-Cologne Act (**MM HYDRO-3**). The Project also incorporates channels, storm drains, and basins, which can serve to attenuate peak-flow rates and allow for infiltration of stormwater. Additional water quality control measures may be implemented at the time of construction in order to comply with TMDL requirements established by the RWQCB within the watershed.

In light of the above water quality regulatory programs already in place, which the proposed MDP and future development projects within the Project boundary will have to comply with, impacts to water quality are anticipated to be **less than significant with mitigation incorporated.**

Additionally, since future MDP facilities within the Project boundary will be required to comply with **MM HYDRO-1** through **MM HYDRO-3**, water quality standards and waste discharge requirements are expected to be **less than significant with mitigation incorporated**.

Would the Project result in substantial discharges of typical stormwater pollutants *(e.g., sediment from construction activities, hydrocarbons and metals from motor vehicles, nutrients and pesticides from landscape maintenance activities, metals or other pollutants from industrial operation)* or substantial changes to surface water quality including, but not limited to, temperature, dissolved oxygen, pH, or turbidity?

There are four extended detention basins proposed within the Project boundary. The purpose of these basins is to mitigate the water quality impact of the runoff from the existing urban areas to Lake Elsinore. About 348 acres, or roughly 20% of the existing urban area within the Project watershed, would be routed through these basins. According to the CNRP, the approximate pollutant removal efficiency of extended detention basins is 75 percent for total phosphorus and 24 percent for total nitrogen. Given the factors listed above, when constructed, these basins would prevent 21 kg/year of Total Phosphorous and 35 kg/year of Total Nitrogen, on average, from reaching Lake Elsinore. These basins, plus the 9 debris basins in the MDP, would also reduce turbidity in Lake Elsinore. Although not calculated, these basins would also treat runoff from open space and forest land uses, further increasing nutrient load reduction benefit. These reductions will assist in offsetting impacts of phosphorus and nitrogen loads from existing and future development; both within and outside of the Project boundary.

The MDP facilities in and of themselves would not create pollutants, but would merely convey surface waters that already discharge into Lake Elsinore due to the close proximity of the drainage areas to Lake Elsinore The time it takes for stormwater to be conveyed through the system would be relatively short, just a matter of minutes, and would not increase the temperature of the water above ambient levels, nor change the pH values to any level of significance. Although stormwater runoff typically has a high dissolved oxygen content, it is likely to be of negligible benefit to Lake Elsinore.

Other potential impacts to surface water quality within the Project boundary are mitigated through existing compliance programs and plans (e.g., TMDL Task Force projects, MS4 Permit compliance programs, and CNRP), of which the District is a participating member (**MM HYDRO-1**). The compliance programs will ensure that a broad range of BMPs are implemented to reduce the discharge of stormwater pollutants to the maximum extent practicable.

Based on the information provided above, potential impacts to discharge of pollutants are considered to be **less than significant with mitigation incorporated**.

Would the Project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level *(e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?*

Groundwater within the Project boundary is generally controlled by the overall Lake Elsinore Groundwater Basin which lies in a closed basin formed between strands of the Elsinore fault zone (see Figure 4.8-1). The MDP is not a development project; it will not require an increase the demands on groundwater supply. The MDP is designed to collect and convey stormwater through the Project boundary. The proposed open, concrete channels will introduce approximately 2.5 acres of new impervious areas where the existing condition is mostly open, pervious lands. The debris basins will encompass a total of approximately 28 acres; most of this area is considered still permeable, as these areas will not be paved, and will be removed of sediment/silt as part of MDP maintenance. The water quality basins will introduce approximately 13 acres of still pervious surfaces, allowing for infiltration.

Per Elsinore Valley Municipal Water District (EVMWD), the Elsinore Basin Groundwater Management Plan (2005) estimated that the increased urbanization around Lake Elsinore will diminish groundwater recharge due to infiltration of runoff from 900 to 700 acre-feet per year between 2005 to 2020, but considered this a relatively small amount that is not considered a significant issue. EVMWD is instituting conjunctive use and artificial recharge programs in past several years and will do so in the future, there such programs are expected to result in satisfactory management of the Elsinore Groundwater Basin.

Since future proposed concrete channels would only be a small fraction of area (approximately 2.5 acres of the approximately 44.61 acres of the MDP facilities) not providing groundwater recharge as compared to development projects, the conversion would be considered less than significant. Furthermore, the 13 acres of water quality basins are designed to allow water to infiltrate and thus may offset loss of 2.5 acres of recharge from proposed impervious concrete-lined facilities listed above. The water quality basins will also be designed to settle out pollutants before the stormwater is discharged to Lake Elsinore.

Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of a watercourse or wetland, in a manner which would result in substantial erosion or siltation on- or off-site?

The Project is designed to respect and improve existing drainage patterns, and will not result in substantial erosion or siltation on or off site. The proposed MDP facilities will generally follow the existing drainage pattern of the area; the existing general drainage pattern is for stormwater to be discharged from the canyon mouths, then flows overland across natural and urban landscapes into Lake Elsinore. In order to provide flood protection to existing development, the drainage pattern in the watersheds making up the Project boundary, would be altered by constructing debris basins in many of the canyon mouths and then conveying the stormwater in channels and underground storm drains

instead of overland. The altered drainage pattern would result in collecting siltation that normally occurs as flows move from the canyons overland to Lake Elsinore, into the debris basins. The debris basin will serve as the collection points to remove siltation, which is by design, making it more economical and efficient to remove siltation at a known point where the facility is open and access is relatively easy.

Most of the proposed MDP facilities will be constructed primarily within existing and proposed road rights-of-way. Some of the existing facilities will be expanded and storm drains will be placed underground. The open channels are all planned to be concrete-lined. The concrete-lined channels will add impervious area to the Project area (approximately 10 acres); however, implementation of the MDP facilities will improve stormwater drainage within the Project boundary by safely collecting, conveying and discharging flows within the Project boundary.

As discussed in Section 4.3, Biological Resources, as well as above, there will be altering and fill that may occur with MDP implementation to existing drainage features, there will also be impacts associated with the transition of currently unlined ditches and open areas conveying stormwater to lined, concrete facilities which do not allow any infiltration or natural conditions to occur in the drainage systems. These impacts will be evaluated on a case by case basis, depending on the resources and conditions present when the specific MDP facility is proposed for regulatory permitting. Mitigation for the fill that may occur within existing drainage features will be coordinated with the regulatory agencies and could include off-site mitigation, conservation or restoration/creation. Typical mitigation for impacts to natural drainages that may be considered jurisdictional by the regulatory agencies, for the type of MDP facilities proposed, would most likely include a combination of the following: creation of riparian or wetland habitat, restoration of riparian or wetland habitat, enhancement of habitat, and/or payment of in lieu fees to an established mitigation bank. With implementation of **MM HYDRO-4** (same as **MM BIO-65**), potential impacts to federally-protected wetlands are reduced to **less than significant** levels.

SWPPPs and BMPs may be incorporated into the construction and operation of the MDP facilities to reduce the potential for erosion or siltation (**MM HYDRO-1**).

Impervious surfaces, including paved areas such as parking lots, roadways, and building rooftops decrease the area in which stormwater runoff can infiltrate, potentially resulting in decreased absorption and increased runoff. Future development projects in the MDP area may be conditioned to comply with the provisions of the NPDES programs to include SWPPPs and WQMPs which includes site design requirements to minimize directly connected impervious areas. The SWPPP includes provisions to identify potential on-site pollutants, identify and implement an effective combination of erosion control and sediment control measures to reduce or eliminate discharge of pollutants to surface water from stormwater and non-stormwater discharges during construction activities. The site-specific WQMP must describe the BMPs that will be implemented and maintained throughout the life of the project, and is used by property owners, facility operators, tenants, facility employees, maintenance contractors, etc., to prevent and minimize water pollution that can be caused by stormwater or urban runoff. BMP selection includes site design measures to minimize directly connected impervious areas, source control

measures to minimize urban runoff potential, and/or treatment control measures to minimize urban runoff pollutant loads. This SWPPP and WQMP requirement will reduce the overall impervious areas within the Project boundary, and thus reduce the overall amount of surface runoff from urban areas.

Through compliance with regulatory permits associated with modifications to any natural drainages or wetlands that may be considered jurisdictional, compliance with the NPDES permitting program and incorporation of appropriate BMPs (**MM HYDRO-1**), impacts are expected to be **less than significant with mitigation incorporated**.

Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

As explained above, the proposed MDP facilities will generally follow the existing drainage pattern of the area; the existing general drainage pattern is for stormwater to be discharged from the canyon mouths, then flows overland across natural and urban landscapes into Lake Elsinore. The proposed MDP facilities will generally follow the existing drainage pattern of the area. The MDP facilities would be constructed to improve flow conveyance conditions in order to reduce the potential for flooding. Sediment removal during maintenance activities of the debris basins would also restore the flow conveyance. Proposed sediment removal activities would include ground-disturbing activities that would occur primarily during the dry-season, avoiding or minimizing the potential for flooding.

The MDP will act as a guide for the location and size of drainage facilities and basins needed to resolve existing flooding problems within the developed areas. The implementation of the MDP will mitigate for existing flooding issues occurring in the Lakeland Village area; the Project will not create flooding.

As discussed above, any modifications to natural drainages that are considered jurisdictional will be addressed by compliance with **MM HYDRO-4**.

Also, during construction of the MDP facilities, SWPPPs and BMPs may be incorporated to the MDP facilities to minimize the potential for flooding (**MM HYDRO-1**). The proposed MDP facilities will be designed to accommodate 100-year stormwater flows from the MDP area; therefore, the MDP will not result in peak flows exiting the site that would result in flooding on- or off-site.

Therefore, since the Project will improve the flooding issues in the Project area and with implementation of **MM HYDRO-1** and **MM HYDRO-4** will mitigate any construction impacts to natural drainages, impacts are considered to be **less than significant with mitigation incorporated**.

Would the Project create or contribute runoff water, which would exceed the capacity of existing or planned stormwater drainage systems?

The Project is intended to collect and convey stormwater through the Project boundary; the Project will not be a generator of runoff water that can exceed existing or planned stormwater drainage systems. Some of the MDP facilities will drain/connect to existing downstream drainage systems. The Project proposes to retrofit or upsize existing facilities whose capacity will be compromised by construction of the MDP or were not designed to convey the tributary runoff. Therefore, since the Project will not create or contribute runoff, and it will require the upsizing of existing facilities so that they can accommodate flows that will be conveyed through the new MDP facilities, impacts are considered to be **less than significant**.

Would the Project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

Portions of the Project area lie within the boundaries of the FEMA 100-year flood plain (see Figure 4.8-1). However, one of the objectives of the Project is to control flooding associated with stormwater runoff within the Project boundary. The Project does not include the construction of a levee. However, MDP facilities do include debris basins. Table 4.8-4 provides a list of debris basins within the Project boundary and whether they fall under the jurisdiction of the Division of Safety of Dams (DSOD) criteria.

The following criteria will be applied to every basin, even if the facility is not within the jurisdiction of the DSOD.

a. The embankment, foundation, abutments, and reservoir rim must be stable and must not develop unacceptable deformations under all loading conditions brought about by construction of the embankment, reservoir operation, and earthquake.
b. Seepage flow through the embankment, foundation, abutments, and reservoir rim must be controlled to prevent excessive uplift pressures; piping; instability; sloughing; removal of material by solutioning; or erosion of material into cracks, joints, or cavities. The amount of water lost through seepage must be controlled so that it does not interfere with planned project functions.
c. The reservoir rim must be stable under all operating conditions to prevent the triggering of a landslide into the reservoir that could cause a large wave to overtop the dam.
d. The embankment must be safe against overtopping or encroachment of freeboard during occurrence of the IDF (inflow design flood) by the provision of sufficient spillway and outlet works capacity.
e. Freeboard must be sufficient to prevent overtopping by waves.
f. Camber should be sufficient to allow for settlement of the foundation and embankment, but not included as part of the freeboard.
g. The upstream slope must be protected against wave erosion, and the crest and downstream slope must be protected against wind and rain erosion.

An earthfill dam designed to meet the above criteria will prove permanently safe, provided proper construction methods and control are achieved.

Would the Project expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow?

A seiche is an oscillation of a landlocked body of water that can cause water damage to buildings, roads, and other facilities that surround the body of water (Lake Elsinore), typically caused by earthquakes. According to the Seismic and Geologic Hazards Review report (Leighton Consulting Inc. 2011; see Appendix D of this PEIR), some areas within the Project boundary are located within an area that could be subject to inundation by seiches from Lake Elsinore. However, as stated in the City of Lake Elsinore's Draft General Plan EIR, although there is the potential for a seiche to occur in Lake Elsinore during an earthquake, it would take a geologically substantial earthquake to cause a seiche. Seiche potential is highest in large, deep, steep reservoirs or water bodies. Lake Elsinore lacks significant potential for a damaging seiche because it is shallow, and because of the flood control infrastructure constructed by the ACOE, including the berm fill at the southern end of the lake. No water is being stored in the water quality or debris basins that would constitute bodies of water that could create a seiche. The MDP facilities will convey stormwater and runoff that would reduce the likelihood of mudflow from the area.

The potential for the occurrence of a tsunami is very low because the Pacific Ocean is the closest tsunami-producing open body of water and is located approximately 25 miles from the Project boundary.

The construction and operation and maintenance of the Project facilities will not increase exposure of land uses to a seiche, mudflow, or tsunami. Therefore, impacts from all three hazards are considered to be **less than significant**.

Table 4.8-4
Debris Basins within the MDP under California Division of Safety of Dams Jurisdiction

Watershed	Downstream Condition	Approximate Embankment Height (ft.)	Structure Classification	Division of Safety of Dams (DSOD) Jurisdiction?	Approximate Debris Volume (ac-ft.)	Approximate Area Footprint (ac)
A	Outlets to existing channel	20	Dam	No	9	2
B	Outlets to existing channel	27	Dam	Yes	16	2
F	Will outlet to proposed storm drain	10	Dam	No	3	1
H	Will outlet to proposed rectangular channel	58	Dam	Yes	97	11
I	Will outlet to proposed storm drain	24	Dam	No	3	1
K	Will outlet into proposed storm drain	7	Dam	No	6	2
N (Line N)	Will outlet into proposed storm drain	10	Dam	No	11	2
O (Line O-10)	Will outlet into proposed storm drain	10	Dam	No	8	2
O (Line O-20)	Will outlet into proposed storm drain	10	Dam	No	6	1

Source: District.

The proposed basins embankments will be designed and constructed in accordance with standard engineering and seismic criteria to minimize the risk of failures. Dams under the jurisdiction of DSOD undergo a thorough review by the Department of Water Resources to ensure that the dam is designed to meet minimum requirements and that the design is appropriate for the known geologic conditions. DSOD also oversees the construction of the dam to ensure the work is done in accordance with approved plans and specifications. Following construction, DSOD inspects each dam on an annual basis to ensure the dam is safe, performing as intended, and is not developing problems. Therefore, impacts are considered **less than significant**.

4.8.6 Mitigation Measures

The CEQA Guidelines require an EIR to describe feasible mitigation measures that could minimize significant adverse impacts (14 CCR 15126.4). Mitigation measures were evaluated for their ability to reduce or eliminate impacts.

MM HYDRO-1 During any construction or maintenance activities that require ground disturbance for future Master Drainage Plan (MDP) facilities, the Riverside County Flood Control and Water Conservation District (District), County of Riverside, and Cities of Lake Elsinore and Wildomar shall comply with the current statewide Construction General Permit for projects resulting in land disturbances of 1 acre. Where projects result in disturbance to less than 1 acre of land, the District, County of Riverside, and Cities of Lake Elsinore and Wildomar shall comply with the local grading ordinance and install best management practices (BMPs) to ensure that sediment is not transported beyond the Project limits or into sensitive areas such as wetlands and water bodies. A De Minimus discharge shall be obtained from the Regional Water Quality Control Board (RWQCB) when required for dewatering activities.

MM HYDRO-2 Future landscape maintenance activities using pesticides (i.e., herbicides or rodenticides) around the MDP facilities shall be phosphorus and nitrogen free or be in conformance with the phosphorus and nitrogen Total Maximum Daily Loads (TMDLs) outlined in the 303(d) list for Lake Elsinore.

MM HYDRO-3 Prior to construction of future MDP facilities that may be located in waters of the United States or waters of the state, the District, County of Riverside, and Cities of Lake Elsinore and Wildomar shall obtain all necessary permits to comply with the federal Clean Water Act (CWA) state discharge permitting requirements, 404 Permits, 401 Permits, 1602 Permits, and California Porter-Cologne Water Quality Control Act permit. Restoration, enhancement, or creation may be required as a result of these regulatory permits and could include such activities on MDP facilities (such as within basins) or could occur off site, but within the same watershed. Mitigation ratios shall be determined at the time specific MDP facilities are proposed for construction in the future.

MM HYDRO-4 Project-specific jurisdictional delineations will be required to determine the limits of the U.S. Army Corps of Engineers (ACOE), RWQCB, and California Department of Fish and Wildlife (CDFW) jurisdiction for the MDP facilities listed in Table 4.3-5. Impacts to jurisdictional waters will need to be verified by the corresponding regulatory agency. If impacts are anticipated, then either a) jurisdictional water will be completely avoided or

b) necessary permits from requisite jurisdictions will be obtained. Obtaining permits may include mitigation for impacts, which would most likely include similar mitigation to that offered in a Determination of Biologically Equivalent or Superior Preservation (DBESP) such as restoration, creation and enhancement of resources in exchange for impacts from the project (same as **MM BIO-5**).

4.8.7 Summary of Environmental Effects After Mitigation Measures Are Implemented

Implementation of these mitigation measures will reduce potentially significant impacts related to hydrology and water quality to a less than significant level.

4.8.8 References

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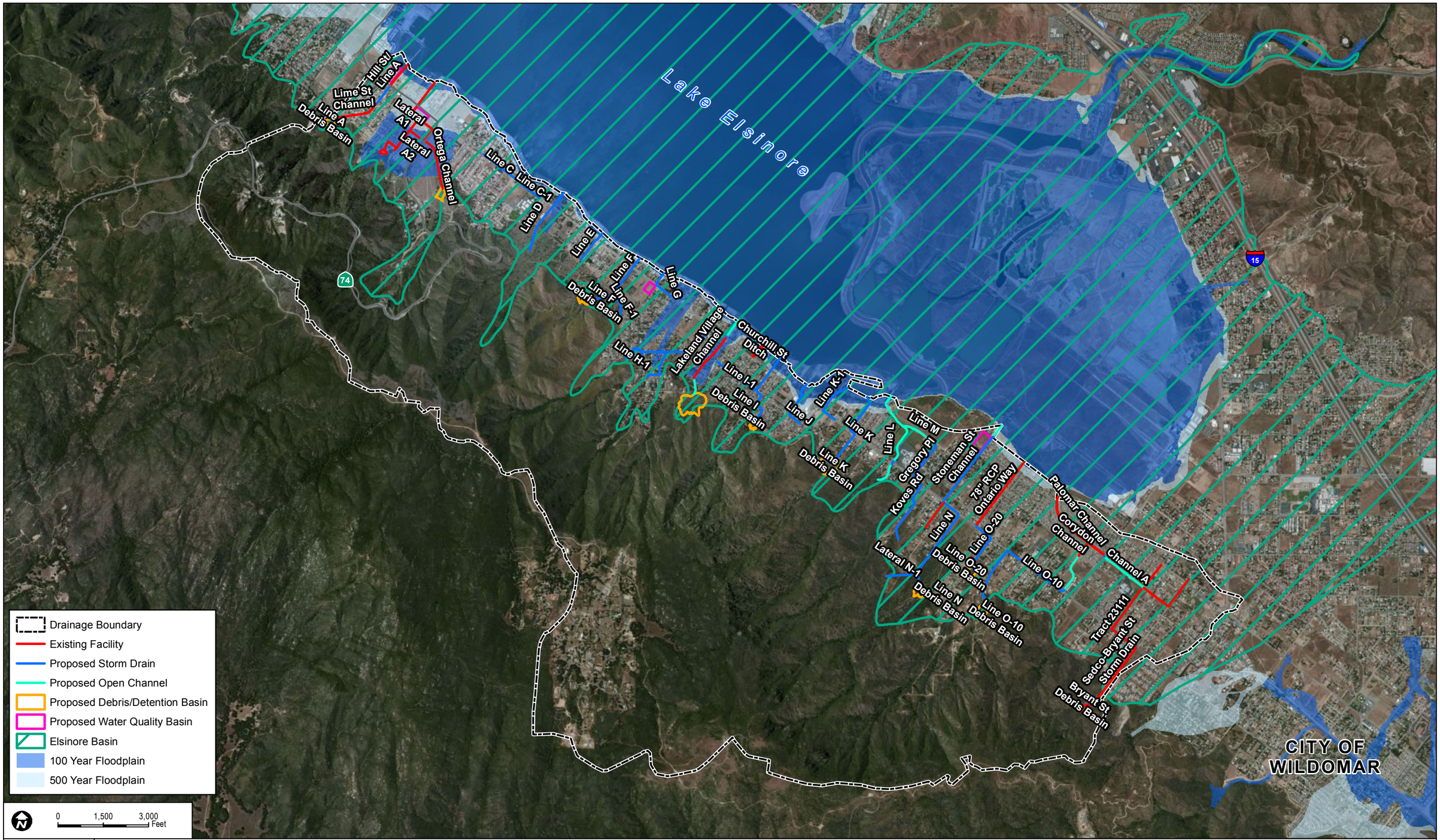

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SOURCE: Riverside County Flood Control and Water Conservation District 2010, 2012; Bing Maps

FIGURE 4.8-1

Groundwater Basin and 100-Year Floodplain

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4.0 MITIGATION MONITORING AND REPORTING PROGRAM

4.1 Introduction

The California Public Resources Code, Section 21081.6, requires that a lead or responsible agency adopt a mitigation monitoring plan when approving or carrying out a project when an Environmental Impact Report (EIR) identifies measures to reduce potential adverse environmental impacts. As lead agency for the project, the Riverside County Flood Control and Water Conservation District (District) is responsible for adoption and implementation of the mitigation monitoring plan.

A Draft Program EIR (PEIR) for the project has been prepared to address the potential environmental impacts and, where appropriate, recommend measures to mitigate these impacts. As such, a mitigation monitoring plan is required to ensure that the adopted mitigation measures are successfully implemented. This plan lists each mitigation measure, describes the methods for implementation and verification, and identifies the responsible party or parties.

4.2 Project Overview

Most of the existing properties located in the Lakeland Village area were subdivided as far back as the early 1900s, long before the Subdivision Map Act granted local agencies the authority to regulate and control the design of subdivisions to protect public health and safety. Consequently, most subdivisions within the Lakeland Village community were developed without consideration of the area's significant flood hazards and without adequate flood protection and drainage infrastructure in place (Draft PEIR, p. 3.0-1).

Grand Avenue is the major thoroughfare into and out of Lakeland Village community and provides access to the adjacent cities of Lake Elsinore and Wildomar. Stormwater runoff from each of the 16 watersheds must cross Grand Avenue on its way to Lake Elsinore. In general, Grand Avenue lacks adequate drainage improvements (road culverts) to convey significant stormwater flows. Therefore, vehicular travel along Grand Avenue during storm events is a major concern for the Lakeland Village residents. In a large storm event, Grand Avenue would likely become impassable, rendering the area inaccessible and isolated (Draft PEIR, p. 3.0-1).

The District proposes to prepare a PEIR for the implementation of the Lakeland Village Master Drainage Plan (MDP). Implementation of the MDP consists of three separate components: administration of the MDP, future construction of the MDP facilities, and future operations and maintenance of the MDP facilities. Implementation of the MDP is hereinafter referred to as the Project (Draft EIR, p. 3.0-1).

Administration of the MDP

The first component of the Project being analyzed in this Draft PEIR consists of the preparation of and, ultimately, the adoption of the Project and its use as a long-range planning document. The MDP will be a

guide for the alignment, type, size, and cost of major existing and proposed facilities (MDP facilities) within the watershed to address the current and future drainage needs of Lakeland Village and the surrounding area. The drainage boundary of the Project is drawn to include all of the watershed area that contributes to the drainage problems in the community. The MDP facilities would contain the 100-year flood discharge (Draft PEIR, p. 3.0-3).

The MDP has a variety of planning uses. The MDP will not only be relied upon by the County of Riverside as it reviews and approves existing and proposed development in the Lakeland Village area, but if adopted, it can be used by the Cities of Wildomar and Lake Elsinore as they review and approve new development. New development may be required to construct MDP facilities or set aside rights–of-way for the future construction of the facilities. The local jurisdictions can also use the MDP to identify MDP facilities and costs for inclusion in capital improvement programs. Finally, the local jurisdictions can use the MDP to aid in long-range planning of other public infrastructure projects like roads or utility pipelines (Draft PEIR, p. 3.0-3).

Future Construction of the MDP Facilities

The second component of the Project being analyzed in this Draft PEIR is the reasonably foreseeable impacts resulting from construction of the MDP facilities. Table 3.0-1 of the Draft PEIR lists the types of drainage improvements (i.e., new facilities and upgrades to existing ones) proposed in the MDP and Table 3.0-2 of the Draft PEIR provides a detailed description of each of the individual MDP facilities (Draft PEIR, p. 3.0-3 through p. 3.0-4).

The MDP identifies the approximate location, size, and type of MDP facilities needed to alleviate and control flooding within the Project boundary. The alignments and type of facility depicted in the MDP can change as more detailed information becomes available during the design process. For example, the locations of underground utilities, new development patterns, or the results of subsequent focused biological surveys may necessitate a shift in alignment or change in facility type (i.e., concrete channel to underground pipe). To add to that uncertainty, the construction of the MDP facilities will be completed in discrete phases over a number of decades (Draft PEIR, p. 3.0-4).

Despite this future environment of uncertainty and change, the Draft PEIR still must identify the general types of construction activities anticipated and their associated impacts. Subsequent CEQA analysis would be required when specific MDP facilities are proposed for construction, but those future construction projects would be able to tier from the PEIR. Actual construction of the MDP facilities may be fulfilled by conditions of approval on development projects or capital improvement projects undertaken by the County of Riverside, the City of Wildomar, the City of Lake Elsinore, or the District (Draft PEIR, p. 3.0-4).

Future Operations and Maintenance of the MDP Facilities

The final component of the Project to be analyzed in this Draft PEIR is the reasonably foreseeable impact of future operation and maintenance activities. Once a facility is constructed, it will require maintenance in order to retain flood control capacity. Following construction of the future MDP facilities, it is expected that the District will operate and maintain all the MDP storm drains, channels, and basins (Draft PEIR, p. 3.0-4).

Maintenance of storm drains and concrete channels typically consists of keeping these facilities and their side drains clear of debris and sediment, as well as repairing access roads and fences. On rare occasions, major repairs may be required following damaging storm events. Thus, major grading will not routinely occur while maintaining the underground storm drains and open concrete channels. To maintain the constructed MDP facilities, the District will occasionally use equipment similar to the types used to construct the proposed MDP facilities (Draft PEIR, p. 3.0-4).

The routine maintenance of the channels and basins will likely require the following activities: the removal of deposition, repair of eroded slopes, and reduction of fire hazard by annual mowing and application of herbicides as well as the maintenance activities described in the previous paragraph. Vegetation must be removed or mowed annually (or as necessary) to provide the designed hydraulic capacity (Draft PEIR, p. 3.0-4).

4.3 Monitoring and Reporting Procedures

The mitigation monitoring plan for the Project will be in place through all phases of the Project, including design, construction, and operation. The District will be responsible for administering the mitigation monitoring plan and ensuring that all parties comply with its provisions. The District may delegate monitoring activities to staff, consultants, or contractors. The District will also ensure that monitoring is documented through periodic reports and that deficiencies are promptly corrected. The designated environmental monitor will track and document compliance with mitigation measures, note any problems that may result, and take appropriate action to rectify problems.

Table 4-1 lists each mitigation measure included in the Draft PEIR. Certain inspections and reports may require preparation by qualified individuals and these are specified as needed. The timing and method of verification for each measure are also specified.

Table 4-1, Mitigation Monitoring and Reporting Program Summary

Mitigation Measure No.	Mitigation Measure	Timing of Implementation	Responsible Party
AIR-1	For all MDP facilities, to minimize impacts related to particulate matter (PM_{10} and $PM_{2.5}$) generation from construction activities, consistent with SCAQMD Rule 403, the District shall ensure that fugitive dust generated by grading and construction activities will be kept to a minimum, with a goal of retaining dust on the site. The contractor shall be required to comply with the applicable provisions of SCAQMD Rule 403 and implement appropriate fugitive dust control measures that include watering, stabilized construction access to reduce tracking of mud or dirt onto public roads, covering trucks hauling loose materials off site, and street sweeping.	During grading and construction activities	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar and contractors
AIR-2	The following measures shall be adhered to by the District and its contractors during project grading and construction to reduce NO_x from construction equipment related to water quality basins (or an activity of similar magnitude): a. All off-road construction equipment with engines rated at greater than 100 horsepower shall be equipped with California Air Resources Board certified Tier 3 or better engines. Records shall be maintained by the contractor and provided to the District to verify the horsepower, model year, and tier of all equipment engines. b. The contractor shall maintain construction equipment in tune per the manufacturer's specifications and make available maintenance records to the District upon request.	During grading and construction activities	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar and its contractors
BIO-1	Suitable habitat has been identified within the Project boundary within the NEPSSA, CASSA, and Burrowing Owl Survey Areas (see Table 4.3-4). All MDP facility alignments and impact footprints shall be reviewed by the District, City of Lake Elsinore, or City of Wildomar during project design in order to determine if suitable habitat conditions have changed from the analysis contained herein. If no changes have occurred, and no suitable habitat is present for CASSA species, NEPSSA species, or burrowing owls, then no further surveys are needed. For the MDP facilities identified as having suitable habitat on Table 4.3-4, those facilities will require habitat assessments and focused surveys conducted by a qualified biologist during the appropriate season. If species are found to be present in the footprint, further measures as recommended by the District's, City of Elsinore's, or City of Wildomar's qualified biologist shall be taken to avoid or minimize adverse project effects to these species and their habitat. Per Section 6.3.2 of the MSHCP, the District,	Design phase	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar

Table 4-1, Mitigation Monitoring and Reporting Program Summary

Mitigation Measure No.	Mitigation Measure	Timing of Implementation	Responsible Party
	City of Lake Elsinore or City of Wildomar shall avoid 90% of the areas providing long-term conservation value for the target species. For burrowing owls, if owls are found in the impact area of an MDP facility, Species Objective 5 from the MSHCP shall be implemented. If avoidance is not feasible, then individual projects will require the approval of a Determination of Biologically Equivalent or Superior Preservation (DBESP) pursuant to the requirements of Section 6.3.2 of the MSHCP including appropriate mitigation, i.e., on-site or off-site enhancement, restoration, establishment (creation), preservation, relocation and/or payment into habitat mitigation banks or in lieu fee programs, or a combination of one or more of these options.		
BIO-2	In order to avoid violation of the MBTA and California Fish and Wildlife Code, the District, City of Lake Elsinore and/or City of Wildomar shall ensure that site-preparation activities (removal of trees and vegetation) shall be avoided, to the greatest extent possible, during the nesting season (generally February 1 to August 31) of potentially occurring native and migratory bird species. If site-preparation activities are proposed during the nesting/breeding season (generally February 1 to August 31), a pre-activity field survey shall be conducted by the District's, City of Lake Elsinore's or City of Wildomar's qualified biologist to determine if active nests of species protected by the MBTA or the California Fish and Wildlife Code are present in the construction zone. If active nests are not located within the a future MDP facility alignment and appropriate buffer (i.e., within 500 feet of an active listed species or raptor nest, 300 feet of other sensitive or protected bird nests (non-listed), or within 100 feet of sensitive or protected songbird nests), construction may be conducted during the nesting/breeding season. However, if active nests are located during the pre-activity field survey, no grading or heavy equipment activity shall take place within at least 500 feet of an active listed species or raptor nest, 300 feet of other sensitive or protected (under MBTA or California Fish and Wildlife Code) bird nests (non-listed), or within 100 feet of sensitive or protected songbird nests until the nest is no longer active.	During site-preparation activities in the nesting/breeding season (generally February 1 to August 31)	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar
BIO-3	All future MDP facilities within the mapped survey area Burrowing owls shall have a qualified biologist conduct a pre-construction survey for resident burrowing owls within 30 days prior to commencement of grading and construction activities. If ground-disturbing activities in these areas are	Within 30 days prior to commencement of grading and construction	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or

Table 4-1, Mitigation Monitoring and Reporting Program Summary

Mitigation Measure No.	Mitigation Measure	Timing of Implementation	Responsible Party
	delayed or suspended for more than 30 days after the pre-construction survey, the area shall be resurveyed for owls. Take of active nests shall be avoided. The pre-construction survey and any relocation activity will be conducted following accepted protocols and in coordination with the Regional Conservation Authority (RCA), California Department of Fish and Wildlife (CDFW), and U.S. Fish and Wildlife Service.	activities	City of Wildomar
BIO-4	As Permittees to the MSHCP, the District, City of Lake Elsinore, or City of Wildomar shall ensure that the construction of each future MDP facility shall be compliant with Section 6.1.2 of the MSHCP and documented as such. For areas not excluded as artificially created, the MSHCP requires 100% avoidance of riparian/riverine areas. If avoidance is not feasible, then individual projects will require the approval of a DBESP including appropriate mitigation, i.e., on-site or off-site enhancement, restoration, establishment (creation), preservation, payment into habitat mitigation banks or in lieu fee programs, or a combination of one or more of these options, to offset the loss of functions and values as they pertain to the MSHCP Covered Species. If riparian vegetation will be impacted, then focused surveys for least Bell's vireo, southwestern willow flycatcher, and western yellow-billed cuckoo will be required if suitable habitat is present. If avoidance is not feasible, then individual projects will require the approval of a DBESP including appropriate mitigation, i.e., on-site or off-site enhancement, restoration, establishment (creation), preservation, payment into habitat mitigation banks or in lieu fee programs, or a combination of one or more of these options.	Design phase	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar
BIO-5	The District, City of Lake Elsinore, or City of Wildomar shall conduct Project-specific jurisdictional delineations to determine the limits of the U.S. Army Corps of Engineers (ACOE), Regional Water Quality Control Board, and CDFW jurisdiction for the MDP facilities listed in Table 4.3-5. Impacts to jurisdictional waters will need to be verified by the corresponding regulatory agency. If impacts are anticipated, then jurisdictional water will either a) be completely avoided or b) necessary permits from requisite jurisdictions will be obtained. Obtaining permits may include mitigation for impacts, which would most likely include similar mitigation to that offered in a DBESP such as restoration, creation and enhancement of resources in exchange for impacts from the project (same as **MM HYDRO-4**). The District, the City of Lake Elsinore, or the	Design phase	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar

Table 4-1, Mitigation Monitoring and Reporting Program Summary

Mitigation Measure No.	Mitigation Measure	Timing of Implementation	Responsible Party
	City of Wildomar shall be responsible for obtaining required regulatory permits for any jurisdictional features prior to ground disturbance.		
BIO-6	MDP facilities located within MSHCP Criteria Cells will require submittal of a JPR to the RCA by the District, City of Lake Elsinore, or City of Wildomar as Permittees to the MSHCP for review and approval to illustrate that the MDP facility does not affect the Reserve Assembly, demonstrate consistency with Sections 6.1.2, 6.1.3, 6.1.4, and 6.3.2, and demonstrate that the appropriate surveys and applicable mitigation measures (refer to **MM BIO-1** through **MM BIO-5**, and **MM BIO-8**) have been conducted.	Design phase	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar
BIO-7	A biological resource assessment shall be prepared by a qualified biologist during the design phase of each MDP facility. The biological resource assessment shall include project location, project description, regulatory context, methods for field surveys including weather, dates, and time of surveys, mapping, and results of the biological assessment. Since the Project is located within the Western Riverside County MSHCP Plan Area, the biological resources assessment shall also include a MSHCP Consistency Analysis and Findings pursuant to Sections 6.1.2, 6.1.3, 6.3.2, and 6.1.4 of the MSHCP. For MDP facilities located within a Criteria Cell, the biological resource assessment shall be included as part of the JPR application.	Design phase	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar
BIO-8	As Permittees to the MSHCP, the District, City of Lake Elsinore, or City of Wildomar shall ensure where appropriate, future MDP facilities shall be surveyed for vernal pools and/or fairy shrimp habitat and documented as such. For areas not excluded as artificially created, the MSHCP requires 100% avoidance of vernal pools and fairy shrimp habitat. If avoidance is not feasible, then individual projects will require the approval of a DBESP including appropriate mitigation to offset the loss of functions and values as they pertain to the MSHCP covered species. Vernal pools and other seasonal ponding depressions will also need to be evaluated for Riverside and Vernal pool fairy shrimp.	Design phase	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar
CUL-1	Prior to design of flood control facilities, a cultural resources survey within all areas previously designated as archaeologically and culturally sensitive shall be completed by a qualified archaeologist with participation by the Pechanga Band of Luiseño Indians (Pechanga) Tribe. The survey shall include an updated site records search at the Eastern Information Center (EIC) to locate all previously recorded archaeological sites within the proposed construction	Prior to final design	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar

Table 4-1, Mitigation Monitoring and Reporting Program Summary

Mitigation Measure No.	Mitigation Measure	Timing of Implementation	Responsible Party
	area of Master Drainage Plan (MDP) facilities. The survey shall assess the direct and indirect impact of the MDP facility. Consultation with the Pechanga Tribe shall be initiated at the beginning of the survey to request additional site information and requested participation in the Project. If the record search indicates that the area has been surveyed and the study is not older than 5 years, a reconnaissance survey shall verify the condition and location of any previously recorded archaeological sites. If previously recorded sites are relocated during the survey, any changes in site condition shall be documented on appropriate State Department Parks and Recreation (DPR) forms, documented in the final technical study as described further in **MM CUL-3** and submitted to the EIC and the Pechanga Tribe. Any prehistoric or historic sites identified during the survey shall be recorded on appropriate DPR forms, discussed and described in the technical study, and submitted to the EIC and the Pechanga Tribe.		
CUL-2	If the cultural resources survey determines that construction of an MDP facility would potentially impact a prehistoric or historic archaeological site and consultation with the design engineers or other appropriate staff evidences that avoidance is not feasible, the Riverside County Flood Control and Water Conservation District (District), City of Lake Elsinore, or City of Wildomar shall have a qualified archaeologist develop a testing program which can include the excavation of shovel test pits and/or test units, in consultation with the Pechanga Tribe. The testing program shall fully define the boundaries of surface and subsurface materials, evaluate the integrity and significance of the site and collect surface and subsurface artifacts. The program shall include mapping of all site features, artifacts, and excavation locations. Related laboratory work shall be conducted to treat the materials that are recovered from the archaeological investigations in consultation with the Tribe. If construction of an MDP facility would potentially impact a historic architectural resource structure because the MDP facility cannot be moved to avoid the resource, a survey of the structure by a qualified architectural historian shall be required to assess the structure's significance. A review of primary and secondary documentary sources, such as tax assessor records, historic fire insurance maps, city directories, aerial photographs, and local building permit files, shall be conducted. The assessment shall take into	Design phase	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar

Table 4-1, Mitigation Monitoring and Reporting Program Summary

Mitigation Measure No.	Mitigation Measure	Timing of Implementation	Responsible Party
	account any events with which the structure is associated, any persons who may have lived in the structure, distinctive architectural characteristics, methods of construction, or association with a notable architect/designer. The assessment by the architectural historian shall recommend to the District, the City of Lake Elsinore, or the City of Wildomar guidelines to assist in the maintenance, repair, and renovation of the resource, if applicable.		
CUL-3	For MDP facilities that have prepared a cultural resources survey per **MM CUL-1** and **MM CUL-2** described above, a technical report shall be prepared that documents all of the information gathered from the survey, data gathered from the testing program of prehistoric or historic archaeological sites, and consultation efforts with the Pechanga Tribe. The report shall identify any significant cultural resources and evaluate the potential impacts to those resources, providing an analysis based upon a regional, landscape viewpoint. If any site evaluated would be impacted by construction of a proposed component, additional project-specific mitigation measures shall be required to reduce the level of impacts. These mitigation measures shall include one of the following or a combination thereof: a. Redesign of the proposed component to avoid the significant cultural resource, thereby avoiding significant impacts. b. A data recovery program to recover sufficient cultural materials to exhaust the research potential of the site such that construction shall no longer represent a significant impact.	Design phase	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar
CUL-4	A data recovery program shall be required whenever avoidance from construction of MDP facilities has been demonstrated to be infeasible. The data recovery program shall include the excavation of a sufficiently large percentage of a subsurface deposit such that the research potential of the deposit will be exhausted. Typically, a 5% sample of the deposit will be required; however, sample sizes in the data recovery program will be determined on a per site basis in consultation with the Pechanga Tribe. Laboratory analysis and research shall be conducted to catalog all recovered materials and interpret the data. Interpretation of the site and any proposed destructive testing methods shall take into account the traditional beliefs and customs of the Tribe.	During construction activities	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar

Table 4-1, Mitigation Monitoring and Reporting Program Summary

Mitigation Measure No.	Mitigation Measure	Timing of Implementation	Responsible Party
CUL-5	Indirect impacts may be identified where construction of MDP facilities would occur adjacent to a significant resource. In cases where construction activities are planned adjacent to known cultural resources, temporary fencing shall be placed around the site boundary by the Project archaeologist and the Pechanga Tribe prior to the start of construction activities to prevent access to the site. All temporary fencing shall be removed once the construction activities are completed.	During construction activities	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar
CUL-6	Ground disturbances associated with construction of proposed MDP facilities that contain recorded archaeological sites identified in the cultural records survey (**MM CUL-1** and **MM CUL-2**) and archaeological sites identified in the technical report (**MM CUL-3**), regardless of significance, shall be monitored by a qualified archaeologist. Monitoring of construction activities shall ensure that any materials uncovered during construction activities are identified and adequately recorded. If the site is prehistoric, a local Native American observer shall also be retained by the District, the City of Lake Elsinore, or the City of Wildomar to monitor construction activities. Not all MDP facilities will be constructed by the District. For District-administered contracts, monitors from the Pechanga Tribe shall be allowed to monitor grading and ground-disturbing activities pursuant to the executed Master Cultural Resources Treatment and Tribal Monitoring Agreement between the Pechanga Tribe and the District. Additionally, the hired contractor would use the District's plans and specifications, which would include all the mitigation measures outlined in this section. For MDP facilities located in the cities of Lake Elsinore and Wildomar where those jurisdictions will have lead agency authority over the project constructing the MDP facility, the cities can utilize the mitigation measures outlined herein, or prepare its own California Environmental Quality Act (CEQA) document with mitigation measures and/or incorporation of conditions of approval in its project approval process that addresses monitoring activities within proximity to recorded archaeological sites.	During ground disturbance	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar
CUL-7	A pre-construction workshop shall be conducted by a qualified archaeologist for an MDP facility that has required additional cultural resources studies per MM CUL-1 and MM CUl-2 described above and further mitigation measures. The workshop shall address the following: review the types of archaeological	Pre-Construction	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or

Table 4-1, Mitigation Monitoring and Reporting Program Summary

Mitigation Measure No.	Mitigation Measure	Timing of Implementation	Responsible Party
	resources that may be uncovered; provide examples of common archaeological artifacts to examine using replicas whenever possible; describe why monitoring is required; identify monitoring procedures; describe what would temporarily stop construction and for how long; describe a reasonable worst-case resource discovery scenario (i.e., discovery of intact human remains or a substantial midden deposit); and describe reporting requirements and the responsibilities of the construction supervisor and crew. The workshop shall make attendees aware of prohibited activities, including unauthorized collecting of artifacts, which can result in impact on cultural resources and which further may violate state and federal law, as well as applicable mitigation measures and conditions of approval for this Project.		City of Wildomar
CUL-8	The following mitigation measure has been included in order to address accidental discoveries of archaeological resources not identified in cultural resources surveys: In the event cultural resources are encountered during construction of any MDP facilities, work shall stop immediately until a qualified archaeologist is retained to determine the potential significance of the find, if one is not already present. If the resources are prehistoric, the District, the City of Lake Elsinore, or the City of Wildomar shall contact the Pechanga Tribe and abide by the District and Pechanga Master Agreement related to treatment of resources unexpectedly uncovered. Measures per the Master Agreement between the District and the Pechanga Tribe shall include giving all cultural items, including ceremonial items and archaeological items to the Pechanga; waiving ownership of any items found in favor of the Pechanga; no photography shall be taken of any articles found; and no destructive testing shall occur on ceremonial and/or sacred objects and human remains unless permission is granted by the Pechanga Tribe.	During construction activities	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar
CUL-9	The following mitigation measures are provided to reduce potential impacts to paleontological resources to less than significant levels: A literature search, and/or paleontological resources field survey (or surveys) by a certified paleontologist shall be completed prior to construction of any MDP facility that lie within the High or Undetermined potential sensitivity paleontological resource area. Relevant treatment for the site as recommended by the Society of Vertebrate Paleontology shall be applied, if	Pre-Construction and Construction	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar

Table 4-1, Mitigation Monitoring and Reporting Program Summary

Mitigation Measure No.	Mitigation Measure	Timing of Implementation	Responsible Party
	needed. If the results of such survey (or surveys) identify the presence of potentially significant paleontological resources, avoidance or other appropriate measures (such as excavation, analysis, and interpretation of resources) potentially leading to curation in perpetuity in a facility that meets the standards of the State of California Guidelines for the Curation of Archaeological Collections and 36 CFR 79, shall be implemented.		
CUL-10	In the unlikely event that paleontological resources such as vertebrate, plant, or invertebrate fossils are discovered during construction or site disturbance, work shall stop within the area of the discovery and the District, along with possibly the County of Riverside, the City of Lake Elsinore, or the City of Wildomar Planning Department, shall be contacted so that a qualified paleontologist can be consulted to determine the extent or quality of the find and make recommendations for further action, if necessary.	During construction activities or site disturbance	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar
GEO-1	In order to ensure individual MDP facilities are placed on the least unstable areas, or designed in a way to address any unstable geologic conditions (i.e., liquefaction), grading and earthwork construction shall conform to *Standard Specifications for Public Works Construction* (the "Greenbook") and grading specifications shall be developed by a geotechnical consultant hired by the Riverside County Flood Control and Water Conservation District (District), the City of Lake Elsinore, or the City of Wildomar. Typical earthwork considerations include: • Remedial grading requirements for any given site are determined based on a site-specific geotechnical investigation to provide stable ground for any proposed structures. Generally, the upper weathered formational materials or loose soils are removed until dense, relatively "non-compressible" soils (alluvium or Formation materials) are encountered. • Topsoil and vegetation layers, root zones, and similar surface materials are typically not suitable for reuse as engineered fill and are normally stripped and either stockpiled for reuse in landscape areas or removed from the site. Most alluvial materials and bedrock materials are considered suitable for reuse as compacted engineer fills. However, excavations in the bedrock materials may generate oversize materials that are difficult to handle in engineered fills. Typically, cobbles and boulders larger than 6 inches in diameter are	Design phase	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar

Table 4-1, Mitigation Monitoring and Reporting Program Summary

Mitigation Measure No.	Mitigation Measure	Timing of Implementation	Responsible Party
	not placed in structural fill under settlement-sensitive improvements and may require special handling and grading procedures.		
GEO-2	In order to provide a safe and stable earthfill dam that would be associated with debris basins or water quality basins, during all phases of construction and operation, the following criteria must be met in accordance with the U.S. Department of the Interior, Bureau of Reclamation, *Design of Small Dams* (BOR 1987): a. The embankment, foundation, abutments, and reservoir rim must be stable and must not develop unacceptable deformations under all loading conditions brought about by construction of the embankment, reservoir operation, and earthquake. b. Seepage flow through the embankment, foundation, abutments, and reservoir rim must be controlled to prevent excessive uplift pressures; piping; instability; sloughing; removal of material by solutioning; or erosion of material into cracks, joints, or cavities. The amount of water lost through seepage must be controlled so that it does not interfere with planned Project functions. c. The reservoir rim must be stable under all operating conditions to prevent the triggering of a landslide into the reservoir that could cause a large wave to overtop the dam. d. The embankment must be safe against overtopping or encroachment of freeboard during occurrence of the IDF (inflow design flood) by the provision of sufficient spillway and outlet works capacity. e. Freeboard must be sufficient to prevent overtopping by waves. f. Camber should be sufficient to allow for settlement of the foundation and embankment, but not included as part of the freeboard. g. The upstream slope must be protected against wave erosion, and the crest and downstream slope must be protected against wind and rain erosion.	Construction and Operation	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar

Table 4-1, Mitigation Monitoring and Reporting Program Summary

Mitigation Measure No.	Mitigation Measure	Timing of Implementation	Responsible Party
GEO-3	In order to address risk of seismic activities such as land spreading or slope instability, future proposed MDP facilities will be assessed by the District, the City of Lake Elsinore, or the City of Wildomar through a qualified geologist to determine whether they are located in areas prone to these types of seismic activities. If so, a geotechnical report (field exploration and borings) shall be prepared during the design phase. The geotechnical report shall include a site-specific seismic evaluation to determine the intensity of ground shaking on the specific MDP facility. MDP facilities within a liquefaction hazard zone per the Riverside County General Plan shall also be evaluated for liquefaction-induced settlement. An analysis of lateral spreading affects to properties adjacent to the lake edge and where future MDP facilities are proposed as well as a review to determine whether the potential for landsliding or slope instability exists shall be performed by a qualified geologist and provided to the District during the design phase. Additionally, future site-specific geologic review shall be performed to determine whether the potential for land sliding or slope instability exist, especially for MDP facilities located on the higher elevations of the Project boundary.	Design phase	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar
HAZ-1	As part of the final design of each Master Drainage Plan (MDP) facility, the design engineer or designee shall check the MDP facility alignments for any properties or nearby properties listing on the most recent Hazardous Waste and Substance List provided by the Riverside County Department of Environmental Health pursuant to Section 65962.5 of the Government Code. Also, before proposed MDP facilities are constructed, the proponent should generate a report from Enviromapper, GeoTracker, and EnviroStor to ensure no new waste sites with reported releases have been documented within proximity to the facilities. If the location of said MDP facility is on the Hazardous Waste and Substances List, Enviromapper, GeoTracker, or EnviroStor, avoidance of that property or properties will be the first consideration; if avoidance is infeasible, **MM HAZ-2** shall be implemented.	Design phase	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar
HAZ-2	If the selected MDP facility traverses a site listed on the Hazardous Waste and Substances List, Enviromapper, GeoTracker, or EnviroStor, and avoidance is not feasible or if there are other indications that a site could be contaminated, a Phase I Environmental Site Assessment (ESA) for the MDP facility will be prepared by a consultant hired by the Riverside County Flood Control and	Design phase	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar

Table 4-1, Mitigation Monitoring and Reporting Program Summary

Mitigation Measure No.	Mitigation Measure	Timing of Implementation	Responsible Party
	Water Conservation District (District), the City of Lake Elsinore, or the City of Wildomar. If the Phase I ESA prepared pursuant to the current ASTM standards identifies possible contamination along the MDP facility alignment, then all recommended subsurface investigation measures listed in the Phase I ESA will be implemented by the District, the City of Lake Elsinore, or the City of Wildomar. Based on subsurface investigations characterizing subsurface contamination, remediation measures (such as excavation of contaminated soil, bioremediation, or soil-vapor extraction), shall be implemented for the applicable MDP facility or an alternative facility alignment will be chosen. The District, the City of Lake Elsinore, or the City of Wildomar shall be responsible for reviewing and complying with the recommendations of the Phase I ESA.		
HAZ-3	All environmental investigation and/or remediation shall be conducted under a work plan approved by jurisdictional regulatory agencies overseeing hazardous waste cleanups until the applicable regulatory standard is met.	Prior to ground-disturbing activities	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar
HAZ-4	Prior to any excavation, grading activities, or soil removal on known contaminated sites, or if contaminated soil (i.e., soil with visible sheen or detectable odor) is encountered during construction, a complete characterization of the soil will be conducted by qualified personnel hired by the District, the City of Lake Elsinore, or the City of Wildomar Prior to the disposal of excavated materials, soil sampling shall be conducted in accordance with the County of Riverside Department of Environmental Health Site Assessment and Cleanup, Corrective Action Guidelines document (County of Riverside 2007). The guidelines set forth the number of samples to be collected per volume of stockpiled soil (i.e., two random samples from stockpiles less than 10 cubic yards); sample analytical methods depend on the current and historical property use and known contamination. If the soil is contaminated, it shall be properly disposed of according to California's Land Disposal restrictions (22 CCR 19). If site remediation involves the removal of contamination, then contaminated material shall be transported off site by a licensed handler/hauler to a licensed hazardous waste disposal facility.	Prior to excavation, grading activities, or soil removal	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar
HAZ-5	If during construction of a specific MDP facility, soil and/or groundwater contamination is suspected, construction in the area of the suspected	During construction activities	Riverside County Flood Control and Water

Table 4-1, Mitigation Monitoring and Reporting Program Summary

Mitigation Measure No.	Mitigation Measure	Timing of Implementation	Responsible Party
	contamination shall cease and appropriate health and safety measure shall be implemented. The construction contractor shall contact the respective jurisdictional enforcement agency (i.e., City of Lake Elsinore, City of Wildomar, County of Riverside) to obtain the necessary information on appropriate measures and their implementation. The measures recommended by the applicable enforcement agency will be implemented.		Conservation District, City of Lake Elsinore, or City of Wildomar
HYDRO-1	During any construction or maintenance activities that require ground disturbance for future Master Drainage Plan (MDP) facilities, the Riverside County Flood Control and Water Conservation District (District), County of Riverside, and Cities of Lake Elsinore and Wildomar shall comply with the current statewide Construction General Permit for projects resulting in land disturbances of 1 acre. Where projects result in disturbance to less than 1 acre of land, the District, County of Riverside, and Cities of Lake Elsinore and Wildomar shall comply with the local grading ordinance and install best management practices (BMPs) to ensure that sediment is not transported beyond the Project limits or into sensitive areas such as wetlands and water bodies. A De Minimus discharge shall be obtained from the Regional Water Quality Control Board (RWQCB) when required for dewatering activities.	During construction or maintenance activities	Riverside County Flood Control and Water Conservation District, County of Riverside, City of Lake Elsinore, or City of Wildomar
HYDRO-2	Future landscape maintenance activities using pesticides (i.e., herbicides or rodenticides) around the MDP facilities shall be phosphorus and nitrogen free or be in conformance with the phosphorus and nitrogen Total Maximum Daily Loads (TMDLs) outlined in the 303(d) list for Lake Elsinore.	During landscape maintenance activities	Riverside County Flood Control and Water Conservation District,City of Lake Elsinore, or City of Wildomar
HYDRO-3	Prior to construction of future MDP facilities that may be located in waters of the United States or waters of the state, the District, County of Riverside, and Cities of Lake Elsinore and Wildomar shall obtain all necessary permits to comply with the federal Clean Water Act (CWA) state discharge permitting requirements, 404 Permits, 401 Permits, 1602 Permits, and California Porter-Cologne Water Quality Control Act permit. Restoration, enhancement, or creation may be required as a result of these regulatory permits and could include such activities on MDP facilities (such as within basins) or could occur off site, but within the same watershed. Mitigation ratios shall be determined at the time specific MDP facilities are proposed for construction in the future.	Pre-Construction	Riverside County Flood Control and Water Conservation District,
HYDRO-4	Project-specific jurisdictional delineations will be required to determine the limits of the U.S. Army Corps of Engineers (ACOE), RWQCB, and California	Design phase	Riverside County Flood

Table 4-1, Mitigation Monitoring and Reporting Program Summary

Mitigation Measure No.	Mitigation Measure	Timing of Implementation	Responsible Party
	Department of Fish and Wildlife (CDFW) jurisdiction for the MDP facilities listed in Table 4.3-5. Impacts to jurisdictional waters will need to be verified by the corresponding regulatory agency. If impacts are anticipated, then either a) jurisdictional water will be completely avoided or b) necessary permits from requisite jurisdictions will be obtained. Obtaining permits may include mitigation for impacts, which would most likely include similar mitigation to that offered in a Determination of Biologically Equivalent or Superior Preservation (DBESP) such as restoration, creation and enhancement of resources in exchange for impacts from the project (same as **MM BIO-5**).		Control and Water Conservation District, City of Lake Elsinore, or City of Wildomar
NOISE-1	In order to mitigate the noise impact associated with construction noise in the City of Lake Elsinore, and in order to address the City of Lake Elsinore's noise criteria related to construction noise, the Riverside County Flood Control and Water Conservation District (District) or entity constructing a Master Drainage Plan (MDP) facility within the City of Lake Elsinore shall ensure or require prior to grading or demolition permit issuance that: • All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers. • Construction noise reduction methods such as shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources and use of electric air compressors and similar power tools, rather than diesel equipment, shall be used where feasible. Unattended construction vehicles shall not idle for more than 5 minutes when located within 200 feet from residential properties. • During construction, stationary construction equipment shall be placed such that emitted noise is directed away from or shielded from the residences. • During construction, stockpiling and vehicle staging areas shall be located as far as practical from noise sensitive receptors. A plan should be provided to the City of Lake Elsinore identifying the staging areas prior to issuance of a construction permit. Construction hours, allowable workdays, and the phone number of the job superintendent shall be clearly posted at all construction entrances to allow surrounding property owners and residents to contact the job superintendent if necessary.	During construction activities	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore

Table 4-1, Mitigation Monitoring and Reporting Program Summary

Mitigation Measure No.	Mitigation Measure	Timing of Implementation	Responsible Party
TRANS-1	To reduce traffic congestion or disruption that may occur during individual Master Drainage Plan (MDP) facility construction or maintenance activities, especially the MDP facilities located within existing road alignments, prior to construction, the Riverside County Flood Control and Water Conservation District (District), City of Lake Elsinore, City of Wildomar, or developers shall prepare a Traffic Control Plan. The Traffic Control Plan will detail and coordinate all traffic movement through the project area and will be implemented throughout project construction. The Traffic Control Plan will also ensure that private property and emergency access will be maintained at all times. Methods to maintain access may include, but are not limited to: temporary bridge crossings (i.e., steel plates or structural design bridges) for all driveway entrances to be closed to vehicular access for any period exceeding 4 hours; use of construction signs, barricades and delineators; and the use of flaggers during construction. All work proposed by the District, City of Lake Elsinore, City of Wildomar, or developers, within state right-of-way requires lane and shoulder closure charts. Also, all roadway features such as signs, pavement delineation, roadway surface, etc. within the State right-of-way must be protected, maintained in a temporary condition, and/or restored by the District, City of Lake Elsinore, City of Wildomar, or developers. The Traffic Control Plan shall be prepared in accordance with the California Department of Transportation (Caltrans) *Manual of Traffic Controls for Construction and Maintenance Work Zones*. If work requires complete road closure, then the public shall be notified within 10 days of that closure.	Pre-Construction	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, City of Wildomar, or developers
TRANS-2	In order to address potential impacts along State Route (SR) 74, the District, City of Lake Elsinore, City of Wildomar, or developer shall obtain an Encroachment Permit from Caltrans for any project activities within SR 74 including but not limited to alterations to existing improvements and conform to current Caltrans design standards and construction practices.	Pre-Construction	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, City of Wildomar or MDP developer
TRANS-3	In order to ensure that construction activities within SR 74 conform to current Caltrans design standards and construction practices, prior to encroachment permit issuance, the District, City of Lake Elsinore, City of Wildomar, or developers shall submit street, grading and drainage construction plans to Caltrans for review and approval.	Prior to encroachment permit issuance	Riverside County Flood Control and Water Conservation District, City of Lake Elsinore, City of Wildomar, or MDP developers

154015

RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT
Riverside, California

LAKELAND VILLAGE

MASTER DRAINAGE PLAN

ZONE THREE

June 2013

WARREN D. WILLIAMS
General Manager-Chief Engineer

LAKELAND VILLAGE
MASTER DRAINAGE PLAN

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APPENDIX

MAP

SECTION I – PURPOSE

The purpose of the Lakeland Village Master Drainage Plan (MDP) report is to identify the network of drainage facilities needed to address the major drainage problems within the community of Lakeland Village. The MDP presented herein provides an effective and economical approach to providing flood protection and drainage to the area and may be used as a guide for locating and sizing critically needed drainage facilities.

Readers should bear in mind that the drainage network presented herein is conceptual in nature. As such, the MDP provides a conceptual solution that addresses the known drainage problems in the Lakeland Village area based on various engineering, environmental, and economic considerations. By no means does the MDP represent the only feasible solution.

The alignment and location of the facilities proposed in this MDP are conceptual. Precise locations will be dictated by site specific conditions and other factors existing at the time of detailed design. Similarly, the facility sizing information shown on the enclosed map is preliminary. More detailed analysis performed at the facility design stage will determine the final facility sizing.

SECTION II – SCOPE

Tasks involved in the development of this master plan include:

1. Determination of the points of concentration and quantity of stormwater runoff produced at various locations.
2. Determination of the quantity of debris produced by major canyons in the watershed.
3. Determination of the location and size of the proposed drainage facilities.
4. Investigation of alternative routes and conveyance methods as a basis for selecting the most economical, environmental, and soundly engineered plan.
5. Preparation of a drainage facility map.
6. Preparation of preliminary plan and profile sheets.
7. Preparation of individual facility cost estimates.

SECTION III – GENERAL DISCUSSION

GENERAL LOCATION

Lakeland Village is a small community located within unincorporated Riverside County. The community is roughly bounded by Lake Elsinore to the north, the ridgeline of the Santa Ana Mountains to the south, Bryant Street and Sheila Lane to the east, and Riverside Drive to the west.

The Lakeland Village Master Drainage Plan study area encompasses approximately thirteen (13) square miles and includes sixteen (16) separate watersheds. These watersheds are characteristically steep with high debris production potential. Runoff originating from these watersheds generally flows northeasterly, across Grand Avenue (the community's principal thoroughfare) and into Lake Elsinore. Existing land-use within the study area is predominantly residential or vacant open space. The majority of the existing developments are located within the northerly portion of the study area.

FLOODING CONCERNS

Since the 1980s, all flooding concerns and complaints received from Lakeland Village residents have been documented by Riverside County Flood Control and Water Conservation District (District) staff. Over the years, various concerns and complaints have been received from local residents through phone calls, letters to the District, community meetings, and the District's annual Budget Hearing process. The concerns discussed below are representative of those concerns expressed by the residents.

Most of the existing properties located in the Lakeland Village area were subdivided as far back as the early 1900s, long before the Subdivision Map Act granted local agencies the authority to regulate and control the design of subdivisions to protect public health and safety. Consequently, most subdivisions within the Lakeland Village community were developed without consideration of the area's significant flood hazards and without adequate flood protection and drainage infrastructure in place.

Within the Lakeland Village area, the Federal Emergency Management Agency (FEMA) has designated and mapped four (4) separate Special Flood Hazard Areas (SFHA). These SFHA indicate areas that are especially prone to flood hazards (i.e., subject to a one percent (1%) annual chance of being flooded). The SFHA are located in the general vicinity of Gregory Place, Baldwin Boulevard, Maiden Lane and Santa Rosa Drive (located in watersheds D, H, L and M, respectively). There are approximately 210 existing structures located within the SHFA. These structures are subject to high flood hazards and are typically subject to mandatory purchase of flood insurance under the provisions of the National Flood Insurance Program (NFIP).

Grand Avenue is the major thoroughfare into and out of Lakeland Village community and provides access to the adjacent cities of Lake Elsinore and Wildomar. Stormwater runoff from each of the sixteen watersheds must cross Grand Avenue on its way to Lake Elsinore. In general, Grand Avenue lacks adequate drainage improvements (road culverts) to convey significant stormwater flows. Therefore, vehicular travel along Grand Avenue during storm events is a major concern for the Lakeland Village residents. In a large storm event, Grand Avenue would likely become impassable, rendering the area inaccessible and isolated.

Existing drainage facilities that currently provide some level of flood protection within the study area are as follows: Lime Street Channel, Ortega Channel, Ortega Channel Lateral A, Ortega Channel Lateral A -1 Debris Basin, Ortega Channel Lateral A-1, Ortega Channel Lateral A-2, Lakeland Village Channel, Churchill Street Drainage Ditch, Stoneman Street Channel, Corydon Channel, Palomar Channel, Ontario Way Storm Drain, Tract 23111 Drainage Ditch, Sedco-Bryant Street Storm Drain Stage 1 and Sedco-Bryant Street Storm Drain and Debris Basin. Additional drainage facilities are needed in order to provide 100-year flood protection to the area.

ADDITIONAL CONCERNS

The watersheds in the Lakeland Village area are considered to have high debris production potential and the area has historically experienced excess debris deposition. When fires occur within the steep canyons, vegetation is destroyed and leaves the soil more susceptible to erosion. During high intensity rainfall events, the debris originating from fires along with eroded sediment is swiftly carried downstream toward Lake Elsinore. This combination of debris and stormwater runoff is referred to as "bulked flow", and includes sand, silt and vegetative debris from the Santa Ana Mountains. As the bulked flow drains to

Lake Elsinore, debris is deposited in the flatter areas causing severe property damage. Additionally, the excess debris and sediment that eventually flows into Lake Elsinore may contribute to water quality degradation of the lake.

Debris from the nearby Santa Ana Mountains also creates a major problem for the existing Ortega Channel Storm Drain. A portion of this facility is constructed on a very mild slope in which the bulked flow moves slowly and sediment tends to settle out. As the sediment accumulates inside the storm drain, the blockage reduces the hydraulic capacity of the facility and makes it susceptible to overflow. To ensure adequate capacity of the channel at all times, frequent routine maintenance is required, which overtime, has become costly.

Lastly, Lake Elsinore is currently listed as a 303(d) impaired water body. The Santa Ana Regional Water Quality Control Board has identified nutrients, specifically nitrogen and phosphorous, as the principal cause of impairment. Very few, if any, of the existing developments within the Lakeland Village area were required to implement water quality best management practices as a condition of their development. Thus, "first flush" events typically collect and carry trash, dirt and other pollutants directly to the lake. Addressing the area's urban runoff will help improve the existing water quality of Lake Elsinore.

SECTION IV – MASTER DRAINAGE PLAN OBJECTIVES

Based on the concerns of the Lakeland Village area, the following objectives were established for the Lakeland Village Master Drainage Plan:

1. Reduce the level of risk from flooding and debris flows to existing/future development and infrastructure to below the "100-year" level[1];

2. Provide "all-weather" access along Grand Avenue by conveying 100-year tributary flood flows below the travelled way;

3. Provide a Master Drainage Plan that meets the project objectives at the lowest construction and right-of-way acquisition cost;

4. Economically manage debris to ensure that the 100-year design capacity is maintained during major storm events;

5. Consider, and where feasible, incorporate regional water quality facilities to mitigate for the impacts from existing development and to improve the water quality of Lake Elsinore;

6. Avoid or minimize impacts to potentially sensitive areas.

[1] i.e., the 1% annual chance flood event

SECTION V – CRITERIA

Underground Storm Drains

The underground facilities proposed in this MDP are located within existing or assumed future right-of-way, whenever possible, and generally consist of reinforced concrete pipe ranging in size from 36 inches to 102 inches in diameter. Reinforced concrete boxes are usually placed under dedicated road crossings or where the flow rates exceed the capacity of standard pipe sizes. All of the underground facilities proposed in the MDP are intended to carry the runoff from a (1%) annual chance ("100-year") storm.

Open Channels

The proposed open channels are located along existing drainage ditches or washes, and where the proposed construction of the channel would have minimal impacts on adjacent properties. The open channels not only serve as flow conveyors, they also provide an outlet for the underground facilities proposed in the plan. The open channels proposed in this MDP consist of two types, lined and unlined. Lined channels[2] are utilized in high velocity flow situations and are typically rectangular shaped with concrete paving on the sides and bottom. Unlined facilities[3] are utilized in low velocity flow situations, are typically trapezoidal in shape and have no protection for the bottom or sideslopes. The channel right-of-way required for both lined and unlined facilities must accommodate the full channel width along with adequate maintenance access. Channels with top widths of less than 20 feet require one maintenance access road; where the top width exceeds 20 feet, two maintenance access roads are necessary. All of the open channels proposed in the MDP are intended to carry the runoff from a 1% annual chance ("100-year") storm.

Detention Basin

The detention basin proposed in this MDP is located upstream of an existing channel with limited hydraulic capacity and room for widening. The purpose of the detention basin is to lower the peak flow rate down to the capacity of the existing channel through the use of temporary detention storage. It should be noted that the detention basin proposed in this plan is sized for the 1% annual chance ("100-year" storm) event. Flows exceeding the design capacity of the basin would pass over the emergency spillway in flow patterns approximating present conditions.

Debris Basins

Debris basins are proposed in watersheds that are equal to or greater than 64 acres and are generally located upstream of the proposed facilities to capture the debris before it enters the downstream conveyance system. The proposed debris basins were sized based on the *Los Angeles District Method for Prediction of Debris Yield* (Method) by the U.S. Army Corps of Engineers Los Angeles District, dated February 2000. The Method is intended to be used for the estimation of debris yield in watersheds of 64 to 128,000 acres (0.1 to 200 mi^2) in area with a high proportion of their total area in steep, mountainous terrain. The calculated debris yield was multiplied by a factor of safety of 2 to produce the ultimate storage volume needed for the sizing of the basins.

[2] Ref. RCFC&WCD Standard Drawing No. CH 327
[3] Ref. RCFC&WCD Standard Drawing No. CH 324

In watersheds that are less than 64 acres in size, the proposed facilities are sized to convey the 1% annual chance "bulked flows", (i.e., a flow rate that includes both stormwater runoff and its associated debris load). The bulked flow rates were obtained by multiplying the 1% annual chance flow rate by a factor of 1.2 (20% increase).

Water Quality Basins

The proposed water quality basins are sized per the *Riverside County Water Quality Management Plan for Urban Runoff*, dated July 2006, and are proposed downstream of existing developments. These water quality basins would capture urban runoff generated from existing developments and would accommodate temporary storage to allow the urban runoff to infiltrate into the ground. The infiltration process is intended to "treat" the urban runoff.

SECTION VI – HYDROLOGY

The hydrology for this MDP was developed using two methods: the Rational Method and the Synthetic Unit Hydrograph Method. The Rational Method was used to determine the peak discharges (cubic feet per second) generated from smaller watersheds less than 300 to 500 acres in size. For watersheds larger than 500 acres, the Synthetic Unit Hydrograph Method was used. To account for the attenuating effects of channel and basin storage, the Convex Routing Method and Modified Puls Methods were used, respectively. Methodology and supportive data for both Rational and Synthetic hydrology, including estimation of loss rates/infiltration, may be found in the *Riverside County Flood Control and Water Conservation District Hydrology Manual*, dated April 1978 (District Hydrology Manual).

The 2003 Riverside County General Plan land use designations were used to develop the hydrology for this MDP. The following table indicates the correspondence between the 2003 Riverside County General Plan land use designations and the District Hydrology Manual land use designations:

Table 1 – Lakeland Village Area Land Use

2003 Riverside County General Plan	District Hydrology Manual April 1978
RR – Rural Residential	Natural (Good) Chaparral Broadleaf
RM – Rural Mountainous	Natural (Good) Chaparral Broadleaf
OS – Open Space	Natural (Good) Chaparral Broadleaf
EDR-RC – Estate Density Residential	1 Acre Lots
VLDR – Very Low Density Residential	1 Acre Lots
Low Density Residential	½ Acre Lots
MDR – Medium Density Residential	¼ Acre Lots
MHDR – Medium High Density Residential	Condominiums
HDR – High Density Residential	Apartments
LI – Light Industrial	Commercial
CR - Commercial	Commercial

NOAA Atlas 14 Version 4 rainfall was used in the hydrology calculations for this MDP. The rainfall frequencies examined are the 2-year (50% annual chance) and the 100-year (1% annual chance) recurrence intervals with 1, 3, 6 and 24 hour durations. The calculated slope of the intensity-duration

curve is 0.6. The following NOAA Atlas 14 Version 4 area weighted point rainfall values were used to develop the hydrology:

Table 2 – NOAA Atlas 14 Point Rainfall Values

Storm Frequency and Duration	Area Weighted Point Rainfall (Inches)
2 Year – 1 Hour	0.62
2 Year – 3 Hour	1.06
2 Year – 6 Hour	1.60
2 Year – 24 Hour	2.64
100 Year – 1 Hour	1.65
100 Year – 3 Hour	2.56
100 Year – 6 Hour	3.78
100 Year – 24 Hour	6.71

SECTION VII – EXISTING FACILITIES

Currently, existing drainage facilities that provide some level of flood protection in the area are as follows:

Lime Street Channel
Ortega Channel
Ortega Channel Lateral A
Ortega Channel Lateral A-1
Ortega Channel Lateral A-2
Lakeland Village Channel
Churchill Street Storm Drain
Stoneman Street Channel
Corydon Channel
Palomar Channel
Ontario Way Storm Drain
Sedco-Bryant Street Storm Drain, Stage 1
Sedco-Bryant Street Storm Drain
Tract 23111 Drainage Ditch

Additional drainage facilities would need to be constructed in order to provide comprehensive "100-year" flood protection to the area. A brief description of the existing facilities is as follows:

Watershed A:

Lime Street Channel (Project No. 3-0-00030) – The construction of the Lime Street Channel system was completed in 1963. Lime Street Storm Drain is a concrete trapezoidal channel whose upstream origin is located at a point approximately 350 feet west of the intersection of Jamieson and Orange Street. The channel extends northeasterly towards Laguna Avenue, transitions into a 42" RCP then heads northerly toward Lake Elsinore. The channel has a base width of 3 feet, a sideslope of 1:1 and depths ranging from 3.5 feet to 4.5 feet.

Watershed B:

Ortega Channel (Project No. 3-0-00070) – The construction of Ortega Channel was completed in 1995. Ortega Channel is a concrete trapezoidal channel that begins at a point approximately 800 feet south of the intersection of Shoreline and Lighthouse Drive. The channel extends northerly toward Ortega Highway. At Ortega Highway, the channel transitions into an 84-inch RCP and extends along Ortega Highway for approximately 815 feet. At this point, the 84-inch RCP transitions into a 96-inch RCP and extends in Lake Terrace Drive for approximately 280 feet. The 96-inch RCP then transitions into a 102-inch RCP and extends parallel to Lake Terrace Drive for approximately 430 feet. At Grand Avenue, the 102-inch RCP transitions into a 10.5'W by 6'D RCB. From there, the concrete trapezoidal channel begins and extends parallel to Serena Way toward Lake Elsinore. The channel has a typical base width of 2 feet and sideslope of 1.5:1.

Ortega Channel Lateral A (Project No. 3-0-00071) – The construction of Ortega Channel Lateral A was completed in 1992. Ortega Channel Lateral A is an RCP ranging in sizes from 54-inches to 60-inches in diameter. Additionally, a small debris basin was constructed at the upstream end of the facility in 2000. The upstream terminus begins at the existing debris basin outlet and extends northerly in Welford Place toward Lake Ridge Road. At Lake Ridge Road, the RCP extends easterly in Lake Ridge Road toward Grandview Avenue. At Grandview Avenue, the RCP extends northerly in Grandview and terminates at its confluence with existing Ortega Channel.

Ortega Channel Lateral A-1 (Project No. 3-0-00071) – The construction of Ortega Channel Lateral A-1 was completed in 1992. Ortega Channel Lateral A-1 is a 48-inch RCP whose upstream origin begins at the intersection of Trabuco Drive and Laguna Avenue. The RCP extends northerly in Laguna Avenue until it terminates and confluences with existing Ortega Channel Lateral A.

Ortega Channel Lateral A-2 (Project No. 3-0-00071) – The construction of Ortega Channel Lateral A-2 was completed in 1994. The upstream terminus is located near the intersection of Grandview Avenue and Lake Ridge Road. From there, the 36-inch RCP extends northerly in Grandview until it confluences with existing Ortega Channel Lateral A.

Watershed H:

Lakeland Village Channel (Project No. 3-0-00010) – The construction of Lakeland Village Channel was completed in 1955. Lakeland Village Channel is a concrete bottom rectangular channel with Elmwood fence and rock filled channel walls. The upstream origin begins near Nelson Avenue. The channel then extends northerly along an existing wash and terminates at Lake Elsinore.

Watershed I:

Churchill Street Storm Drain (Project No. 3-0-00080) – Churchill Street "Storm Drain" begins at Grand Avenue and extends northerly toward Lake Elsinore. It consists of an earthen drainage ditch with a base width of 2.5 feet, depth of approximately 3 feet and sideslope of 1.5:1, located on both sides of Churchill Street.

Watershed N:

Stoneman Street Channel (Project No. 3-0-00060) – Construction of Stoneman Street Channel was completed circa 1966. Stoneman Street is a paved trapezoidal channel and has a typical base width of 24 feet and 6:1 sideslopes. The channel begins near Stoneman Street at a point approximately 1,015 feet south of Grand Avenue and extends northerly in Stoneman Street until it terminates at approximately 300 feet north of Grand Avenue.

Watershed O:

Corydon Channel (Project No. 3-0-00045) – The construction of Corydon Channel was completed after 2006, and was accepted by the District for maintenance in August 2009. Corydon Channel is a rectangular concrete channel with an average width of approximately 28.7 feet and depth of 12.5 feet. Beginning at Union Street as a double 14'W x 8'D RCB, the facility transitions to a rectangular channel extending parallel to Union Street then transitions into a double 14'W x 8'D RCB and terminates at the confluence with existing Palomar Channel.

Palomar Channel (Project No. 3-0-00045) – The construction of Palomar Channel was completed after 2006, and was accepted by the District for maintenance in August 2009. Palomar Channel is predominantly a rock riprap lined channel. The upstream origin begins at Corydon Street as a triple 14'W x 4.2'D RCB, transitions into a trapezoidal channel with base widths ranging from 22 to 24 feet, top widths ranging from 70 to 76 feet, depths ranging from 12 to 13 feet, respectively, and sideslope of 2:1. The trapezoidal channel extends northerly along Old Coach Road. At Palomar Street, the trapezoidal channel transitions into a two - 14'W x 8'D RCB.

Ontario Way Storm Drain – The construction of Ontario Way Storm Drain was completed with Tracts 24138 and 24139. The Ontario Way Storm Drain is an RCP ranging in size from 72inches to 78inches. The upstream origin begins at Grand Avenue then extends northerly in Ontario Way toward Lake Elsinore for approximately 2,800 feet. This facility is maintained by the City of Lake Elsinore.

Watershed P:

Sedco - Bryant Street Storm Drain, Stage 1 (Project No. 3-0-00085-01) – The construction of Bryant Street Storm Drain Stage 1 was completed in 2008. The Bryant Street Storm Drain Stage 1 is a 30-inch RCP. The upstream origin begins near Palomar Street. The storm drain then extends southerly in Bryant Street for approximately 1,325 feet then northerly and parallel to Union Street for approximately 810 feet where it terminates at the confluence with proposed Channel A.

Sedco - Bryant Street Storm Drain (Project No. 3-0-00085) – The construction of Sedco Bryant Street Storm Drain was completed after 2006. Sedco Bryant Street Storm Drain is a system of RCPs ranging in sizes from 42inches to 66inches. The upstream origin begins at the existing debris basin outlet located at the southernmost end of Sweet Nectar Road. From there, the storm drain extends northerly in Sweet Nectar Road and continues northerly in Bryant Street to Grand Avenue. The storm drain then traverses northerly in Grand Avenue for approximately 1,016 feet where it terminates.

Construction of the debris basin was completed after 2005. The debris basin is located upstream of the existing Bryant Street Storm Drain at the southernmost end of Sweet Nectar Road and has a volume of 1.2 acre-feet.

Tract 23111 Drainage Ditch – The upstream origin of the paved ditch begins at the downstream terminus of Sedco - Bryant Street Storm Drain at Grand Avenue. From there, the paved ditch extends northerly and parallel to Bryant Street until it confluences with the proposed Channel A and existing Sedco - Bryant Street Storm Drain, Stage 1. This facility is maintained by the District pursuant to an agreement with the Riverside County Economic Development Agency.

SECTION VIII – PROPOSED IMPROVEMENTS

The improvements proposed in this MDP are shown on the enclosed map found at the back of this report. Supporting data for all proposed facilities is available at the Riverside County Flood Control and Water Conservation District's Office.

The design engineer should be aware that a detailed utility search was not completed. This means that, while the major known facilities were considered during the development of this Master Plan, a more thorough search may reveal additional or newly placed utilities that may necessitate minor alignment and size changes, or utility relocations during final design.

Watershed A:

Line A Debris Basin – Line A Debris Basin is located at a point approximately 350 feet west of the intersection of Jamieson Street and Orange Street, just upstream of existing Lime Street Channel, and has a volume of approximately 9.3 acre-feet and an approximate right-of-way of 1.5 acres. The partially incised debris basin has an approximate embankment height of 20 feet and includes a low flow outlet and a spillway structure.

Line A / Lime Street Channel – Floodwalls ranging in heights from 1 to 2 feet would be added to the existing Lime Street Channel. The improved Lime Street Channel will ultimately have a uniform height ranging from 4.5 to 5.5 feet. The upstream origin of Line A begins as a 72-inch RCP at the downstream terminus of existing Lime Street Channel located at the intersection of Hill Street and Laguna Avenue. From there, the 72-inch RCP extends northerly in Hill Street until it connects to the existing Lime Street Channel. The 72-inch RCP would replace the existing 42-inch RCP.

Line A Water Quality Basin – Located at the northwest corner of the intersection of Hill Street and Grand Avenue, the water quality basin would require a connection to the existing drainage system of the existing tract located at the southwest corner of the intersection of Grand Avenue and Hill Street. The incised water quality basin has a volume of approximately 5.5 acre-feet and approximate right-of-way of 3.3 acres.

Watershed B:

Line B (Ortega Channel) Debris Basin – Ortega Channel Debris Basin is located at a point approximately 700 feet south of the intersection of Shoreline Drive and Lighthouse Drive, just upstream of the existing Ortega Channel, and has a volume of approximately 15.7 acre-feet and an approximate right-of-way of 1.6 acres. The partially incised debris basin has an approximate embankment height of 27 feet and includes a low flow outlet and a spillway structure.

Line B (Ortega Channel) Channel Outlet – One foot floodwalls would be added to the existing Ortega Channel Outlet located on the north side of Grand Avenue.

Line B (Ortega Channel) Water Quality Basin – Line B Water Quality Basin is located at the southeast intersection of Serena Way and Grand Avenue. The incised basin has a volume of approximately 5.0 acre-feet and an approximate area footprint of 3.2 acres.

Watershed C:

Line C – The upstream origin of Line C begins at the intersection of Windward Way and Grand Avenue as a 48-inch RCP. From there, the 48-inch RCP extends easterly in Grand Avenue, transitions into a 60-inch, then a 78-inch RCP. Near the intersection of Blanche Drive and Grand Avenue, the 78-inch RCP transitions into a 90-inch RCP and extends northerly toward Lake Elsinore.

Line C-1 – The upstream origin of Line C-1 begins near the intersection of Santa Rosa Drive and Grand Avenue as a 48-inch RCP. The RCP then extends westerly in Grand Avenue and transitions into a 66-inch RCP. Near Blanche Drive, the 66-inch RCP transitions into a 78-inch RCP and confluences with the proposed Line C.

Watershed D:

Line D – The upstream origin of Line D begins at a point approximately 840 feet south of the southern end of Santa Rosa Drive as a 60-inch RCP. From there, the RCP extends northerly towards Santa Rosa Avenue, continues in Santa Rosa Avenue, transitions into a 66-inch, 72-inch, 78-inch RCP, then a daylight/outlet structure with an approximate length of 105 feet, width of 40 feet and a maximum depth of 6.5 feet.

Watershed E:

Line E – The upstream origin of Line E begins near the intersection of the future alignment of Union Avenue and Esther Street as a 54-inch RCP. From there, the RCP would extend northerly in Esther Street and transition into a 72-inch RCP as it continues northerly and parallel to Olive Street toward Lake Elsinore.

Watershed F:

Line F Debris Basin – Line F Debris Basin is located at a point approximately 1,090 feet southwest of the intersection of Evergreen Street and Union Avenue at the upstream origin of proposed Line F and has a volume of approximately 2.6 acre-feet and approximate right-of-way of 1.9 acres. The partially incised debris basin has an approximate embankment height of 13 feet and includes a low flow outlet pipe and a spillway structure.

Line F – The upstream origin of Line F begins at a point approximately 1,090 feet southwest of the intersection of Evergreen Street and Union Avenue as a 42-inch RCP. From there, the 42-inch RCP extends easterly towards a point located approximately 1,000 feet southeast of the intersection of Evergreen Street and Union Avenue. Near this point, the 42-inch RCP transitions into a 60-inch RCP, a 66-inch RCP and then a daylight/outlet structure with an approximate length of 75 feet, width of 25 feet and a maximum depth of 4.5 feet as it extends northerly and parallel to Evergreen Street towards Lake Elsinore.

Line F-1 – The upstream origin of Line F-1 begins at a point approximately 370 feet southwest of the intersection of Akley Street and Gillette Street as a 42-inch RCP. From there, the 42-inch RCP extends northwesterly for approximately 1,040 feet to a point where it confluences with the proposed Line F.

Watershed G:

Line G – The upstream origin of Line G begins near the intersection of Deeble Entrance and Grand Avenue as a 54-inch RCP. From there, the 54-inch RCP transitions into a 66-inch RCP and continues westerly along Grand toward Adelfa Street. Near Adelfa Street, the 66-inch RCP transitions into a 72-inch RCP then a daylight structure/outlet with an approximate length of 65 feet, width of 15 feet and a maximum depth of 6.5 feet as it continues northeasterly toward Lake Elsinore.

Line G Water Quality Basin – An approximate 4.0 acre-feet water quality basin with an approximate right-of-way of 1.9 acres is proposed at the southwest corner of the intersection of Grand Avenue and Adelfa Street. The water quality basin is located west of an existing development located at the southeast corner of the intersection of Adelfa Street and Grand Avenue. The incised water quality basin would require a connection to the existing local drainage system.

Watershed H:

Line H (Adelfa Channel) – The upstream origin of Line H begins at Gillette Street as a 48-inch RCP. From there, the 48-inch RCP extends easterly toward Zellar Street and then northerly in Zellar Street. At Cottrell Boulevard, the 48-inch RCP transitions into a 66-inch RCP and extends easterly in Cottrell Boulevard. At Landerville Boulevard, the 66-inch RCP transitions into an 84-inch RCP and continues easterly in Cottrell Boulevard and then northerly in Blackwell Boulevard toward Lake Elsinore.

Line H-1 – The upstream origin of Line H-1 begins approximately 127 feet south of Cottrell Boulevard in Adelfa Street. From there, the 42-inch RCP extends northerly in Adelfa Street until it confluences with the proposed Line H.

Line H-2 – The upstream origin of Line H-2 begins near the intersection of Brand Street and Anthony Avenue as a 60-inch RCP. From there, the 60-inch RCP extends easterly in Anthony Avenue and heads northerly in Landerville Boulevard. At Peeler Avenue, the 60-inch RCP transitions into a 54-inch RCP and continues in Landerville Boulevard until it confluences with the proposed Line H at Cottrell Boulevard.

Lakeland Village Channel Debris/Detention Basin – The debris/detention basin is proposed approximately 350 feet south of the southernmost end of Blackwell Boulevard and has a volume of approximately 97 acre-feet and an approximate right-of-way of 10.8 acres. The partially incised basin has an approximate embankment height of 58 feet.

Lakeland Village Channel – The upstream origin of the existing Lakeland Village Channel begins near the southernmost end of Blackwell Boulevard at the proposed debris/attenuation basin outlet. From there, the existing channel extends parallel to Baldwin Boulevard along the geographic low until it terminates at Lake Elsinore. The existing Lakeland Village Channel would remain and improvements would be made to the existing undersized culverts at Nelson Avenue, Hayes Street, Bobrick Avenue, MacKay Avenue, Brightman Avenue, Sutherland Avenue, Raley Avenue and Grand Avenue to meet the existing capacity.

The existing channel downstream of Grand Avenue would be removed and replaced with a 12'W x 4'D rectangular channel sized to convey 515 cfs.

Watershed I:

Line I Debris Basin – Line I Debris Basin is located at a point approximately 265 feet south of Hayes Street and upstream of proposed Line I. The debris basin has a volume of approximately 3.0 acre-feet and an approximate right-of-way of 0.9 acre. The partially incised debris basin has an approximate embankment height of 24 feet and includes a low flow outlet pipe and a spillway structure.

Line I – The upstream origin of Line I begins at a point approximately 265 feet south of Hayes Street as a 36-inch RCP. From there, a 36-inch RCP extends northerly in Wood Street. At Broomall Avenue, the 36-inch RCP transitions into a 48-inch RCP and continues westerly in Broomall Avenue. At Dowman Street, the 48-inch RCP transitions into a 72-inch RCP and continues northerly in Dowman Street, easterly in Brightman Avenue and then northerly in Lorimer Street. At Grand Avenue, the 72-inch RCP transitions into a 90-inch RCP and outlets into Lake Elsinore.

Line I-1 – The upstream origin of Line I-1 begins near the intersection of Baldwin Boulevard and Brightman Avenue as a 42-inch RCP. From there, the 42-inch RCP extends easterly in Brightman Avenue and transitions into a 48-inch RCP at Churchill Street. The 48-inch RCP extends easterly in Brightman Avenue until it confluences with the proposed Line I at Lorimer Street.

Watershed J:

Line J – The upstream origin of Line J begins near the intersection of Brightman Avenue and Benner Street as a 54-inch RCP. From there, the 54-inch RCP extends westerly in Brightman Avenue toward Turner Street. At Turner Street, the 54-inch RCP transitions into a 60-inch RCP. The 60-inch RCP continues northerly in Turner Street and transitions to a 5 'W x 5'D RCB. At Grand Avenue, the RCB transitions into a 7'W x 5'D RCB. The 7'W x 5'D RCB then transitions into a daylight/outlet structure with an approximate length of 350 feet, width of 7 feet and maximum depth of 5 feet as it extends northerly toward Lake Elsinore.

Watershed K:

Line K Debris Basin – Line K Debris Basin is located at the southernmost end of Ginger Lane, upstream of the proposed Line K, has a volume of approximately 7.4 acre-feet and an approximate right-of-way of 4.8 acres. The partially incised debris basin has an approximate embankment height of 36 feet and includes a low flow outlet pipe and a spillway structure.

Line K – The upstream origin of Line K begins near the southernmost end of Ginger Lane. From there, the 60-inch RCP extends northerly in Ginger Lane toward Grand Avenue. At Grand Avenue, the 60-inch RCP transitions into a 78-inch RCP and extends easterly in Turtle Dove Drive. The 78-inch RCP transitions into a 7'Wx5'D RCB, then into a daylight structure/outlet with an approximate length of 200 feet, width of 7 feet and maximum depth of 5 feet as it continues easterly in Turtle Dove Drive toward Lake Elsinore.

Line K-1 – The upstream origin of Line K-1 begins near the intersection of Kathryn Way and Grand Avenue as a 36-inch RCP. The 36-inch RCP extends westerly in Grand Avenue and then easterly and

parallel to Vail Street. Near Lake Elsinore, the 36-inch RCP transitions into a daylight/outlet structure with an approximate length of 265 feet, width of 10 feet and maximum depth of 3 feet.

Watershed L:

Line L – The upstream origin of Line L begins at a point approximately 696 feet south of Grand Avenue. From there, the 6'W x 5'D rectangular channel extends along the geographic low. At Grand Avenue, the open channel transitions into a 7'W x 7'D RCB. The RCB then transitions into a 15'W x 5'D, to a 18'W x 10'D, to a 15'W x 8'D, to a 60' W x 5'D rectangular channel, then a daylight/outlet structure with an approximate length of 180 feet, width of 60 feet and maximum depth of 5 feet as it outlets into Lake Elsinore.

Watershed M:

Line M – The upstream origin of Line M begins near the southern end of Koves Road as a 60-inch RCP. The 60-inch RCP extends northerly in Koves Road and transitions into a 66-inch RCP. At Grand Avenue, the 66-inch RCP transitions into a 72-inch RCP and extends westerly in Grand Avenue towards Gregory Place. At Gregory Place, the 72-inch RCP transitions into a 90-inch RCP and continues northerly in Gregory Place. At the geographic low, the 90-inch RCP transitions into a 15'W x 8'D then a 15'W x 10'D rectangular channel and confluences with the proposed Line L.

Watershed N:

Line N Debris Basin – Line N Debris Basin is located at a point approximately 690 feet south of Morrell Lane, just upstream of the proposed Line N and has a volume of approximately 9.3 acre-feet and approximate right-of-way of 2.9 acres. The partially incised debris basin has an approximate embankment height of 33 feet and includes a low flow outlet pipe and a spillway structure.

Line N – The upstream origin of Line N begins at a point approximately 690 feet south of Morrell Lane, just downstream of the proposed Line N debris basin. From there, the 66-inch RCP extends northerly towards Morrell Lane. At Morrell Lane, the 66-inch RCP transitions into a 90-inch RCP and continues northerly in Morrell Lane toward Grand Avenue. At Grand Avenue, the 90-inch RCP transitions into a 102-inch RCP. The 102-inch RCP extends westerly in Grand Avenue and northerly in Stoneman Street. At approximately 1,859 feet in Stoneman Street, the 90-inch RCP transitions into a 12'W x 7'D RCB. From there, the RCB transitions into a 20'W x 7'D open channel, then a daylight/outlet structure with an approximate length of 230 feet, width of 50 feet and maximum depth of 4 feet as it extends toward Lake Elsinore.

Lateral N-1 – The upstream origin of Lateral N-1 begins at a point approximately 367 feet west of Stoneman Street as a 36-inch RCP. From there, the 36-inch RCP extends easterly until it confluences with proposed Line N.

Line N Water Quality Basin – Line N Water Quality Basin is located at the southwest corner of the intersection of Palomar and Stoneman Street. The incised water quality basin has an approximate volume of 5.9 acre-feet and an approximate right-of-way of 3.7 acres, and would require a connection to the drainage system of the tract located west of the proposed water quality basin.

Watershed O:

Line O-10 Debris Basin – Line O-10 Debris Basin is located near the intersection of Skylark Drive and Cissna Place, just upstream of the proposed Line O-10 and has a volume of 9.1 ac-ft. and an approximate right-of-way of 1.8 acres. The partially incised debris basin has an approximate embankment height of 28 feet and includes a low flow outlet pipe and a spillway structure.

Line O-10 – The upstream origin of Line O-10 begins near the intersection of Skylark Drive and Cissna Place as a 66-inch RCP. From there, the 66-inch RCP extends northerly in Skylark Drive. At Grand Avenue, the 66-inch RCP transitions into a 78-inch RCP and extends easterly in Grand Avenue. At the geographic low between Gill Lane and Corydon Road, the 78-inch RCP transitions into a 20'W x 10'D open channel. Just before connecting to the existing Palomar Channel, the 20'W x 10'D transitions into a 14'W x 8'D open channel.

Line O-20 Debris Basin – Line O-20 Debris Basin is located at a point approximately 1,060 feet south of Grand Avenue on Borchard Drive, just upstream of the proposed Line O-20 and has a volume of approximately 6.7 acre-feet and an approximate right-of-way of 2.1 acres. The partially incised debris basin has an approximate embankment height of 23 feet and includes a low flow outlet pipe and a spillway structure.

Line O-20 – The upstream origin of Line O-20 begins at a point approximately 1060 feet south of Grand Avenue on Borchard Drive. From there, the 60-inch RCP extends northerly in Borchard Drive. At Grand Avenue, the 60-inch RCP transitions into a 72-inch RCP, extends westerly in Grand Avenue and connects to the existing 78-inch RCP in Ontario Way. The downstream terminus of the existing 78-inch RCP transitions into a proposed 7'W x 7'D RCB. The RCB then transitions into a daylight/outlet structure with an approximate length of 300 feet, width of 50 feet and maximum depth of 5 feet as it outlets into Lake Elsinore.

Watershed P:

Channel A – The upstream origin of Channel A begins at the downstream terminus of Sedco-Bryant Street Storm Drain Stage 1. From there, the 40'W x 6'D trapezoidal channel extends westerly along the geographic low. At Corydon Road, the trapezoidal channel transitions into a 42'W x 6'D RCB. The 42'W x 6'D RCB would replace the existing 42'W x 4'D RCB.

SECTION IX – ALTERNATIVES

Four (4) alternative plans were developed using the Master Drainage Plan Objectives (Objectives) discussed in Section IV. Each alternative was evaluated and scored against the Objectives and the alternative with the highest score was selected as the Preferred Alternative. A description of each alternative can be found below. For more information on the alternatives analysis, refer to "Appendix 'A' – Alternatives Analysis."

Alternative 1 – Alternative 1 is the "No Project" alternative. No new facilities all proposed under this alternative; the level of flood protection is limited to that which is currently provided by the existing District and non-District maintained drainage facilities within the Lakeland Village area. Existing drainage facilities include: Lime Street Channel, Ortega Channel Lateral A-1 Debris Basin, Ortega Channel, Ortega Channel Lateral A, Ortega Channel Lateral A-1, Ortega Channel Lateral A-2, Lakeland

Village Channel, Churchill Street Drainage Ditch, Stoneman Street Channel, Corydon Channel, Palomar Channel, Ontario Way Storm Drain, Tract 23111 Drainage Ditch, Sedco – Bryant Street Storm Drain Stage 1, Sedco – Bryant Street Storm Drain and Debris Basin. (See Exhibit 1)

Alternative 2 – Alternative 2 proposes 21 underground storm drains (approximately 45,000 lineal feet), four open channels (approximately 9,000 lineal feet), two debris basins and one debris/detention basin. The proposed storm drains and open channels are sized to convey "bulked flows" (i.e., flows that include both stormwater runoff and its associated debris load) to Lake Elsinore. The two debris basins are proposed upstream of the existing Ortega and Lime Street Channels to capture sediment before entering the channels. These channels historically have been subject to debris accumulation and frequent maintenance due to relatively flat slopes. A debris/detention basin is proposed upstream of the existing Lakeland Village Channel to capture debris and attenuate flow during a 100-year storm event. (See Exhibit 2)

Alternative 2 also proposes improvements to the following existing facilities:

- Lime Street Channel – Floodwalls (2-feet high) would be added to the top of the channel. The existing 48-inch diameter pipe along Hill Street would be replaced with a 72-inch pipe.
- Ortega Channel – Floodwalls (2-feet high) would be added to the portion of Ortega Channel downstream of Grand Avenue.
- Lakeland Village Channel – The existing double 36-inch culverts located at Nelson Avenue, Bobrick Avenue, MacKay Avenue, Brightman Avenue, Sutherland Avenue, Raley Avenue and Grand Avenue would be replaced with a 12' x 4' reinforced concrete box.

Alternative 3 – Alternative 3 proposes 17 underground storm drains (approximately 37,000 linear feet), four open channels (approximately 7,000 lineal feet), and eight debris basins. Like Alternative 2, Alternative 3 also includes improvements to the existing Lime Street, Ortega and Lakeland Village Channels, such as flood walls and larger culverts. Alternative 3 also proposes the acquisition of properties and the removal of over 200 structures located within the FEMA mapped SFHAs. The existing culverts located along Grand Avenue, including those located within the SFHAs, are also proposed to be enlarged to convey the 100-year storm. (See Exhibit 3)

Alternative 4 - Preferred Alternative – Alternative 4 (Preferred) proposes 21 underground storm drains (approximately 45,000 lineal feet), four open channels (approximately 9,000 linear feet), eight debris basins, and one debris/detention basin. Like Alternatives 2 and 3, Alternative 4 proposes improvements to the existing Lime Street, Ortega and Lakeland Village Channels, such as flood walls and larger culverts. Alternative 4 also proposes construction of four water quality basins. (See Exhibit 4)

SECTION X – ESTIMATED COST

A cost summary for the MDP facilities is shown in "Table 3 – Cost Summary". Cost estimates were based on 2012 Planning Unit Cost Sheets and include construction, right of way and 28% for engineering, environmental mitigation, administration and contingencies.

The cost of the storm drains shown in Table 3 includes the cost of manholes, catch basins and pipe installations. Manholes are located as necessary with a maximum spacing of 500 feet. Catch basins are

not specifically located but the total number of lineal feet is included in the cost estimate. The cost of the open channels includes the cost of the access roads. Access roads are assumed to be 15 feet wide and two (2) access roads were included where the channel top width exceeds 20 feet. Water quality and debris basin costs include the cost of a 15-foot wide access road around the perimeter of the basin.

SECTION XI – CONCLUSIONS

Based on the studies and investigations made for this report, it is concluded that:

1. The Lakeland Village area has experienced serious problems related to flooding and excess debris, and will continue to experience these problems until a network of flood protection and drainage facilities is constructed. In addition, urban runoff from the Lakeland Village area currently flows into Lake Elsinore with little or no treatment.

2. When fully implemented, the Lakeland Village MDP described herein will (i) protect homes and businesses against a one percent (1%) annual chance flood; (ii) maintain ingress/egress along Grand Avenue during major storm events, and (iii) improve the quality of urban runoff that flows into Lake Elsinore.

3. The proposed MDP provides the maximum benefit to the Lakeland Village community and its residents.

4. The proposed MDP lends itself to staged construction as funds become available.

5. The total cost of the recommended improvements, including construction, rights-of-way, engineering, administration and contingencies, is estimated to be **$48,010,000**.

SECTION XII – RECOMMENDATIONS

It is recommended that:

1. The Lakeland Village MDP, Alternative 4 as set forth herein, be adopted by the District's Board of Supervisors.

2. The MDP, as set forth herein, be used as a guide for all future developments in the study area and that such developments be required to conform to the Plan insofar as possible.

3. All rights-of-way necessary for implementation of the MDP be protected from encroachment.

TABLE 3
LAKELAND VILLAGE MASTER DRAINAGE PLAN 154015
COST SUMMARY

Facility	Construction Cost	Engineering Admin *	Right of Way	Total Cost
Line A (Lime Street Channel)	$485,266	$185,659	$0	$663,000
Line A Debris Basin	$187,917	$71,895	$111,000	$368,000
Line A Water Quality Basin	$228,435	$87,397	$248,000	560,000
Line B	$17,600	$6,734	$0	$24,000
Line B Debris Basin	$307,965	$117,825	$120,000	$541,000
Line B Water Quality Basin	$220,455	$84,344	$240,000	$541,000
Line C	$831,345	$318,066	$0	$1,136,000
Line C-1	$350,847	$134,231	$0	$479,000
Line D	$1,052,803	$402,794	$8,000	$1,447,000
Line E	$462,774	$177,054	$0	$632,000
Line F	$833,898	$319,043	$8,000	$1,147,000
Line F Debris Basin	$164,115	$62,789	$437,000	$661,000
Line F-1	$281,548	$107,718	$0	$385,000
Line G	$517,211	$197,881	$0	$707,000
Line G Water Quality Basin	$114,765	$43,908	$143,000	$300,000
Line H	$2,170,862	$830,554	$0	$2,966,000
Line H-1	$72,244	$27,640	$0	$99,000
Line H-2	$514,149	$196,709	$0	$703,000
Lakeland Village Channel Debris/Detention Basin	$1,692,403	$647,500	$810,000	$3,122,000
Lakeland Village Channel	$1,184,299	$453,103	$53,000	$1,671,000
Line I Debris Basin	$134,205	$51,346	$68,000	$251,000
Line I	$1,244,570	$476,163	$0	$1,701,000
Line I-1	$472,136	$180,635	$0	$645,000
Line J	$900,131	$344,383	$15,000	$1,245,000
Line K Debris Basin	$771,489	$295,166	$360,000	$1,414,000
Line K	$1,540,490	$589,379	$0	$2,105,000
Line K-1	$593,311	$226,996	$0	$811,000
Line L	$672,425	$257,265	$180,000	$1,099,000
Line M	$2,880,384	$1,102,012	$68,000	$4,004,000
Line N Debris Basin	$389,992	$149,208	$218,000	$751,000
Line N	$4,869,738	$1,863,123	$98,000	$6,752,000
Lateral N-1	$261,056	$99,878	$0	$357,000
Line N Water Quality Basin	$146,231	$55,947	$278,000	$478,000
Line O-10 Debris Basin	$196,342	$75,119	$135,000	$403,000
Line O-10	$3,206,140	$1,226,643	$113,000	$4,494,000
Line O-20 Debris Basin	$192,775	$73,754	$158,000	$421,000
Line O-20	$775,958	$296,875	$0	$1,060,000
Channel A	$1,206,666	$461,661	$218,000	$1,867,000
TOTAL	**$32,144,937**	**$12,298,396**	**$4,087,000**	**$48,010,000**

* Includes 3% Mitigation

Appendix 'A' – Alternatives Analysis

All four (4) alternatives were analyzed against the Master Plan Objectives (Objectives) listed in Table 4. Various weights have been assigned to each of the objectives to emphasize the level of importance of the objective. The assigned weights range from 10% (lowest) to 20% (highest), which would result in points ranging from 10 to 20 points, respectively, for each objective. The total number of points possible is 100 points.

As previously discussed above, 100-year flood protection and all-weather access along Grand Avenue are major concerns in the Lakeland Village area. Therefore, Objectives 1, 2 and 4 have been assigned the highest weight of 20% (20 points). The cost to implement this MDP and the possibility of impacting potentially sensitive areas (Objectives 3 and 6) were also important areas of consideration. These two objectives have been assigned a weight of 15% (15 points). Lastly, the possibility of incorporating regional water quality facilities to mitigate impacts from existing development (Objective 5) was assigned a weight of 10%.

The assignment of scores is discussed below. The alternative with the highest score was selected as the Preferred Alternative. With the highest score of 90 out of a total of 100 points, Alternative 4 closely addressed all the Objectives and was selected as the Preferred Alternative. See Table 4: Alternatives Analysis – Summary of Scores.

Table 4: Alternatives Analysis - Summary of Scores

Objective		Alternative 1	Alternative 2	Alternative 3	Alternative 4
1	Reduce the level of risk from flooding and debris flows to existing/future development and infrastructure to below the 100-year level Weight = 20% (Points = 20 out of 100)	5	20	20	20
2	Provide "all-weather" access along Grand Avenue by conveying 100-year tributary flood flows below the travelled way Weight = 20% (Points = 20 out of 100)	0	20	20	20
3	Provide a MDP at the lowest construction and right-of-way acquisition cost Weight = 15% (Points = 15 out of 100)	0	15	5	12
4	Economically manage debris to ensure that the 100-year design capacity is maintained during major storm events Weight = 20% (Points = 20 out of 100)	5	10	20	20
5	Consider, and where feasible, incorporate regional water quality facilities to mitigate for the impacts from existing development and to improve the water quality of Lake Elsinore Weight = 10% (Points = 10 out of 100)	0	0	0	10
6	Avoid or minimize the impacts to potentially sensitive areas Weight = 15% (Points = 15 out of 100)	15	13	11	8
Total Score (out of 100):		25	78	76	90

ALTERNATIVE 1 – NO PROJECT

Alternative 1 is the "No Project" alternative. Thus, there are no new facilities proposed under this alternative. For this alternative, flood protection is only provided by the existing District and non-District maintained drainage facilities within the Lakeland Village area. Existing drainage facilities include: Lime Street Channel, Ortega Channel Lateral A-1 Debris Basin, Ortega Channel, Ortega Channel Lateral A, Ortega Channel Lateral A-1, Ortega Channel Lateral A-2, Lakeland Village Channel, Churchill Street Drainage Ditch, Stoneman Street Channel, Corydon Channel, Palomar Channel, Ontario Way Storm Drain, Tract 23111 Drainage Ditch, Sedco – Bryant Street Storm Drain Stage 1, Sedco – Bryant Street Storm Drain and Debris Basin. (See Exhibit 1)

Based on the discussion below, Alternative 1 was assigned a total score of 25 out of 100 points.

1. **Reduce the level of risk from flooding and debris flows to existing/future development and infrastructure to below the "100-year" level**
   (Score = 5 out of 20 points)
   There are no new drainage facilities proposed in Alternative 1; therefore, this alternative would not provide any additional protection against the 100-year flood event.

2. **Provide "all-weather" access along Grand Avenue by conveying 100-year tributary flood flows below the travelled way**
   (Score = 0 out of 20 points)
   Alternative 1 does not propose any additional facilities or improvements; therefore, access along Grand Avenue will continue to be limited or rendered impassable during storm events.

3. **Provide a Master Drainage Plan at the lowest construction and right-of-way acquisition cost**
   (Score = 0 out of 15 points)
   Alternative 1 does not propose any additional facilities or improvements; therefore, this alternative would be the least expensive but it would not meet the main project objective of providing flooding protection to the Lakeland Village area.

4. **Economically manage debris to ensure that the 100-year design capacity is maintained during major storm events**
   (Score = 5 out of 20 points)
   Alternative 1 does not propose any additional facilities or improvements; therefore, long-term maintenance costs would be incurred only for the maintenance of drainage facilities already in place in the area.

5. **Consider, and where feasible, incorporate regional water quality facilities to mitigate for the impacts from existing development to improve the water quality of Lake Elsinore**
   (Score = 0 out of 10 points)
   Alternative 1 does not include any water quality features; therefore, water quality concerns would not be addressed by this alternative.

6. **Avoid or minimize the impact to potentially sensitive areas**
   (Score = 15 out of 15 points)

Alternative 1 does not propose any additional facilities or improvements; therefore, no biologically or culturally sensitive areas would be impacted.

ALTERNATIVE 2

Alternative 2 proposes 21 underground storm drains (approximately 45,000 lineal feet), four open channels (approximately 9,000 lineal feet), two debris basins and one debris/detention basin. The proposed storm drains and open channels are sized to convey "bulked flows" (i.e., flows that include both stormwater runoff and its associated debris load) to Lake Elsinore. The two debris basins are proposed upstream of the existing Ortega and Lime Street Channels to capture sediment before entering the channels. These channels historically have been subject to debris accumulation and frequent maintenance due to relatively flat slopes. A debris/detention basin is proposed upstream of the existing Lakeland Village Channel to capture debris and attenuate flow during a 100-year storm event. (See Exhibit 2)

Alternative 2 also proposes improvements to the following existing facilities:

- Lime Street Channel – Floodwalls (2-feet high) would be added to the top of the channel. The existing 48-inch diameter pipe along Hill Street would be replaced with a 72-inch pipe.

- Ortega Channel – Floodwalls (2-feet high) would be added to the portion of Ortega Channel downstream of Grand Avenue.

- Lakeland Village Channel – The existing double 36-inch culverts located at Nelson Avenue, Bobrick Avenue, MacKay Avenue, Brightman Avenue, Sutherland Avenue, Raley Avenue and Grand Avenue would be replaced with a 12' x 4' RCB.

Based on the discussion below, Alternative 2 was assigned a total score of 78 out of 100 points.

1. **Reduce the level of risk from flooding and debris flows to existing/future development and infrastructure to below the "100-year" level**
   (Score = 20 out of 20 points)
   Alternative 2 proposes storm drains and open channels sized large enough to convey the bulked 100-year tributary flows to Lake Elsinore. In addition, improvements are proposed to the existing Lime Street, Ortega and Lakeland Village Channels.

2. **Provide "all-weather" access along Grand Avenue by conveying 100-year tributary flood flows below the travelled way**
   (Score = 20 out of 20 points)
   Alternative 2 proposes underground storm drains sized to provide 100-year flood protection to Grand Avenue, thereby, making the road accessible during all but the most extreme storm events.

3. **Provide a Master Drainage Plan at the lowest construction and right-of-way acquisition cost**
   (Score = 15 out of 15 points)
   The cost to construct and acquire the necessary rights-of-way for the proposed improvements in Alternative 2 is approximately $42,803,000. Aside from Alternative 1 (No Project), Alternative 2 is the least costly in terms of construction and right-of-way acquisition.

4. **Economically manage debris to ensure that the 100-year design capacity is maintained during major storm events**
(Score = 10 out of 20 points)
The proposed storm drains and open channels would convey the bulked flows to Lake Elsinore. Since the debris would not be captured upstream, the proposed underground storm drains and open channels would need to be routinely maintained to ensure that the design capacity is conveyed at all times. Storm drain inspection and debris removal is especially critical for those drainage facilities aligned along Grand Avenue due to the abrupt change in the storm drain profile from steep to flat slope. This abrupt change would result in the accumulation of debris in the flatter reaches, thereby, requiring more frequent storm drain inspection and debris removal. Due to the enclosed nature of the underground storm drains, removing the sediment would involve specialized methods, such as jetting or vacuuming. These specialized maintenance methods are far more expensive than the simple excavation methods used on channels and debris basins.

5. **Consider, and where feasible, incorporate regional water quality facilities to mitigate for the impacts from existing development and to improve the water quality of Lake Elsinore**
(Score = 0 out of 10 points)
Alternative 2 does not include any water quality features; therefore, Lake Elsinore water quality concerns would not be addressed by this alternative.

6. **Avoid or minimize the impacts to potentially sensitive areas**
(Score = 13 out of 15 points)
Biologically Sensitive Areas: The proposed underground facilities located within existing street rights-of-way and the proposed improvements to existing facilities located outside of biologically sensitive survey areas would not substantially impact biological resources. However, the proposed open channels are generally aligned along existing natural watercourses that may support sensitive biological resources. These biological resources may be impacted by construction activities.

ALTERNATIVE 3

Alternative 3 proposes 17 underground storm drains (approximately 37,000 linear feet), four open channels (approximately 7,000 linear feet), and eight debris basins. Like Alternative 2, Alternative 3 also includes improvements to the existing Lime Street, Ortega and Lakeland Village Channels, such as flood walls and larger culverts. Alternative 3 also proposes the acquisition of properties and the removal of over 200 structures located within the FEMA mapped SFHAs. The existing culverts located along Grand Avenue, including those located within the SFHAs, are also proposed to be enlarged to convey the 100-year storm. (See Exhibit 3)

Based on the discussion below, Alternative 3 was assigned a total score of 76 out of 100 points.

1. **Reduce the level of risk from flooding and debris flows to existing/future development and infrastructure to below the "100-year" level**
(Score = 20 out of 20 points)
Alternative 3 proposes a series of storm drains, channels and debris basins that would provide 100-year flooding protection to the Lakeland Village area. In addition to the proposed structural

improvements, this alternative would also implement a non-structural approach to flood risk reduction by removing at-risk structures from the FEMA mapped SFHAs. Over 200 properties located within four separate SFHAs would be acquired, the structures located on the properties demolished, and the floodplain areas would revert to open space.

2. **Provide "all-weather" access along Grand Avenue by conveying 100-year tributary flood flows below the travelled way**
(Score = 20 out of 20 points)
Alternative 3 would provide underground storm drains and culverts sized to provide 100-year flood protection to Grand Avenue, thereby, making the road accessible during all but the most extreme storm events.

3. **Provide a Master Drainage Plan at the lowest construction and right-of-way acquisition cost**
(Score = 5 out of 15 points)
The cost to construct the proposed improvements in Alternative 3 is approximately $36,630,000. Implementation of Alternative 3 would also include a non-structural approach to flood risk reduction and would require the acquisition of over 200 existing properties and structures. The cost to acquire properties, remove structures and relocate property owners is approximately $75,000,000. Due to the extensive right-of-way acquisition cost, Alternative 3 would be the most costly in terms of construction and right-of-way acquisition, with a total cost of $111,630,000.

4. **Economically manage debris to ensure that the 100-year design capacity is maintained during major storm events**
(Score = 20 out of 20 points)
Alternative 3 proposes several debris basins to capture sediment and debris from the mountains before it enters into the proposed storm drains. Although this alternative proposes storm drains aligned along Grand Avenue where there is an abrupt change from a steep to flat slope, the debris would be captured upstream and would not affect the hydraulic capacity of the storm drain over time. Given the topography of the Lakeland Village area, implementation of debris basins would best manage the debris and will ensure the hydraulic capacity of the underground systems is maintained at all times. The captured debris would need to be removed from the basins to ensure adequate storage capacity for subsequent storm events. Compared to the cost of specialized methods used to maintain underground storm drains, the cost to excavate debris from the basins would be significantly less.

5. **Consider, and where feasible, incorporate regional water quality facilities to mitigate for the impacts from existing development and to improve the water quality of Lake Elsinore**
(Score = 0 out of 10 points)
Other than the proposed debris basins, Alternative 3 does not include any water quality features; therefore, water quality concerns would not be addressed by this alternative.

6. **Avoid or minimize the impacts to potentially sensitive areas**
(Score = 11 out of 15 points)

Biologically Sensitive Areas: The proposed underground facilities located within existing street rights-of-way and the proposed improvements to existing facilities located outside of biologically sensitive survey areas would not substantially impact biological resources. However, the proposed open channels and debris basins are generally aligned along natural watercourses and may be located in areas that support sensitive biological resources. These biological resources may be permanently impacted by the facilities. Conversely, the acquired properties located within the FEMA mapped SFHA would be converted to open space and could support biological resources.

Culturally Sensitive Areas: There are four (4) recorded resources within 125 feet of the proposed storm drains and channels. Within the footprint of two of the debris basins, historical resources were found and further evaluation would be necessary. For the remaining debris basin footprints, there were no previous studies available. Since the proposed debris basins are generally located within undeveloped areas, there is a higher probability of finding prehistoric cultural resources in these areas.

The acquisition of properties located within the FEMA mapped SFHA areas would include approximately 50 architectural resources (structures at least 50 years old) and would require further evaluation.

ALTERNATIVE 4 - PREFERRED

Alternative 4 (Preferred) proposes 21 underground storm drains (approximately 45,000 lineal feet), four open channels (approximately 9,000 lineal feet), eight debris basins, and one debris/detention basin. Like Alternatives 2 and 3, Alternative 4 proposes improvements to the existing Lime Street, Ortega and Lakeland Village Channels, such as flood walls and larger culverts. Alternative 4 also proposes construction of four water quality basins. (See Exhibit 4)

Based on the discussion below, Alternative 4 was assigned a total score of 90 out of 100 points.

1. **Reduce the level of risk from flooding and debris flows to existing/future development and infrastructure to below the "100-year" level**
   (Score = 20 out of 20 points)
   Alternative 4 would provide 100-year flood protection to the entire Lakeland Village area, including FEMA mapped SFHA, by proposing drainage systems consisting of storm drains, open channels, debris basins, and improvements to the existing Lime Street, Ortega and Lakeland Village Channels.

2. **Provide "all-weather" access along Grand Avenue by conveying 100-year tributary flood flows below the travelled way**
   (Score = 20 out of 20 points)
   Alternative 4 would provide underground storm drains sized to provide 100-year flood protection to Grand Avenue, thereby, making the road accessible during all but the most extreme storm events.

3. **Provide a Master Drainage Plan at the lowest construction and right-of-way acquisition cost**

(Score = 12 out of 15 points)

The cost to construct and acquire the necessary rights-of-way for the proposed improvements in Alternative 4 is approximately: $48,000,000. The cost to implement Alternative 4 is higher than the cost to implement Alternative 2 ($42,803,000) but lower than the cost to implement Alternative 3 ($111,630,000).

4. Economically manage debris to ensure that the 100-year design capacity is maintained during major storm events

(Score = 20 out of 20 points)

Alternative 4 proposes several debris basins to capture sediment and debris from the mountains before it enters the proposed storm drains. Although this alternative proposes storm drains aligned along Grand Avenue where there is an abrupt change from a steep to flat slope, the debris would be captured upstream and would not affect the hydraulic capacity of the storm drain over time. Given the topography of the Lakeland Village area, implementation of debris basins would best manage the debris and will ensure the hydraulic capacity of the underground systems is maintained at all times. The captured debris would need to be removed from the basins to ensure adequate storage capacity for subsequent storm events. Compared to the cost of specialized methods used to maintain underground storm drains, the cost to excavate debris from the basins would be significantly less.

5. Consider, and where feasible, incorporate regional water quality facilities to mitigate for the impacts from existing development to improve the water quality of Lake Elsinore

(Score = 10 out of 10 points)

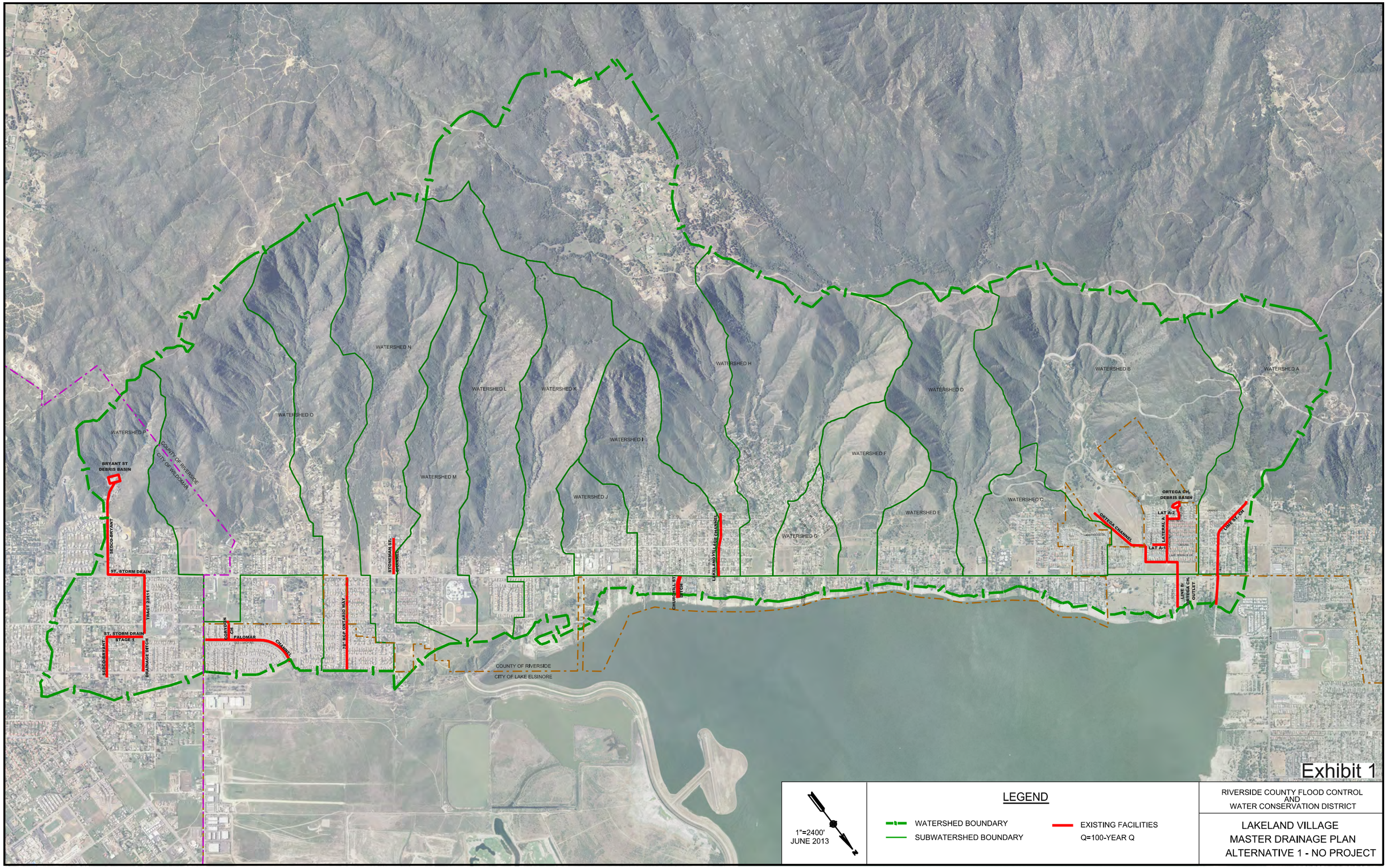
In addition to a network of flood protection and drainage improvements, Alternative 4 proposes several water quality basins located downstream of existing developments within the Lakeland Village area. The proposed basins are intended to capture and treat urban runoff originating from these existing development areas; thereby, reducing the amount of pollutants that would otherwise flow into Lake Elsinore.

6. Avoid or minimize the impacts to potentially sensitive areas

(Score = 8 out of 15 points)

Biologically Sensitive Areas: The proposed underground facilities located within existing street rights-of-way and the proposed improvements to existing facilities located outside of biologically sensitive survey areas would not substantially impact biological resources. However, the proposed open channels, debris basins, and water quality basins are generally aligned along natural watercourses or undeveloped areas and may be located in areas that support sensitive biological resources. The biological resources in these areas may be impacted by construction activities.

Culturally Sensitive Areas: There are four (4) recorded resources within 125 feet of the proposed storm drains and channels. Within the footprint of two of the proposed debris and water quality basins, historical resources were found. For the remaining debris and water quality basin footprints, further evaluation would be necessary. Since the proposed debris and water quality basins are generally located within undeveloped areas, there is a higher probability of finding prehistoric cultural resources in these areas.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WATERSHED D
WATERSHED C
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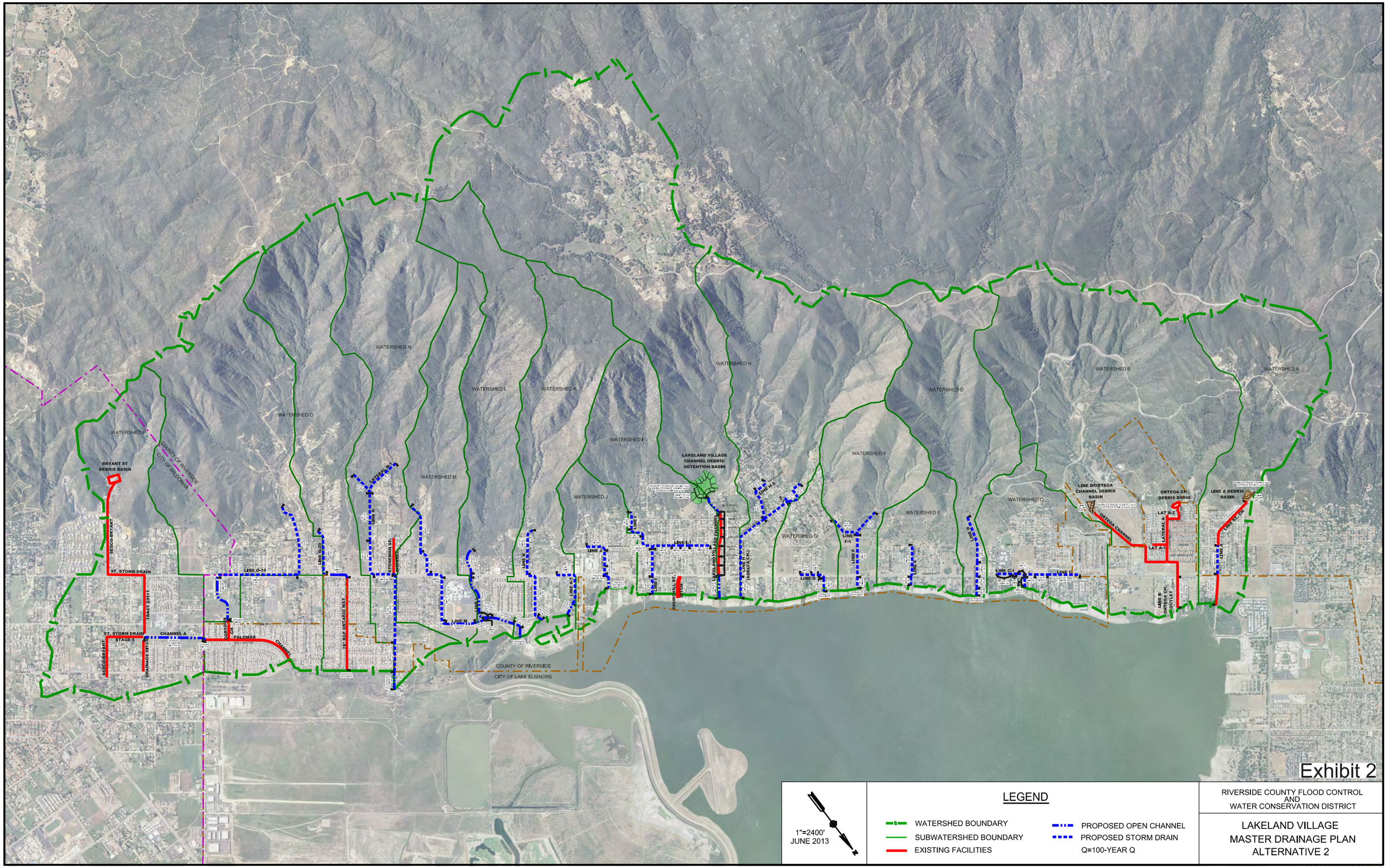
WATERSHED A
COUNTY OF RIVERSIDE
CITY OF WILDOMAR
BRYANT ST DEBRIS BASIN
SED.D.BRYANT
ST. STORM DRAIN
TRACT 23111
ST. STORM DRAIN STAGE 1
SED.D.BRYANT
DRAINAGE DITCH
PALOMAR CHANNEL
PALOMAR
STONEMAN ST. CHANNEL
36" RCP ONTARIO WAY
COUNTY OF RIVERSIDE
CITY OF LAKE ELSINORE
CHURCHILLS ST. DITCH
LAKELAND VILLAGE CHANNEL
ORTEGA CHANNEL
ORTEGA CH. DEBRIS BASIN
LAT A-2
LATERAL A
LAT A-1
LINE ST.-CH
LINE B OUTLET
Exhibit 1
1"=2400'
JUNE 2013
LEGEND
WATERSHED BOUNDARY
SUBWATERSHED BOUNDARY
EXISTING FACILITIES
Q=100-YEAR Q
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
LAKELAND VILLAGE
MASTER DRAINAGE PLAN
ALTERNATIVE 1 - NO PROJECT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COUNTY OF RIVERSIDE
CITY OF WILDOMAR
BRYANT ST DEBRIS BASIN
SEDCO BRYANT
ST. STORM DRAIN
TRACT 23111
ST. STORM DRAIN STAGE 1
CHANNEL A
DRAINAGE DITCH
SEDCO BRYANT
LINE O-10
LINE O-20
CORYDON CT.
PALOMAR
CHANNEL
36" RCP ONTARIO WAY
LATERAL K-2
STONEMAN ST.
LINE K-1
LINE K-2
LINE M
LAKELAND VILLAGE CHANNEL DEBRIS/ DETENTION BASIN
LAKELAND VILLAGE CHANNEL
LINE H-2
LINE H-1
LINE F-1
LINE F
LINE G
CHURCHILL ST.
DITCH
LINE E
LINE C
LINE B
LINE B/ORTEGA CHANNEL DEBRIS BASIN
ORTEGA CHANNEL
ORTEGA CHL. DEBRIS BASIN
LAT A-2
LAT A-1
LINE B/ ORTEGA CHL. OUTLET
LINE A DEBRIS BASIN
LINE ST-2A
LINE A
COUNTY OF RIVERSIDE
CITY OF LAKE ELSINORE
Exhibit 2
1"=2400'
JUNE 2013
LEGEND
WATERSHED BOUNDARY
SUBWATERSHED BOUNDARY
EXISTING FACILITIES
PROPOSED OPEN CHANNEL
PROPOSED STORM DRAIN
Q=100-YEAR Q
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
LAKELAND VILLAGE
MASTER DRAINAGE PLAN
ALTERNATIVE 2

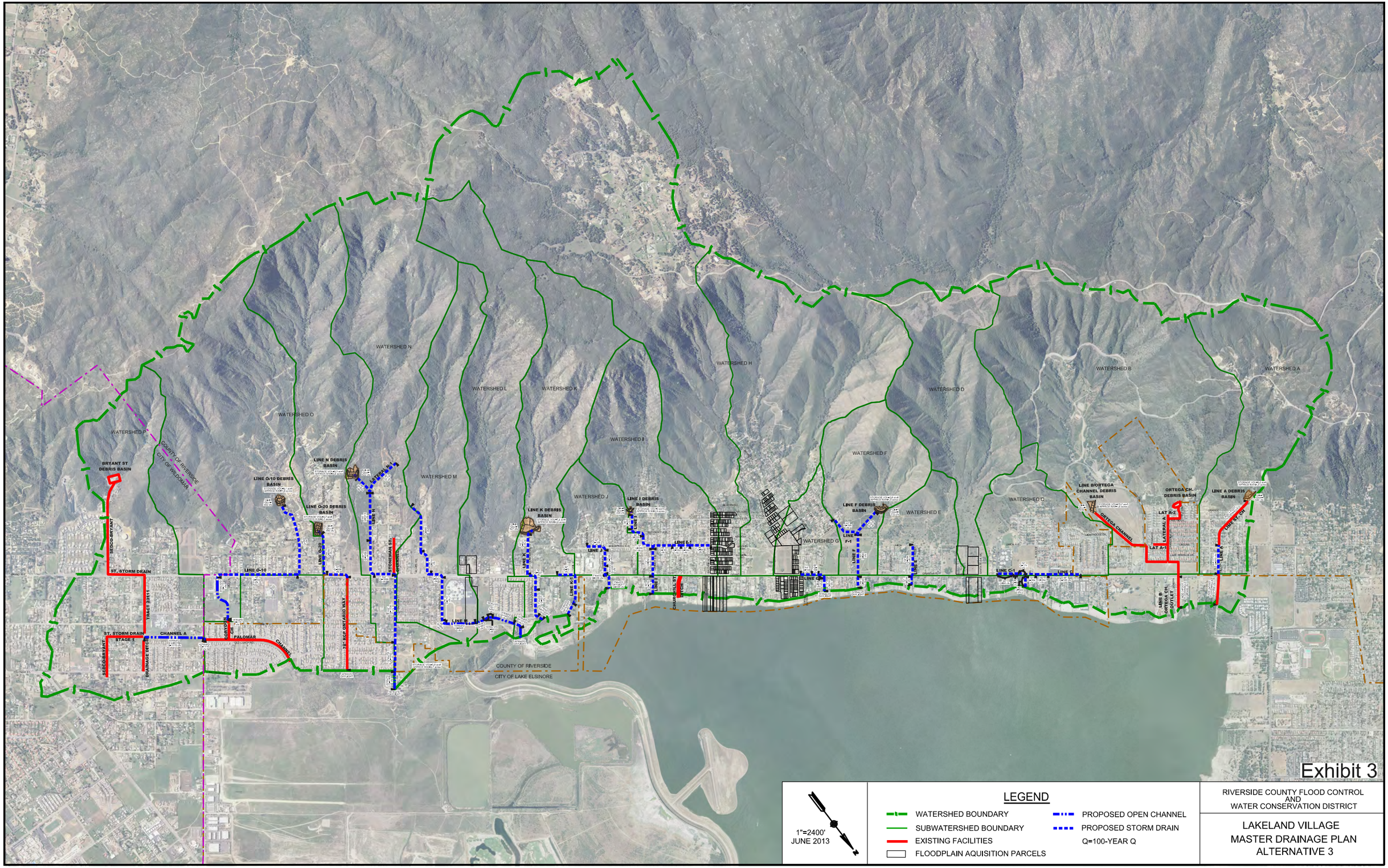

Exhibit 3

1"=2400'
JUNE 2013

LEGEND

- WATERSHED BOUNDARY
- SUBWATERSHED BOUNDARY
- EXISTING FACILITIES
- FLOODPLAIN AQUISITION PARCELS
- PROPOSED OPEN CHANNEL
- PROPOSED STORM DRAIN
- Q=100-YEAR Q

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

LAKELAND VILLAGE MASTER DRAINAGE PLAN ALTERNATIVE 3

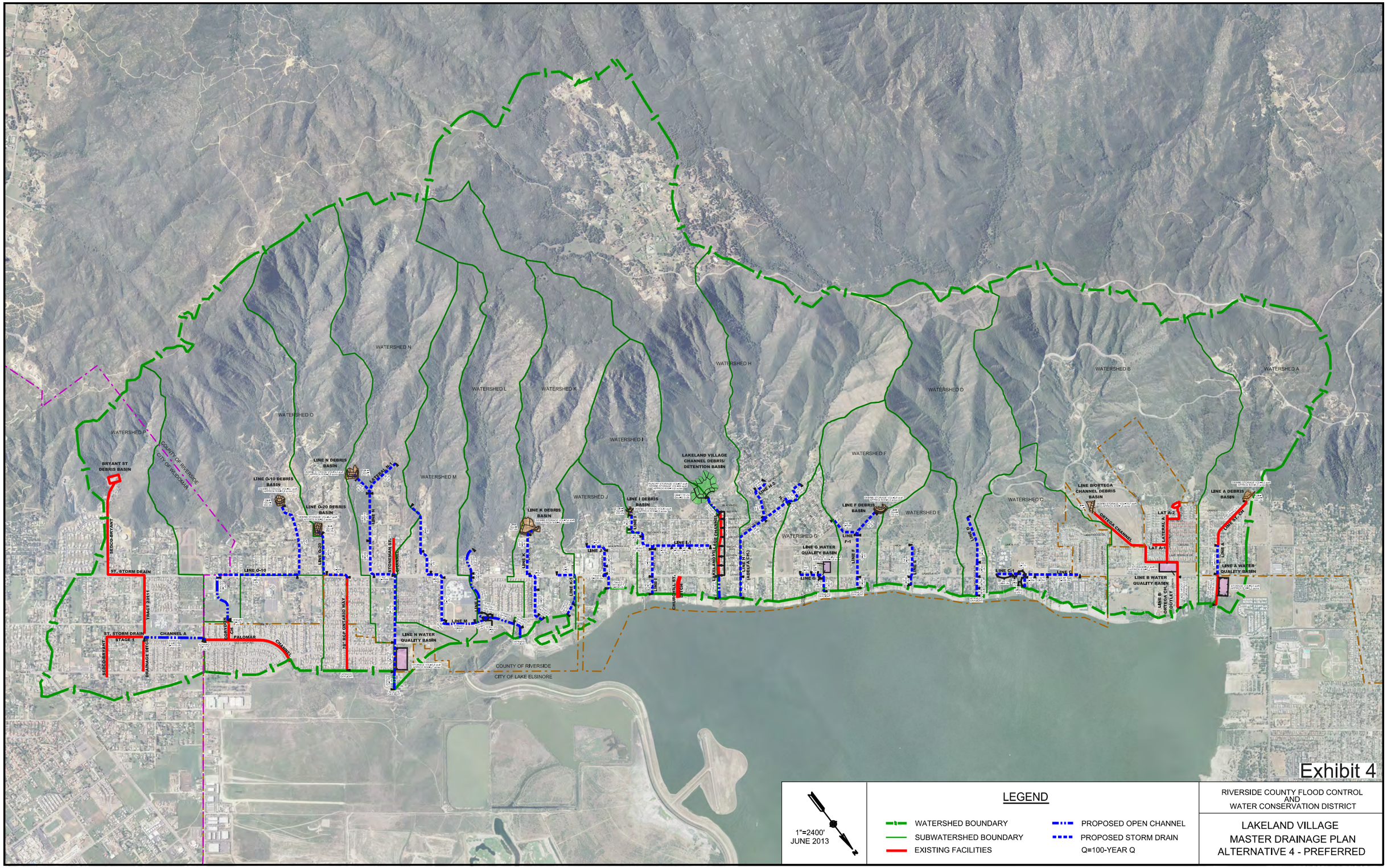

Exhibit 4

1"=2400'
JUNE 2013

LEGEND

- WATERSHED BOUNDARY
- SUBWATERSHED BOUNDARY
- EXISTING FACILITIES
- PROPOSED OPEN CHANNEL
- PROPOSED STORM DRAIN
  Q=100-YEAR Q

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

LAKELAND VILLAGE
MASTER DRAINAGE PLAN
ALTERNATIVE 4 - PREFERRED


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SUBWATERSHED BOUNDARY
EXISTING FACILITIES
PROPOSED OPEN CHANNEL
PROPOSED STORM DRAIN
Q=100-YEAR Q
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
LAKELAND VILLAGE MASTER DRAINAGE PLAN
(ALTERNATIVE 4 - PREFERRED)
ORIGINAL ADOPTION DATE - MO. YEAR
COUNTY OF RIVERSIDE
CITY OF LAKE ELSINORE

WARREN D. WILLIAMS
General Manager-Chief Engineer

RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

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March 2015

Lakeland Village Master Drainage Plan

In accordance with Section 509.a.7 of the Rules for the Riverside County Flood Control and Water Conservation District Implementing the California Environmental Quality Act, the General Manager-Chief Engineer of the Riverside County Flood Control and Water Conservation District hereby certifies that the Programmatic Environmental Impact Report for the Lakeland Village Master Drainage Plan (SCH#2011091017) is an objective and accurate statement which has been completed in compliance with the California Environmental Quality Act (CEQA) and the State CEQA Guidelines.

WARREN D. WILLIAMS
General Manager-Chief Engineer

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