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Montecito Debris Nets Maintenance Project

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1.0 REQUEST/PROJECT DESCRIPTION

Project Background

Following the Thomas Fire in December 2017, a subsequent storm event on January 9, 2018 resulted in substantial debris flows along several creeks in the south coast of Santa Barbara County. The debris flows impacted expansive areas within the community of Montecito, resulting in 23 fatalities, damage to or loss of more than 400 homes and dozens of businesses (see Photograph 1), and temporary, but prolonged closure of U.S. Highway 101. In order to protect against future debris flows, The Partnership for Resilient Communities (TPRC; Applicant) proposed the emergency installation of temporary debris nets intended to capture and retain larger debris, including large boulders, rocks, tree trunks, branches, and mudflows during future storm events.[1]

Photograph 1. *The Thomas Fire burned approximately 281,893 acres resulting in large unvegetated areas with loose sediments that were mobilized by rainfall during the substantial debris flows on January 9, 2018.*

On December 21, 2018, the County issued a Notice of Exemption and an Emergency Permit for 11 Geobrugg flexible debris nets in three canyons north of the community of Montecito (Case No. 18EMP-00000-00007). The Emergency Permit authorized installation, 1 year of monitoring and maintenance as well as subsequent removal of the 11 debris nets after 1 year (i.e., on December 21, 2019). The California Department of Fish and Wildlife (CDFW) allowed the emergency action to proceed under a California Department of Fish and Game Code Section 1610 Emergency Notification. Installation of the debris nets was also authorized by the Central Coast Regional Water Quality Control Board (RWQCB) via a Notice of Applicability (NOA) under Order No. 2004-0004-DWQ (Project No. 34218WQ39).

Pursuant to the Montecito Land Use and Development Code (MLUDC) Section 35-472.090(G), an Emergency Permit does not constitute an entitlement for the construction of permanent structures. Therefore, the Applicant submitted a Development Plan application for 6 of the 11 nets that were previously authorized by the Emergency Permit, located within Cold Springs Canyon, San Ysidro Canyon, and Buena Vista Canyon (see Table 1 and Figure 1). At the time of the Development Plan application, four of the six nets had been previously installed under the conditions of the Emergency Permit, including two in Cold Springs Canyon (CS-11 and CS-18), one in San Ysidro Canyon (SY-18), and one in Buena Vista Canyon (BV-4). The Applicant chose not to seek approval for the other five debris nets that were originally authorized under the Emergency Permit. The County approved the Development Plan on June 19, 2019 and determined that the project was exempt from CEQA pursuant to CEQA Guidelines Section 15269(c), confirming that the project was within the original scope of the original Notice of Exemption approved on December 21, 2018. The Development Plan authorized the installation of the six debris nets as well as the monitoring and maintenance of the nets for 1 year through December 20, 2019, with subsequent removal of the debris nets authorized under the Emergency Permit.[2]

On December 19, 2019, the County issued a second Notice of Exemption and an Emergency Permit for 1 year of monitoring and maintenance as well as subsequent removal of the six Geobrugg flexible debris nets (Case No. 19EMP-00000-00003). As described in the Notice of Exemption, the Applicant would be

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[1] The Partnership for Resilient Communities (TPRC) was formed by County residents shortly after the debris flow as a 501(c)(3) non-profit community organization focusing on recovery, safety, and resiliency efforts.

[2] The four original debris nets were constructed in April 2019 under the original Emergency Permit. The two other nets (SY-7a and BV-10) were constructed in September 2019 after the approval of the Development Plan (see Table 1).

required to remove the debris nets within 1 year of the Emergency Permit approval date if a subsequent Development Plan or new Emergency Permit is not obtained.

Each of the six debris nets – which are collectively referred to as the debris flow protection system – is engineered to resist the velocities and pressures that are unique to debris flows composed of large boulders and rock as well as tree trunks and branches (see Photograph 2). The individual components of the debris nets include multiple support cables that traverse the stream channels, steel ring nets, and wire rope anchors that were drilled approximately 15 to 32 feet into stable bedrock and reinforced with grout. The cables transfer debris impact and pressure loads from the ring nets into the ground. Excessive energy is absorbed by net braking elements in the support cables.

Photograph 2. *Six Geobrugg flexible debris nets were installed within Cold Springs Canyon, San Ysidro Canyon, and Buena Vista Canyon. SY-18 (pictured above) was installed in San Ysidro Canyon in April 2019 under the original Emergency Permit issued by the County.*

Per the conditions of the Emergency Permits and Development Plan the debris nets were installed at a minimum elevation ranging from 3 to 5 feet above the water surface within the low-flow channel of each creek to allow for the passage of water, fine sediment, and fish and wildlife. The Emergency Permits and Development Plan require that the space between the water surface and the bottom of the debris net be maintained at a minimum of 3 feet, such that debris does not restrict the low-flow channel, except during high stream flow or debris flow events. Depending on their location, the debris nets range in height from 10 to 20 feet. The bottom length of each debris net ranges from 14 to 98 feet wide, the middle length of each debris net ranges from 26 to 134 feet wide, and the top length of each debris net ranges from 37 to 150 feet wide. Engineering oversight was provided by DRS Engineering and Geo Solutions during the installation of the debris nets in April and September 2019. Additionally, consistent with the condition of the Emergency Permits and Development Plan, full-time biological monitoring was provided by Storrer Environmental Services (SES). Table 1 below provides a description of net type, retention capacity, and location of the six debris nets.

Table 1. Debris Net Descriptions and Locations

Debris Net Location and Name	Geobrugg Net Type[1]	Freeboard[2] (inches)	Approximate Retention Volume[3] (cubic yards)	Latitude	Longitude	Installation Date
Cold Spring Creek						
CS-11	VX160-H6	18-40	1,300	34.460252	-119.654054	04/05/2019
CS-18	SVX180-H6	36-57	2,300	34.460208	-119.655108	04/05/2019
San Ysidro Creek						
SY-7a	SVX180-H6	5-58	960	34.468166	-119.622936	09/23/2019
SY-18	SVX180-H6	20-50	2,700	34.459536	-119.623201	04/05/2019
Buena Vista Creek						
BV-4	SVX180-H6	2-46	2,100	34.454738	-119.611534	04/05/2019
BV-10	VX160-H6	4-56	1,000	34.452348	-119.611480	09/23/2019

Notes:
[1] Net types provided by the General Report of Findings (KANE GeoTech, Inc. 2018; see Attachment 1).
[2] Net freeboard is measured from bank to bank.
[3] Net retention volumes were recalculated in September 2019 by Waterways Consulting, Inc. (see Attachment 2).
Source: SES 2019.

Aerial Source: Google 2020.

Montecito Debris Net Locations

FIGURE 1

Project Overview

The previously issued Emergency Permits and Development Plan set forth detailed monitoring and maintenance requirements for removal of accumulated debris necessary to maintain the low-flow stream channel, while protecting special-status species and sensitive habitats. However, following the original installation of the debris nets, no major maintenance activities have been required due to a lack of accumulated debris. In order to provide additional time for the recovery of the watershed affected by the Thomas Fire (i.e., re-growth of vegetation necessary to stabilize exposed soils), the Applicant has submitted a new Development Plan application proposing continued monitoring and maintenance of the six Geobrugg flexible debris nets, as needed, for an additional 3 years, for a cumulative total of 5 years of maintenance activities.[3] As described in further detail below, all of the original conditions for maintenance activities described in the Emergency Permits and Development Plan would continue to apply. These conditions are described in the impact analysis provided in Section 4, *Potentially Significant Effects Checklist* and are further emphasized as Project-specific mitigation measures that would be tracked in the Mitigation Monitoring and Report Program (MMRP) associated with this Initial Study (IS) / Mitigated Negative Declaration (MND).

The original installation and removal of the debris nets were evaluated under the 2018 and 2019 Notices of Exemption. This IS evaluates the new Development Plan that includes additional monitoring and maintenance activities over a period of 3 years, which were not previously evaluated under the 2018 or 2019 Notice of Exemptions.

Monitoring and Maintenance Activities

The U.S. Geological Survey (USGS) and National Weather Service (NWS) have developed a Debris Flow Warning System (NWS 2018) for post-burn areas. The USGS computes rainfall rate thresholds based on statistical occurrences of debris flows and associated rainfall rates for burn areas less than 2 years old. The NWS uses these thresholds as guidance for warnings of possible flash flooding and debris flows. Pursuant to the original Emergency Permits, a “storm event” is an event that triggers the thresholds used by the NWS (NWS 2018). A storm event ends when no further precipitation is forecasted, and entry is permitted by public safety officials. Table 2 summarizes the rainfall rate thresholds used to determine the likelihood of debris flows in and near recent burn areas. High intensity, short duration rainfall rates are found to be the primary cause of debris flows.

Table 2. NWS Rainfall Rate Thresholds

Duration		Precipitation Amount
High Intensity, Short Duration Rainfall Rates	15 minutes	0.2-inch
	30 minutes	0.3-inch
	1 hour	0.5-inch
Normal Intensity Rainfall Rates	3 hours	1.0 inch
	6 hours	1.4 inches
	12 hours	1.9 inches

Source: NWS 2018.

Pursuant to the conditions of the original Emergency Permits and Development Plan, the existing debris nets are inspected by a qualified geotechnical engineer and a qualified biologist within 48 hours of each storm event greater than 0.25 inches. The need for maintenance activities is based upon the results of these routine inspections, with major debris accumulation maintenance activities most likely to be required following intense localized storm events which have the potential to mobilize large boulders, rocks, tree trunks, branches, and mudflows that would be captured by the nets. In addition to routine inspections,

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[3] The cumulative total of 5 years includes the 1 year of maintenance authorized by Emergency Permit Case No. EMP-00000-00007 and Development Plan Case No. 19DVP-00000-00005 as well as the 1 year of maintenance activities authorized by Emergency Permit Case No. 19EMP-00000-00003.

battery-operated motion-activated cameras (Bushnell Trophy Cam HD 24 MP Trail Cameras) were installed at each of the debris net locations in December 2019 to monitor fish and wildlife passage. Cameras and footage are examined regularly (i.e., approximately every 2 weeks) by a qualified biologist to assess the general conditions of the debris nets and the potential effects on fish and wildlife passage.

According to the post-inspection summary reports, in 2019 there were four storm events greater than 0.25 inches, ranging from 1.15 to 4.15 inches. Similarly, in early 2020, there were five storm events greater than 0.25 inches, ranging from 0.65 to 4.16 inches. Increased surface flows were noted at all debris net locations during the inspections following these storm events. Some leafy vegetation and branches were stuck in the debris nets at Buena Vista Creek and Santa Ynez Creek, indicating that flow reached the bottom of the debris nets in these locations. This debris was removed by hand during the inspection and did not require any maintenance with hand tools, power tools, or heavy construction equipment. No other maintenance activities have been required since the original installation of the debris nets in April and September 2019 as no major mobilization of larger debris appears to have occurred.

In the event that future inspections indicate that maintenance activities are required, debris removal and/or repair of the debris nets shall commence as soon as possible pursuant to the conditions of the original Emergency Permits and Development Plan. Maintenance would preferably commence within 48 hours of the inspection, but no later than 72 hours after the inspection, unless an earlier time period, if any, is required in authorizations issued by CDFW, Central Coast RWQCB, and/or U.S. Army Corps of Engineers (USACE).

Maintenance Activities

The debris nets would be managed in accordance with the magnitude of debris accumulated using a two-phased, seasonal approach for the wet and dry seasons. As previously described, during the wet season (November 1 to May 31), the debris nets would be inspected by a qualified geotechnical engineer and a qualified biologist within 48 hours of each storm event greater than 0.25 inches. If cobbles, sediment, or other debris (e.g., leafy vegetation and small branches) have accumulated in the channel below the nets, maintenance crews would utilize hand tools (minor maintenance) or heavy construction equipment (major maintenance) to re-create the low-flow channel and re-establish fish and wildlife passage. During the dry season (June 1 to October 31), maintenance of the debris nets would involve the re-distribution of material that was side-cast (i.e., excavated and moved outside of the low-flow channel) or stockpiled to the side of the creek during wet season maintenance to re-create the low-flow channel. As described in further detail below, re-distribution of debris during the dry season may involve the temporary installation of a dewatering and stream diversion system and placement of material in a prescriptive fashion between the 2-year flow delineation and 100-year flow delineation. These activities would be directed by a qualified geomorphologist and a qualified biologist.

Photograph 3. *Required maintenance activities would vary depending on the size and total volume of sediment or other debris captured by the debris nets. Minor debris accumulation maintenance would involve the use of hand tools (e.g., picks, shovels, and small hydraulic splitters). If major debris accumulation occurs, maintenance would require the use of heavy construction equipment.*

When the debris nets were originally installed, baseline freeboard measurements were taken in September 2019 to evaluate the cross-sectional freeboard discharge area for each net.[4] Freeboard measurements would

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[4] “Freeboard” is generally defined as a factor of safety usually expressed in feet above a flood level for purposes of floodplain management. "Freeboard" tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the

be made during the dry season each year, before and after the re-distribution of any debris. These freeboard measurements would be used to understand the difference in cross-sectional area from the baseline condition at each of the debris net locations. If excavation is necessary, a qualified geomorphologist and a qualified biologist would be on-site to measure the cross-sectional area to provide the contractor guidance in restoring baseline channel conditions. This data would be used as the baseline data for the following year and would guide future maintenance activities.

As previously described, maintenance activities would be dictated by the frequency, intensity, type, and amount of precipitation or flow events generated in the watershed by any storm. As such, minor debris accumulation maintenance and major debris accumulation maintenance are described below to distinguish activities that would be employed under these scenarios.

Minor Debris Accumulation Maintenance

For minor debris accumulation, a qualified geotechnical engineer and a qualified biologist would evaluate and report the suspected cause of the accumulation event (e.g., the nets were hanging too low above the low-flow channel) and provide an evaluation of the impact to water quality and the natural stream process. Minor maintenance activities would be accomplished using hand tools and materials transported on foot using the existing trail system in the area. These activities would generally include the use of picks, shovels, and small hydraulic splitters to split rock, if necessary, to re-establish the low-flow channel. Chainsaws may also be required for tree trunks and branches. Small amounts of cobbles, fine sediments, and vegetation would be side-cast or stockpiled outside of the active low-flow channel. If such maintenance is required, tree trunks, branches, and vegetation may also be placed in adjacent upland habitat, if recommended by the qualified biologist.

Photograph 4. *Pursuant to the conditions of the original Emergency Permits and Development Plan, parking during construction, maintenance, and removal activities shall not occur at the existing trailheads. Maintenance crews and monitors shall be shuttled to each canyon and shall hike into each debris net location.*

The size of the maintenance crew required for minor maintenance activities would generally average between one and four construction workers per net. All light-duty trucks and other required equipment and materials (e.g., picks, shovels, small hydraulic splitters, chainsaws, straw wattles, silt fencing, and filter fabric) would be staged at paved or previously graded and disturbed off-site locations. Pursuant to the conditions of the original Emergency Permits and Development Plan, parking during construction, maintenance, and removal activities shall not occur at the trailheads. Maintenance crews and monitors shall be shuttled to each canyon and shall hike into each debris net location. Once transported by foot to the debris net locations, all equipment and materials would be staged adjacent to the debris nets, outside of the low-flow channel. Best management practices (BMPs) necessary to minimize downstream turbidity originating from the maintenance activities (e.g., straw wattles, silt fencing, and filter fabric) would be installed prior to the use of picks, shovels, small hydraulic splitters, chainsaws, or any other hand tools or handheld power tools that could result in soil erosion.

The scenario provided below generally describes the required activities and workflow for minor debris accumulation maintenance:

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hydrological effect of urbanization of the watershed. In the case of the debris nets, freeboard is defined as the distance from water surface of the low-flow channel to the bottom of the net, which is required to allow for the passage of water, fine sediment, and fish and wildlife.

Scenario Conditions:

- Multiple winter storms during the wet season cause minor debris accumulation.
- No more than 50 percent the existing freeboard is obstructed (i.e., the distance between the water surface and the bottom of the net).

Wet Season (November 1 – May 31):

- Project team – including a qualified geotechnical engineer and a qualified biologist – inspects the debris nets within 48 hours of a storm event greater than 0.25 inches and documents conditions.
- Project team mobilizes contractor to maintain or re-establish the low-flow channel after storm event when deemed safe.
- Contractor uses hand tools to re-create the pre-storm channel slope and re-establish a minimum freeboard depth of 3 feet over the water surface.
- Contractor moves accumulated material downstream out of the direct flow path as directed by a qualified geomorphologist and a qualified biologist.
- Project team de-mobilizes personnel and equipment prior to next storm event.

Dry Season (June 1 – October 31):

- Project team – including a qualified geomorphologist and a qualified biologist – evaluates if any further debris management is necessary to achieve baseline channel conditions. If required, the following tasks would be performed:
  - Qualified biologist conducts pre-construction fish presence/absence surveys and nesting bird surveys.
  - Project team mobilizes contractor to re-establish a minimum freeboard depth of 3 feet over the water surface using hand tools. (Heavy construction equipment would *not* be required to re-distribute minor debris accumulation.)
  - Qualified biologist document impacts, if any, to vegetation, wildlife, water quality, and natural stream processes.
- Annual Data Collection
  - Project team collects new digital terrain model (DTM) data via aerial drone surveys after the re-distribution of debris to understand the stream's cross-sectional and longitudinal profiles.
  - Project team performs hydraulic modeling to reflect flood inundation areas to new channel morphology.
  - Project team uses new DTM data and flood inundation maps as the baseline data for following year.

Major Debris Accumulation Maintenance

Should the debris nets accumulate enough material to block the low-flow channel, heavy construction equipment would be airlifted to the debris net locations, after it is safe to do so. Light airlift activities would be accomplished using a MD-500 helicopter and heavy lift activities would be accomplished using a CH-47 helicopter. The contractor would use a Spyder excavator or a 10-ton class excavator to remove the debris from the low-flow channel depending on the specific characteristics of the debris flow. The crew size for these activities would average approximately four construction workers per debris net location.

Photograph 5. *In the event of major debris accumulation, heavy construction equipment would be required to remove the large boulders, rocks, tree trunks, branches, and other debris to restore capacity and function of the existing debris nets. (Photograph of captured debris within Camarillo Springs.)*

As described for minor maintenance activities, all light-duty trucks and other required equipment and materials (e.g., picks, shovels, small hydraulic splitters, chainsaws, straw wattles, silt fencing, and filter fabric) would be staged at paved or previously disturbed off-site locations. Maintenance crews and monitors shall be shuttled to each canyon and shall hike into each debris net location. If maintenance crews cannot access the debris net locations by foot, they would be airlifted to the debris net locations along with the required heavy construction equipment and other equipment and construction materials necessary to accomplish the required major maintenance activities.

Once transported to the debris net locations, all heavy construction equipment and other equipment and construction materials necessary to accomplish the maintenance activities would be staged adjacent to the debris nets, outside of the active stream channel. BMPs necessary to minimize downstream turbidity originating from the debris management activities would be installed (e.g., straw wattles, silt fencing, and filter fabric). The ultimate scale and placement of BMPs would be determined in the field following the initial inspection; however, it is assumed that BMP requirements during major debris accumulation maintenance activities involving heavy construction equipment would be much greater than that required for minor debris accumulation maintenance activities involving hand tools.

If a storm event results in accumulation of a substantial volume of debris, the priority would be to re-establish a low-flow channel and a minimum freeboard of 3 feet over the water surface to allow for fish and wildlife passage. Under the direction and supervision of a qualified geomorphologist and a qualified biologist, the contractor would re-establish the low-flow channel upstream of the net using an excavator(s) once stream flows have subsided sufficiently to allow safe access and working conditions. Restoring the low-flow channel to pre-storm elevation would begin from the back of the debris flow working towards the net. The excavators used to accomplish the debris removal would be as small as practicable, but would ultimately be determined in the field following the initial inspection. For example, a Spyder excavator could be used to remove rocks and large volumes of fine sediments; however, a 10-ton class excavator would be required to remove larger debris including large boulders, tree trunks, and large branches.

Photograph 6. *Heavy construction equipment (e.g., Spyder excavator or 10-ton class excavator and conveyor belt system) would be airlifted to via helicopter for major maintenance activities.*

Depending on the characteristics of the debris flow, the debris net may be disconnected from the top support cables and laid on the ground so that the excavator can re-distribute the debris downstream. Under the direction and supervision of a qualified geomorphologist and a qualified biologist, the material excavated during re-establishment of the low-flow channel would be side-cast in a manner that does not impede the low-flow channel and maximizes the potential for habitat restoration. Restoration activities would include maintaining flow conditions within the stream channel, mimicking natural deposition of material, and creating pools and eddies. The distance for re-distribution downstream shall depend on the professional judgment of the qualified geomorphologist and the qualified biologist taking into account the amount of debris and precise channel topography downstream. If a substantial amount of debris has accumulated within the nets and is placing the nets under tension, the qualified geomorphologist and qualified biologist, in consultation with the contractor, may decide in their professional judgment not to disassemble the debris net. In this scenario, the debris would be moved over the debris net by the excavator and would remain within the riparian area.

To re-establish the low-flow channel during the wet season, the helicopter would place the excavator(s) on top of the accumulated debris (i.e., behind the debris net). The excavator would then clear a low-flow channel by excavating through the middle of the debris in the channel and side-casting material against the upstream banks. Restoring the low-flow channel to baseline elevation conditions would begin from the back of the debris flow working towards the debris net. During the excavation of the low-flow channel, a minimum of 3 feet of freeboard would be re-established to maintain terrestrial wildlife passage under the net through the duration of the wet season.

The use of heavy equipment in the wetted portion of the creek between November 1 and May 31 would be limited to clearance and maintenance of a low-flow channel. Distribution of the remaining material accumulated behind the debris net would take place after the rainy season ends and once stream flows recede enough to allow for installation of a temporary dewatering and stream diversion system.

After May 31, the extent of the net freeboard established at each location during the wet season would be returned to the baseline elevations and continued upstream at an appropriate grade, based on the elevation calculations provided by Waterways Consulting, Inc. in September 2019 (see Attachment 2). Excavated material would be placed at a bank slope inclination sufficient to allow the stream flow to meet or exceed baseline flow conditions. After debris flow events, channel morphology is generally dynamic and unstable. In the event the low-flow channel meanders from its original flow path measured at the baseline condition, an alternate low-flow channel may be established with the following conditions: 1) the maximum freeboard measurement must be reestablished at any given location along the debris net; 2) the total area of freeboard must equal or exceed that measured from the baseline conditions.

Photograph 7. *During major maintenance activities, heavy construction equipment and materials would be airlifted to the debris net locations and staged in unvegetated disturbed areas, similar to the original installation activities (as pictured above at Buena Vista Creek).*

The scenario provided below generally describes the required activities and workflow for major debris accumulation maintenance:

<u>Scenario Conditions:</u>

- Baseline terrain and flood inundation data already collected during prior year.
- Multiple winter storms during wet season cause major debris accumulation requiring re-distribution with heavy construction equipment.

<u>Wet Season (November 1 to May 31):</u>

- Project team – including a qualified geotechnical engineer and a qualified biologist – inspects the debris nets within 48 hours of a storm event greater than 0.25 inches and documents conditions.
- Project team mobilizes contractor to create low-flow channel when deemed safe after the storm event.
- Contractor airlifts heavy construction equipment (e.g., Spyder excavator or a 10-ton class excavator) to the debris net locations.
- Beginning from the back of the debris flow and working towards the debris net heavy construction equipment is used to re-create a low-flow channel that reflects pre-storm channel slope and re-establish a minimum freeboard depth of 3 feet over the water surface.

- Accumulated material is moved downstream out of the direct flow path as directed by a qualified geomorphologist and a qualified biologist until the dry season when more extensive maintenance work can be completed.
- Protect team de-mobilizes personnel and equipment prior to next storm event.

Dry Season (June 1 to October 31):

- Qualified biologist conducts pre-construction fish presence/absence surveys and nesting bird surveys.
- Contractor installs temporary dewatering and stream diversion system, if necessary.
- Contractor airlifts Spyder excavator and/or 10-ton class excavator to the debris net location.
- Contractor excavates material from upstream portion of accumulated debris and strategically places debris in accordance with appropriate placement areas – as directed by a qualified geomorphologist and qualified biologist – to re-establish baseline channel conditions and freeboard measurements.
- Project team de-mobilize personnel and equipment prior to October 15.
- Qualified biologist document impacts, if any, to vegetation, wildlife, water quality, and natural stream processes.
- Annual Data Collection
    - Project team collects new DTM data via aerial drone surveys post debris re-distribution to understand the stream's cross-sectional and longitudinal profiles.
    - Project team performs hydraulic modeling to reflect flood inundation areas to new channel morphology.
    - Project team uses new DTM data and flood inundation maps as the baseline data for following year.

Dewatering and Stream Diversion System

If a substantial volume of debris needs to be re-distributed, temporary dewatering may be necessary to ensure that fish and other aquatic or amphibious species are not adversely impacted during the major maintenance activities. Temporary dewatering would involve the contractor – under the supervision of a qualified biologist – installing an upstream diversion with plastic sheeting, sandbags, cofferdam, and diversion pipes to bypass the debris net locations and associated work areas. If necessary, temporary tanks (e.g., Baker Tanks) and pumps may be used during temporary dewatering activities to allow for sediment to settle prior to discharge downstream.[5] Water detained behind the upstream cofferdam would be pumped past the work areas and discharged below the downstream cofferdam. Upstream and downstream exclusion nets would be set in place to ensure no aquatic or amphibious species enter the diversion pipes.

Details regarding the timing and plan specifications for each of the temporary dewatering and stream diversion systems would be developed by the contractor – with guidance from a qualified geomorphologist and a qualified biologist – based on the extent and type of material accumulated as well as the streamflow volume. Dewatering and stream diversion plan sheets would be submitted to the County Planning and Development Department for approval prior to mobilization for major maintenance activities.

Debris Types and Placement

The re-distribution of the material behind the debris nets would depend on the type of material, which can generally be characterized as sediment debris (including larger boulders and rocks) and woody debris (including tree trunks and branches).

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[5] Baker Tanks are used to store large volumes of liquid on-site within a small footprint. These rental storage tanks are commonly used for a variety of construction activities involving dewatering, wastewater, and slurries.

Photograph 8. *Major maintenance events with major debris may require removal of large boulders using hydraulic splitters and excavators.*

Sediment Debris: Sediment debris varies in size and would generally include fine sands, dirt, gravels, cobbles, and large boulders or rocks. Selective distribution of sediment would depend on the size of material and sorting capabilities of the contractor and equipment. For the purposes of describing the proposed maintenance activities, sediment sizes have been broken up into three categories based on physical and biological process considerations: 1) fine material (less than 6 millimeters [mm] in diameter); 2) bedload material (e.g., gravel to large boulders); and 3) immobile material. These classifications are based on the equipment used by the contractor and the effect of the material on natural stream processes as well as aquatic and amphibious species – the primary intent being to retain spawning gravels within the channel for the federally endangered Southern California steelhead (*Oncorhynchus mykiss irideus*). Bedload material is classified as sediment from 6 mm up to any size that would not be mobilized under the 2-year flow event threshold. Immobile material is classified as any material that could not be re-distributed using an excavator.

> Fine Material: The contractor would use various sifts or screens to sort the fine material at the debris net locations prior to re-distribution. (While sorting the fine material would result in additional disturbance at the debris net locations during the initial phases of debris re-distribution, it would limit disturbance at the receiver sites.) Following sorting, the fine material would be re-distributed outside the 2-year flow delineation and below the 100-year flow delineation. Placing fine material within the 100-year flow delineation would allow for the material to be re-mobilized during a higher flow events and carried downstream, ultimately to the beach.
>
> Bedload Material: Bedload material would be re-distributed – under the direction and supervision of a qualified geomorphologist and a qualified biologist – anywhere within the 100-year flow delineation, with preference given to areas inside the 2-year flow delineation. Placement of some large rocks below the 2-year flow delineation would promote aggradation, which would benefit the channel morphology in areas that have experienced major incision.[6] Additionally, placement of suitable material below the 2-year flow delineation would keep habitat forming features (e.g., small boulders, cobbles, etc.) in the channel. If larger material is placed outside the 2-year delineation, it would take longer to mobilize and has the potential to promote further incision in the stream channel before being re-mobilized at a lower probability high flow event (i.e., 10-year to 100-year events). Large rocks would be placed at the toe-slopes of the creek banks to promote bank stabilization, encourage riparian cover, and create roughness elements that slow flood flows, allow establishment of habitat, and reduce overall flood potential.
>
> Immobile Material: Large boulders that cannot be lifted by the excavator would be broken in place using hydraulic splitters or a hydraulic excavator-mounted hammer to enable management with the excavator. The materials would then be placed according to size, or as otherwise directed by a qualified geomorphologist and a qualified biologist.

Woody Debris: Woody debris is considered large pieces of organic materials (i.e., woody, plant-based materials) including tree trunks, branches, or uprooted trees and shrubs. If large pieces of woody debris are

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[6] Aggradation to fill or rise in the level of a streambed due to the deposition of sediment. Aggradation typically occurs in areas where the supply or sediment exceeds the rate at which system can transport the material downstream.

present and would prevent the re-establishment of the low-flow channel, the large pieces would be cut into smaller 3-foot sections and placed downstream of the net above the 2-year flow delineation or in an upland location as directed by a qualified biologist.

Transport of Accumulated Material to Receiver Sites

Material that accumulates behind the nets must be transported upstream or downstream of the nets to appropriate receiver sites. The method of transport would depend upon the type, size, and quantity of material that is present. For example, side-casting of material above the 2-year delineation in upstream locations and in close proximity to the debris nets, would likely require a Spyder excavator or 10-ton class excavator and/or a conveyor belt system. If necessary, a helicopter may be used to transport debris to receiver sites downstream that are too far for conveyor belts systems or for heavy equipment to travel within the stream channel.

Required Avoidance and Minimization Measures

The Applicant shall continue to comply with the conditions the Emergency Permits and Development Plan. For example, the Findings and Conditions of Approval of the Montecito Planning Commission Action Letter for Development Plan Case No. 19DVP-00000-00005, include reference to the following conditions of approval, among others, for the minor debris accumulation and major debris accumulation maintenance activities:

4. Parking during construction, maintenance, and removal activities shall not occur in tailhead parking areas by construction crews or biological monitors. Crews and monitors shall be required to be shuttled to each canyon and walk into each net location.
5. All heavy construction equipment shall be airlifted to each net location for construction and installation, maintenance, and removal. Heavy machinery and/or vehicles shall not be permitted on trails used to access the canyon sites by foot.
6. If trails are temporarily closed during construction, maintenance, or removal activities, the Applicant shall coordinate with the Montecito Trails Foundation and Parks Division of the Community Services Department to ensure adequate noticing has occurred in the Montecito community.
8. **CulRes-09 Stop Work at Encounter.** The Owner/Applicant and/ their agents, representatives, or contractors shall stop or redirect work immediately in the event archaeological remains are encountered during grading, construction, landscaping, or other construction-related activities. The Owner/Applicant shall immediately contact the P&D staff, and retain a P&D approved archaeologist and Native American representative to evaluate the significance of the find in compliance with the provisions of the County Archaeological Guidelines and conduct appropriate mitigation funded by the Owner/Applicant.
9. **Bio-08 Fish and Wildlife** No work authorized by this development Plan shall commence until the Owner/Applicant demonstrates receipt of all authorization from the California Department of Fish and Wildlife, and the Regional Water Quality Control Board for any planned alternation to stream channels or banks.

Additionally, all measures identified in the Biological Resources Assessment (see Attachment 3), including Site Specific and Sensitive Habitat Avoidance and Minimization Measures, General Construction Avoidance and Minimization Measures, and the Invasive Plant Management Program shall be implemented during the proposed maintenance activities.

Required Permits and Approvals

In addition to the required approval of the Development Plan by the County Planning and Development Department, the proposed Project would also be subject to review and approval by agencies with jurisdiction over resources that might be affected by the proposed Project. The Applicant submitted a Section 404 permit application to USACE and a Section 401 Water Quality Certification to the Central Coast RWQCB for the proposed Project in compliance with the Clean Water Act (CWA). However, on April 13, 2020, USACE sent a letter notifying the Applicant that USACE would not be regulating the proposed maintenance activities under Section 404 of the CWA at this time. Per regulatory guidance provided by Central Coast RWQCB, the Applicant withdrew the Section 401 Water Quality Certification application and shall reapply if and when re-distribution of material becomes necessary and the USACE makes a determination if/how to regulate these activities under Section 404. If activities are required that do not trigger a Section 404 permit, then the Applicant may still be required to submit a Report of Waste Discharge in order to obtain Waste Discharge Requirements (WDRs) under the Porter-Cologne Water Quality Control Act for discharges to Waters of the State. (Personal Communication between Suzanne Elledge, Agent, and Mark Cassady, Environmental Scientist, Central Coast RWQCB).

2.0 PROJECT LOCATION

The six Geobrugg flexible debris nets are located in the Santa Ynez Mountains within Cold Springs Canyon, San Ysidro Canyon, and Buena Vista Canyon, to the north (i.e., upstream) of the community of Montecito. The debris nets at Cold Springs Canyon are located approximately 0.25 miles from the Cold Springs Trailhead on East Mountain Drive near the fork in the West and East Cold Spring Trails. SY-18 is located approximately 0.4 miles from the San Ysidro Trailhead on East Mountain Drive, and SY-7a is located approximately 1.7 miles from the trailhead near the San Ysidro Trail where San Ysidro Creek splits into three tributaries. BV-4 is located approximately 0.5 miles from the Buena Vista Trailhead on Park Lane near where the Buena Vista Trail splits and meets the Edison Catway, and BV-10 is located approximately 0.3 miles from the Buena Vista Trailhead (refer to Table 1 and Figure 1).

The two debris nets in Cold Springs Canyon are located on Assessor Parcel Numbers (APNs) 011-010-027 and 011-010-028; the two debris nets in San Ysidro Canyon are located on APNs 151-180-019 and 007-020-003; and the two debris nets in Buena Vista Canyon are located on APN 007-020-009. Table 3 summarizes additional site information, including County Comprehensive Plan designation, zoning, and access for each of the debris net locations.

Table 3. Site Information

Comprehensive Plan Designation	County of Santa Barbara: Rural Area, Montecito Community Plan Area CS-11 (APN 011-010-027): MA-100 (Mountainous Area, 100-acre minimum parcel size) CS-18 (APN 011-010-028): MA-100 (Mountainous Area, 100-acre minimum parcel size) SY-7a (APN 151-180-019): MA-320 (Mountainous Area, 320-acre minimum parcel size) SY-18 (APN 007-020-003): MA-40 (Mountainous Area, 40-acre minimum parcel size) BV-4 and BV-10 (APN 007-020-009): MA-320 (Mountainous Area, 320-acre minimum parcel size)

Zoning District / Ordinance	**Ordinance**: Montecito Land Use and Development Code **Zone**: CS-11 (APN 011-010-027): RMZ-100 (Resource Management, 100-acre minimum parcel size) CS-18 (APN 011-010-028): RMZ-100 (Resource Management, 100-acre minimum parcel size) SY-7a (APN 151-180-019): RMZ-320 (Resource Management, 320-acre minimum parcel size) SY-18 (APN 007-020-003): RMZ-40 (Resource Management, 40-acre minimum parcel size) BV-4 and BV-10 (APN 007-020-009): RMZ-320 (Resource Management, 320-acre minimum parcel size)
Site Size	CS-11 (APN 011-010-027): 43.24 acres CS-18 (APN 011-010-028): 77.57 acres SY-7a (APN 151-180-019): 358.25 acres SY-18 (APN 007-020-003): 79.43 acres BV-4 and BV-10 (APN 007-020-009): 239.50 acres
Present Use / Development	Los Padres National Forest land, undeveloped area, public trails
Surrounding Uses/Zoning	<u>CS-11 (APN 011-010-027)</u> **North**: Undeveloped; RMZ-40 (Resource Management, 40-acre minimum parcel size) **South**: Residential development; 3-E-1 (Single Family, 3-acre minimum parcel size) **East**: Undeveloped; RMZ-100 (Resource Management, 100-acre minimum parcel size) **West**: Undeveloped; RMZ-100 (Resource Management, 100-acre minimum parcel size) <u>CS-18 (APN 011-010-028)</u> **North**: Undeveloped; RMZ-320 (Resource Management, 320-acre minimum parcel size) and RMZ-40 (Resource Management, 40-acre minimum parcel size) **South**: Residential development; 3-E-1 (Single Family, 3-acre minimum parcel size) **East**: Undeveloped; RMZ-100 (Resource Management, 100-acre minimum parcel size)

	West: Undeveloped; RMZ-100 (Resource Management, 100-acre minimum parcel size) SY-7a (APN 151-180-019) **North**: Undeveloped; RMZ-320 (Resource Management, 320-acre minimum parcel size) **South**: Undeveloped; RMZ-40 (Resource Management, 40-acre minimum parcel size) **East**: Undeveloped; RMZ-320 (Resource Management, 320-acre minimum parcel size) **West**: Undeveloped; RMZ-320 (Resource Management, 320-acre minimum parcel size) SY-18 (APN 007-020-003) **North**: Undeveloped; RMZ-320 (Resource Management, 320-acre minimum parcel size) **South**: Undeveloped; RMZ-40 (Resource Management, 40-acre minimum parcel size) **East**: Undeveloped; RMZ-100 (Resource Management, 100-acre minimum parcel size) **West**: Undeveloped; RMZ-40 (Resource Management, 40-acre minimum parcel size) BV-4 and BV-10 (APN 007-020-009) **North**: Undeveloped; RMZ-320 (Resource Management, 320-acre minimum parcel size) **South**: Residential development; RMZ-40 (Resource Management, 40-acre minimum parcel size) **East**: Undeveloped; RMZ-40 (Resource Management, 40-acre minimum parcel size) and RMZ-100 (Resource Management, 100-acre minimum parcel size) **West**: Undeveloped; RMZ-40 (Resource Management, 40-acre minimum parcel size) and RMZ-100 (Resource Management, 100-acre minimum parcel size)
Access	Public trails run parallel to the creek corridors within the canyons adjacent to each of the debris net locations; however, there are no paved pathways or roads. Maintenance crews and monitors shall be shuttled to each canyon and shall hike into each debris net location. Heavy construction equipment and materials would be airlifted to the debris net locations by helicopter.
Public Services	Water Supply: Montecito Water District (No water lines / connections) Sewage: Montecito Sanitary District (No sewer lines / connections) Fire: Montecito Fire Protection District Law enforcement: County of Santa Barbara Sheriff's Department

3.0 ENVIRONMENTAL SETTING

Physical Setting

The Project site is located to the north (i.e., upstream) of the community of Montecito, within the Montecito Community Plan Area (refer to Table 3). The Montecito Community Plan Area is situated between the Pacific Ocean and foothills of the Santa Ynez Mountain Range, bounded by East Camino Cielo Road and the Los Padres National Forest to the north, the City of Santa Barbara to the west, the unincorporated communities of Summerland and Toro Canyon to the east, and the Pacific Ocean to the south.

The Montecito region experiences a Mediterranean climate with mild, moist winters and warm, dry summers. A heavy marine layer or fog is often present in late spring and early summer mornings. Temperatures in the region are relatively mild, with an average maximum temperature of 75 degrees Fahrenheit (ºF) in August and September and an average minimum temperature of 40 ºF in December and January (Western Regional Climate Center [WRCC] 2018). Average annual precipitation is 16.34 inches, with the majority of that occurring between the months of October and April.

Slope and Topography

The slopes at all debris net locations are generally steep and the stream channels themselves are deeply eroded and scoured from the debris flow on January 9, 2018. At Cold Springs Canyon, the debris nets are located in a part of the canyon with elevations ranging from approximately 1,300 to 1,600 feet above mean sea level (amsl) with 50- to 75-percent slopes on adjacent hillsides. At San Ysidro Canyon, the SY-7a is located at elevations ranging from approximately 1,400 to 1,800 feet amsl with 50- to 100-percent slopes on adjacent hillsides. SY-18 is located slightly downstream at elevations ranging from approximately 1,000 to 1,200 feet amsl with 50-75 percent slopes on adjacent hillsides. At Buena Vista Canyon, the debris nets are located in a part of the canyon with elevations from approximately 1,000 to 1,200 feet with 50- to 75-percent slopes on adjacent hillsides (USGS 2020; U.S. Department of Agriculture [USDA] 2020).

As described further in the Debris Distribution and Net Management Plan (SES and South Coast Habitat Restoration [SCHR] 2020; see Attachment 2), Sandshed conducted baseline aerial, photogrammetric surveys of Cold Spring, San Ysidro, and Buena Vista Creeks September 4-6, 2019 using an unmanned aerial vehicle (UAV). The resulting baseline DTMs provide high-resolution three dimensional data that show each of the stream's cross-sectional and longitudinal profiles. These profiles were used to determine the area of debris distribution and analyze the change (i.e., degradation or aggradation of material) in stream morphology over time.

Flora and Fauna

A Biological Resources Assessment was originally prepared by SES in October 2018 and revised in January 2019 (SES 2019; see Attachment 3). The assessment, which included a literature review and two field surveys conducted in September and December 2018, was intended to: 1) provide a general characterization of existing conditions at each of the debris net locations; 2) inventory plant and wildlife species; 3) evaluate the potential for federally listed or State-listed plants and wildlife species or other special-status species afforded regulatory protection at the debris net locations; 4) map special-status plant and wildlife populations; 5) delineate jurisdictional waters; 6) quantify and describe potential impacts to biological resources that may occur as a result of the installation

Photograph 9. *Much of the vegetation communities at the debris net locations are currently in early successional stages as they continue to recover from the debris flows. However, some areas of arroyo willow (*Salix lasiolepis*) are present within and adjacent to the creek channels including Buena Vista Creek (pictured above).*

and maintenance of the debris nets; and 7) make recommendations to reduce impacts to existing vegetation and sensitive communities.

As described in the Biological Resources Assessment (SES 2019; see Attachment 3), coast live oak woodland, arroyo willow thickets, and other riparian habitats (e.g., western sycamore woodland and California bay forest) are present within the creek corridors as well as the debris net locations. These habitat types are considered to be valuable biological resources and are classified as Environmentally Sensitive Habitat (ESH) pursuant to the County's Environmental Thresholds and Guidelines Manual (County of Santa Barbara 2018). Individual mature coast live oak trees (6 inches or greater diameter at breast height) are also provided protection by the Comprehensive Plan Conservation Element Oak Tree Protection Supplement (2009).

Two special-status plant species, Plummer's baccharis (*Baccharis plummerae* ssp. *plummerae*) and ocellated Humboldt lily (*Lilium humboldtii* ssp. *ocellatum*), were observed within the stream corridors during the field surveys. Plummer's baccharis was observed in close proximity to the debris net locations in Cold Springs Canyon and San Ysidro Canyon (CS-11 and SY-7a). Suitable habitat for two additional special-status plant species, umbrella larkspur (*Delphinium umbraculorum*) and Ojai fritillary (*Fritillaria ojaiensis*), was also present in all of the stream corridors as well as all of the debris net locations.

The field surveys enabled a characterization of habitat quality and assessment of potential for occurrence of special-status wildlife species including, but not limited to, Southern California steelhead, California red legged frog (*Rana draytonii*), coast range newt (*Taricha torosa torosa*), southwestern pond turtle (*Actinemys pallida*), two-striped garter snake (*Thamnophis hammondii*), and Cooper's hawk (*Accipiter cooperii*). No special-status wildlife species were observed during the field surveys. However, 19 special-status wildlife species have the potential to occur within the vicinity of the debris net locations (see Table 4). Potential for nesting, roosting, or foraging by sensitive bird species, including various species of raptors was also assessed during the surveys.

Photograph 10. *Federally endangered Southern California steelhead are known to occur downstream of the debris net locations; however, there is little or no possibility of incidental take due to the presence of existing barriers that prevent upstream migration.*

Archaeological Sites

A Phase I Cultural Resources Survey – including a records search and an intensive ground surface survey – was conducted for the proposed Project to determine the potential for historic built resources or buried archaeological resources to be adversely impacted by the proposed Project. An archaeological site records and literature search of the California Historical Resources Information System (CHRIS) Central Coast Information Center (CCIC), University of California, Santa Barbara, was conducted on August 20, 2020. The records search identified all previously conducted cultural resource surveys and any known archaeological sites located within a 0.5-mile buffer around each of the six debris nets. The search found that the areas around four of the debris nets had not previously been investigated, and that the area around the two nets at Cold Springs Canyon (CS-11 and CS-18), had been previously investigated eight times. Two prehistoric archaeological sites, one historic-period archaeological site, and one archaeological site with a prehistoric and historic component have been recorded within the 0.5- mile radius of CS-11 and CS-18. However, there are no prehistoric or historic-period archaeological resources recorded within the stream channel or immediately adjacent upland areas that would be affected by the proposed maintenance activities. On August 1 and 3, 2020, an intensive ground surface survey was conducted at all six debris net locations including the areas 50 feet upstream and downstream of the debris nets. No previously unrecorded prehistoric or historic-period resources were identified during this survey (see Section 4.5, *Cultural Resources*). Nevertheless, as described in *Required Avoidance and Minimization Measures*, as a condition of approval for the Development Plan, the contractor shall stop or redirect work immediately in the event archaeological remains are encountered during maintenance activities. Ground disturbances in this location would be immediately suspended and redirected outside of the immediate area of the find. A County-qualified archaeologist would prepare a plan to characterize the nature, extent, and significance of the cultural materials, to be reviewed and approved by the County. All archaeological investigations would be undertaken consistent with the *County of Santa Barbara Cultural Resource Guidelines* (see Section 4.5, *Cultural Resources*). If the cultural resources are determined to be significant, a mitigation plan would be prepared and conducted by a County-qualified archaeologist subsequent to review and approval by the County. All excavations would be monitored by a local Chumash tribal observer.

Geology and Soils

As part of the response to the debris flow on January 9, 2018 KANE GeoTech, Inc. was retained by the Applicant to provide engineering design and construction oversight for the installation of the debris nets. The first phase of their assessment began with a general overview of existing conditions in the canyons (KANE GeoTech, Inc. 2018; see Attachment 1). KANE GeoTech, Inc. conducted an initial aerial assessment of the canyons by helicopter, which was followed by a 4-month long field investigation from May to September 2018.

The Santa Ynez Mountains are a part of the Transverse Ranges of Southern California. As described further in the General Report of Findings (KANE GeoTech, Inc. 2018; see Attachment 1) bedrock within the Santa Ynez Mountains is almost entirely composed of interbedded sandstone and shale strata. These beds exhibit differential weathering causing large, blocky sandstone overhangs seen throughout the area. The blocks eventually weather and fall, resulting in sandstone boulders of various sizes that collect within the drainages. The bedding dip varies throughout the site and is governed by the extensive folding and faulting in the area. The Mission Ridge Fault is located in the western area of Montecito, while the extensive Santa Ynez Fault runs along the entire width of the Santa Ynez Mountain above Montecito (KANE GeoTech, Inc. 2018).

The Santa Ynez Mountains are covered in Quaternary alluvial deposits including flood plain deposits and large, prominent alluvial fan resulting from earlier debris flow events (KANE GeoTech, Inc. 2018). The soils at CS-11, CS-18, SY-7, and BV-11 are made up of stony fine sandy loam at shallow depths, and loam and unweathered bedrock at deeper depths (USDA 2020). The soils at SY-18 and BV-8 are largely similar, but with more unweathered bedrock (USDA 2020).

Surface Water Features

Montecito is located with the Mission Creek-Front Santa Barbara Channel watershed (Hydrologic Unit Code [HUC] 180600130203), which spans approximately 110 square miles, including the front country of the Santa Ynez Mountains to the Pacific Ocean from Goleta Slough to Summerland (U.S. Environmental Protection Agency [USEPA] 2020). The existing debris nets are located within four delineated drainages depicted as "blue-line streams" on the Santa Barbara and Carpinteria USGS 7.5-minute quadrangles.[7] All four drainages originate on and drain the south slopes of the Santa Ynez Mountains, ultimately outletting into the Pacific Ocean.


Photograph 11. *The existing drainages, including Buena Vista Creek (pictures above) are perennial, with surface water generally flowing throughout the year.*

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[7] A blue-line stream is any stream shown as a solid or broken blue line on 7.5 Minute Series quadrangle maps prepared by the USGS. A blue-line stream is a body of concentrated flowing water in a natural low are or natural channel on the land surface and may be any creek, stream or other flowing water feature, perennial or ephemeral, indicated on USGS quadrangle maps, with the exception of man-made watercourses.

Most of the upper reaches of drainages are located within the Los Padres National Forest. However, the lower, more urban segments of the drainages are in private ownership. Each of the drainages are perennial, sustaining surface flows for some or all of their length, particularly in upper reaches, throughout the years characterized by average rainfall. With the exception of one location in a tributary to Buena Vista Creek (BV-11), all of the creeks evaluated in the Biological Resources Assessment had active flow in the channel during the September and December 2018 surveys (SES 2019). These drainages were burned in the Thomas Fire in the December 2017 and the condition of the hillside and riparian corridor vegetation reflects early succession. The drainages were further impacted by the debris flow that occurred on January 9, 2018, which significantly altered the channel morphology by deeply scouring channel beds to depths as low as 15 to 30 feet below previous elevations.

As described further in the Biological Resources Assessment (SES 2019; see Attachment 3), SES conducted a wetland delineation at each of the debris net locations. Pursuant to Section 401 of the CWA, the limit of USACE jurisdiction in non-tidal waters extends to the Ordinary High Water Mark (OHWM) and includes all adjacent wetlands. The OHWM is an element used to identify the lateral limits of non-wetland waters based on stream geomorphology and vegetation response to the dominant stream discharge (Lichvar and McColley 2008). Due to the debris flow on January 9, 2018, the stream channels were highly altered from what would be considered typical or "ordinary", and indicators of high water were not always evident or reliable. "Ordinary high water" implies flow levels that are above average, but less than extreme, that occur with some regularity (USACE 2008). Therefore, the approximate OHWM was established at each net location using physical marks on the landscape (e.g., drainage patterns, topographic breaks in slope, changes in sediment characteristics, etc.) that represented a reasonable judgement of water levels at "above average, but not extreme" levels.

SES also mapped the approximate top-of-bank (TOB) at the debris net locations, which corresponds to the extent of CDFW jurisdiction. The stream banks and canyon walls at the majority of the proposed debris net locations were steeply incised and most of the vegetation along the slopes was burned in the Thomas Fire. Therefore, the TOB was mapped using obvious topographic changes and ridgelines as boundaries. In many locations the TOB was well above the stream channel (i.e., 30 to 50 feet) and was mapped with the greatest accuracy possible.

Table 4. Summary of Stream Characteristics at the Debris Net Locations

Net Location and Name	Approximate Width of Active Flow in Channel	Approximate Depth of Flow in Channel	Approximate Width of Channel at OHWM
Cold Spring Creek			
CS-11	16 inches to 3 feet	1 to 6 inches (intermittent ponds)	7 to 12 feet
CS-18	8 inches to 2 feet	1 to 2 inches	6 to 12 feet
San Ysidro Creek			
SY-7a	14 inches to 4 feet	2 to 6 inches	10 to 25 feet
SY-18	2 to 6 feet	1 to 6 inches (intermittent ponds)	12 to 20 feet
Buena Vista Creek			
BV-4	6 inches to 3 feet	1 to 5 inches (intermittent ponds)	10 to 20 feet
BV-10	1 to 5 feet	2 to 10 inches (intermittent ponds	5 to 16 feet

Note: Measurements taken by SES during the field surveys in September and December 2018.
Source: SES 2019; see Attachment 3.

As described further in the Debris Distribution and Net Management Plan (SES and SCHR 2020; see Attachment 2) Waterways Consulting, Inc. used the DTMs provided by Sandshed to create a two-dimensional hydraulic model of each net location using the Hydrologic Engineering Center's River Analysis System (HEC-RAS) (USACE 2019). HEC-RAS utilized data from each debris net location to simulate the timing and magnitude of flow characteristics. The hydrology of each debris net located was generated using the USGS StreamStats online software (USGS 2019) to estimate both the 2-year and the 100-year flow delineations.

Surrounding Land Uses and Existing Structures

No residences, roads, or other urban development are located adjacent to the debris nets; the nearest residences and roads are located 0.25 miles from the debris nets, often further. The debris nets are all located in areas zoned for Resource Management, with parcels of 100 acres and larger (refer to Table 3). Surrounding areas are generally rural and undeveloped, with development limited to narrow single-track hiking trails that generally run parallel to the stream corridors within the canyons. As described in Section 2, *Project Location*, the debris nets at Cold Springs Canyon are located approximately 0.25 miles from the Cold Springs Trailhead on East Mountain Drive near the fork in the West and East Cold Spring Trails. SY-18 is located approximately 0.4 miles from the San Ysidro Trailhead and SY-7a is located approximately 1.7 miles from the trailhead near the San Ysidro Trail where San Ysidro Creek splits into three tributaries. BV-4 is located approximately 0.5 miles from the Buena Vista Trailhead on Park Lane near where the Buena Vista Trail splits and meets the Edison Catway, and BV-10 is located approximately 0.3 miles from the Buena Vista Trailhead (refer to Table 1 and Figure 1).

Cumulative Projects

The community of Montecito is continuing to rebuild following the damage that occurred from the debris flows on January 9, 2018. Homes along East Mountain Drive and other area roadways proximate to the debris net locations are being actively repaired or reconstructed, along with ongoing repairs to roadways, bridges, and other public infrastructure in the area. In addition, the Santa Barbara County Flood Control & Water Conservation District. is pursuing expansion of several flood detention basins such as that along Cold Springs Creek, located approximately 0.25 miles downstream of the debris net locations within Cold Springs Canyon. As such, if maintenance of the debris nets is required it would overlap with other planned and pending private and public construction activities and associated vehicles and equipment, earth disturbance, and noise proximate to public roads, trailheads, and trails at or near debris net locations.

Environmental Baseline

The baseline from which environmental impacts are assessed consists of the physical environmental conditions near the debris net locations, as described above. Additional baseline information is included as appropriate for each of the environmental issue areas discussed within Sections 4.1 to 4.15 below.

4.0 POTENTIALLY SIGNIFICANT EFFECTS CHECKLIST

The following checklist indicates the potential significance of the identified environmental impacts resulting from the proposed Project, which is defined as follows:

Potentially Significant Impact: A fair argument can be made, based on the substantial evidence in the record, that an environmental impact resulting from the proposed Project may be significant and unavoidable.

Less Than Significant Impact with Mitigation: The proposed Project may result in a potentially significant and unavoidable impact; however, with the incorporation of feasible mitigation measures this impact would be reduced to a less than significant impact.

Less Than Significant Impact: The proposed Project may result in an adverse environmental impact; however, the impact would not exceed the County's thresholds of significance established in the Environmental Thresholds and Guidelines Manual (County of Santa Barbara 2018).

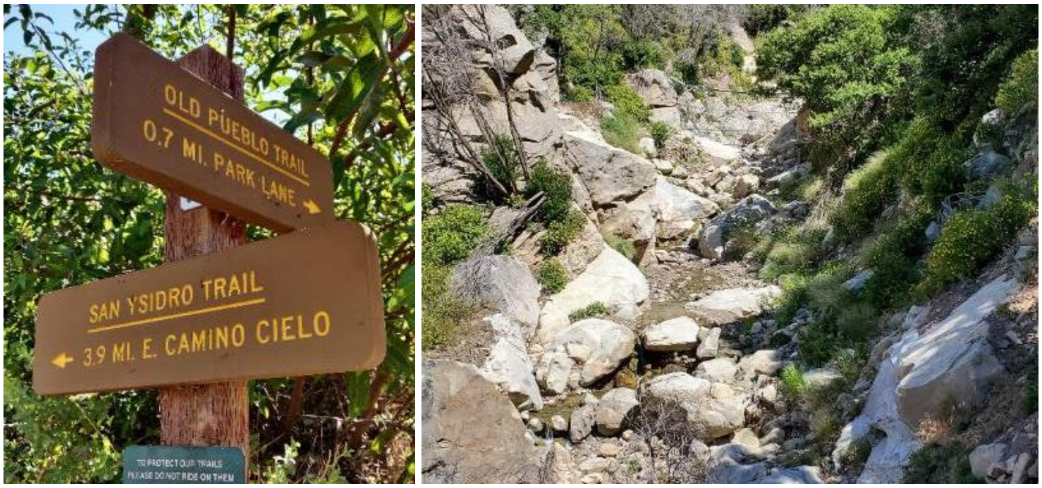
No Impact: There is adequate support in the information referenced in or appended to the impact analysis to demonstrate that the proposed Project would result in no measurable impact or the County's threshold of significance simply does not apply.

Reviewed Under Previous Document: The analysis contained in a previously adopted/certified environmental document addresses this issue adequately for use in the current case and is summarized in the discussion below. The discussion should include reference to the previous documents, a citation of the page(s) where the information is found, and identification of mitigation measures incorporated from the previous documents.

4.1 AESTHETICS/VISUAL RESOURCES

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
a. The obstruction of any scenic vista or view open to the public or the creation of an aesthetically offensive site open to public view?			X		
b. Change to the visual character of an area?			X		
c. Glare or night lighting which may affect adjoining areas?				X	
d. Visually incompatible structures?				X	

Existing Setting: The debris nets are located in the Santa Ynez Mountains within Cold Springs Canyon, San Ysidro Canyon, and Buena Vista Canyon. The stream channels at these locations are surrounded by steep canyon walls and vegetation ranging from early successional chapparal and oak woodland habitats to densely wooded oak and bay forests (see Section 4.4, *Biological Resources*). The debris nets are surrounded by undeveloped parcels with the nearest residences, roads, and urban development located at distance of at least 0.25 miles. As such, the debris nets are not visible from any residences, roadways, or public parks; however, the debris nets are visible from adjacent public trails that parallel the stream (refer to Section 2, *Project Location*).



Photograph 12. *The debris nets are visible for short periods along the trails that parallel the stream, including the San Ysidro Trail (pictured above). However, with the exception of limited areas where the trails pass directly adjacent to the debris nets, views of the debris nets are generally in the mid-ground to background. Due to the transparency of the steel rings, the debris nets generally blend into the existing environment and do not distract from the overall views of the canyons upstream or downstream.*

County Environmental Thresholds. The County's Visual Aesthetics Impact Guidelines classify coastal and mountainous areas, the urban fringe, and travel corridors as "especially important" visual resources. A project may have the potential to create a significantly adverse aesthetic impact if (among other potential effects) it would impact important visual resources, obstruct public views, remove significant amounts of vegetation, substantially alter the natural character of the landscape, or involve extensive grading visible from public areas.

Impact Discussion:

a) ***Less than Significant***. Minor maintenance activities would involve the transportation of hand tools and construction materials by foot using the existing trail system. Maintenance would generally involve the use of picks, shovels, small hydraulic splitters, and chainsaws. BMPs could include the limited use of straw wattles, silt fencing, and filter fabric to control potential soil erosion. The maintenance crew, consisting of between one and four construction workers in high visibility safety vests, would be visible to trail users along short segments of the trails; however, maintenance activities would generally occur over a limited area and for a short period of time (e.g., generally over a period less than 2 weeks).

In contrast, major maintenance activities would involve the use of a helicopter to transportation heavy construction equipment and materials to the debris nets. The helicopters would fly over the canyons to reach the drop off locations adjacent to the debris nets. Helicopter operations would be visible to trail users, drivers on local roads (e.g., East Mountain Drive), and nearby residents due to their suspended loads as well as the noise associated with flight or hovering at the drop-off locations near the debris nets. In addition to the maintenance crew, heavy construction equipment (e.g., Spyder excavator and/or 10-ton class excavator) would also be visible from the trails. However, in the event of a debris flow that would trigger major maintenance activities, the trails may be damaged, closed, and/or less frequently used due to inclement conditions, access, and safety concerns. Additionally, as described in the Comprehensive Plan consistency analysis associated with Development Plan Case No. 19DVP-00000-00005, the Applicant would have monitors on the trails near the debris net locations that would hold trail users for minutes at a time in order for helicopters to safely drop equipment and construction materials. The monitors would have radios for communications to ensure safety and to reduce the time of impacts on any recreational trail (see Section 4.13, *Recreation*).

Given that no major maintenance activities have been required since the original installation of the nets in April and September 2019, it is anticipated that maintenance activities would be limited in frequency. If required, maintenance activities would be visible from the trails; however, these activities would not *obstruct* any designated scenic vista or create a permanent aesthetically offensive site open to public view with trail users viewing this disturbance for only several minutes while passing the debris nets. During minor maintenance activities, visual distractions along the trail would be limited to a crew of between one and four construction workers in high visibility safety vests. During major maintenance activities visual distractions would also include helicopter operations as well as heavy construction equipment. However, each of these activity types would be temporary and would only affect a limited area in close proximity to the debris nets – including the debris flow behind the debris nets and the downstream receiver sites. Additionally, the maintenance activities would restore the overall visual character of the channel, which would otherwise be affected by debris that could include large swaths of

Photograph 13. *Minor maintenance activities would involve a crew of between one and four personnel that would be visible for short periods along the trails paralleling the creek. These maintenance activities would look similar to the original installation activities pictured above.*

sediments within the channel. Given the limited duration and frequency of maintenance activities and the implementation of avoidance and minimization measures described in the Biological Resources Assessment (e.g., limitation of equipment and construction materials to the designated work and staging areas, required daily removal of trash and food items, etc.) the potential impacts to scenic vistas from net maintenance would be less than significant.

b) ***Less than Significant***. Although maintenance activities would involve the presence of one to four construction workers in high visibility safety vests, hand tools, handheld power tools, and BMPs, these activities would be of limited frequency and duration. Additionally, the more intensive major maintenance activities – involving the use of helicopters and heavy construction equipment – would only occur if debris was blocking the low-flow stream channel. Removing the debris from the debris nets and re-distributing it downstream could improve the overall visual character of the canyons following a storm event that triggers a large debris flow. While maintenance activities would be temporarily visible to trail users, visual resources along the majority of the trail would remain unimpaired and these activities would not unduly distract from the natural open space characteristics of the canyons and the surrounding mountainous topography. Therefore, impacts to the visual character of the canyons would be infrequent, short-term, and less than significant.

c-d) ***No Impact.*** Except in the event of emergencies (e.g., search and rescue or responses to other active public safety hazards), minor and major maintenance activities would be restricted to daytime hours and would not result in any sources of daytime glare or nighttime light impacts. Further, no new temporary or permanent structures are proposed that would generate daytime glare or nighttime light or could be otherwise visually incompatible. As such, there would be no impacts as a result of the proposed Project.

Cumulative Impacts: As previously described, implementation of the proposed maintenance activities would not obstruct any scenic vistas or otherwise result in any permanent changes to the visual character of the canyons. Additionally, given that the infrequent nature and short duration of the proposed maintenance activities, the proposed Project would be consistent with Montecito Community Plan Policy VIS-M-2.1, which states that "…lands which should be preserved in open space for scenic value include road-side turnouts, stream channels, equestrian and hiking trails, and mountainous areas." The maintenance activities would not be readily visible to trail users from the majority of the surrounding trail system and would only be visible to trail users for brief interval. Therefore, when considered with other cumulative projects in the region – including reconstruction efforts associated with the debris flows – the proposed maintenance activities would not contribute to a cumulatively considerable effect on aesthetics.

Mitigation and Residual Impact: No mitigation measures required. Residual impacts associated with the proposed maintenance activities would remain less than significant.

4.2 AGRICULTURAL RESOURCES

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
a. Convert prime agricultural land to non-agricultural use, impair agricultural land productivity (whether prime or non-prime) or conflict with agricultural preserve programs?				X	
b. An effect upon any unique or other farmland of State or Local Importance?				X	

Existing Setting: Neither the debris net locations nor any of the surrounding areas are designated or zoned for agricultural operations (refer to Table 3). The debris net locations are installed within the bedrock of the existing canyons in areas that were previously scoured by the January 9, 2018 debris flow. These locations are not underlain with farmland soils and do not support the acreage necessary for agricultural uses.

County Environmental Thresholds: The County's Agricultural Resource Guidelines provide a methodology for evaluating impacts to agricultural resources. The guidelines evaluate parcel size, soil classification, water availability, agricultural suitability, existing and historic land use, Comprehensive Plan land use designation, adjacent land use designation, agricultural preserve potential, and combined farming operations. These nine components are evaluated with a points-based system weighted according to their estimated resource value. The IS evaluates the value of a site's agricultural suitability and productivity, to determine whether the loss or impairment of agricultural resources would result in a potentially significant impact.

Impact Discussion:

a-b) ***No Impact***. As previously described, the Project site has no agricultural lands or farmland of Statewide or Local Importance and has never been used for agricultural purposes. Implementation of the proposed Project would be limited to continued monitoring and maintenance of existing debris nets and would not result in the loss or disturbance of agricultural land, soils, or other agricultural resources. Therefore, the proposed Project would have no impact on agricultural resources.

Cumulative Impacts: The proposed Project would have no direct or indirect impacts to agricultural resources as there are no prime agricultural soils or existing farmland at or proximate to the debris net locations. Similarly, pending public and private developments, such as the reconstruction of homes, roads, bridges or other public infrastructure in the vicinity would not impact existing or potential agricultural resources as the upper foothills of Montecito generally do not support such resources. Therefore, the proposed Project would not contribute to the regionally significant loss of agricultural resources and the proposed Project when considered with other cumulative projects in the Montecito Community Plan Area would not result in a cumulatively considerable impact on agricultural resources.

Mitigation and Residual Impact: No mitigation measures required. There would be no residual impacts associated with the implementation of the proposed maintenance activities.

4.3a AIR QUALITY

Will the proposal result in:		**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
a.	The violation of any ambient air quality standard, a substantial contribution to an existing or projected air quality violation, or exposure of sensitive receptors to substantial pollutant concentrations (emissions from direct, indirect, mobile and stationary sources)?			X		
b.	The creation of objectionable smoke, ash or odors?				X	
c.	Extensive dust generation?			X		

Existing Setting: The Project site is located in the South Central Coast Air Basin (SCCAB) that encompasses San Luis Obispo, Santa Barbara, and Ventura counties. The Santa Barbara County Air Pollution Control District (SBCAPCD) monitors and regulates the local air quality in the County.

Air quality is primarily characterized by ambient ground-level concentrations of seven specific pollutants – known as "criteria pollutants" – identified by the USEPA to be of concern with respect to health and welfare of the public. Table 5 shows the National Ambient Air Quality Standards (NAAQS), which are set by the USEPA and the California Ambient Air Quality Standards (CAAQS), which are set by the California Air Resources Board (CARB). An area is designated in *attainment* when it is in compliance with the NAAQS and/or the CAAQS for a criteria pollutant. If an area exceeds the NAAQS and/or CAAQS, the area is classified as *nonattainment* for that criteria pollutant. If there are not enough data available to determine whether an area exceeds the NAAQS and/or CAAQS, the area is designated as *unclassified*. The County is currently in attainment of NAAQS and is in attainment for all CAAQS with the exception of the State's 8-hour O_3 standard and the State's PM_{10} standards (USEPA 2020; CARB 2018). The County has been designated as a *nonattainment transitional* area for the State 8-hour O_3 standard, which indicates that pollution concentrations still violate the State standard but are nearing *attainment* (CARB 2018).

Table 5. Criteria Air Pollutant Standards

Pollutant	Averaging Period	California (CAAQS)	Federal (NAAQS)
Ozone (O_3)	1-Hour Average	0.09 ppm (180 µg/m^3)	--
	8-Hour Average	0.070 ppm (137 µg/m^3)	0.070 ppm (137 µg/m^3)
Carbon Monoxide (CO)	1-Hour Average	20 ppm (23 µg/m^3)	35.0 ppm (40 mg/m^3)
	8-Hour Average	9.0 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)
Nitrogen Dioxide (NO_2)	1-Hour Average	0.18 ppm (338 µg/m^3)	0.10 ppm (188 µg/m^3)
	Annual Arithmetic Mean	0.03 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)
Sulfur Dioxide (SO_2)	1-Hour Average	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)
	24-Hour Average	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)
	Annual Arithmetic Mean	--	0.030 ppm (80 µg/m^3)
Respirable Particulate Matter (PM_{10})	24-Hour Average	50 µg/m^3	150 µg/m^3
	Annual Arithmetic Mean	20 µg/m^3	--
Fine Particulate Matter ($PM_{2.5}$)	24-Hour Average	--	35 µg/m^3
	Annual Arithmetic Mean	12 µg/m^3	12.0 µg/m^3
Lead (Pb)	30-day Average	1.5 µg/m^3	--
	Calendar Quarter	--	1.5 µg/m^3
	Rolling 3-Month Average	--	0.15 µg/m^3
Sulfates	24-Hour Average	25 µg/m^3	

Pollutant	Averaging Period	California (CAAQS)	Federal (NAAQS)
Hydrogen Sulfide	1-Hour Average	0.03 ppm (42 µg/m^3)	No Federal Standards
Vinyl Chloride	24-Hour Average	0.01 ppm (26 µg/m^3)	

Notes: ppm = parts per million; µg/m^3 = micrograms per cubic meter.
Source: CARB 2016.

Applicable SBCAPCD Rules and Regulations: The SBCAPCD Rules and Regulations establish emission limitations and control requirements for various sources, based upon their source type and magnitude of emissions. The SBCAPCD rules applicable to the proposed Project may include the following:

- Rule 302 (Visible Emissions). Rule 302 prohibits emissions of visible air contaminants from any potential source of air contaminants. The rule prohibits air contaminants, other than water vapor, that are a certain level of darkness or opacity from being discharged for a combined period of more than 3 minutes in any 1 hour.
- Rule 303 (Nuisance). This rule could apply to fugitive dust emitted during proposed construction activities or odors during operation. This rule states that a person shall not discharge air contaminants from any source that can cause injury, detriment, nuisance, or annoyance to any considerable number of persons, or that can endanger the comfort, repose, health, or safety of any such persons or their business or property.
- Rule 311 (Sulfur Content of Fuels). The purpose of this rule is to limit the sulfur content in gaseous fuels, diesel and other liquid fuels, and solid fuels for the purpose of both reducing the formation of SO_x and particulates during combustion.
- Rule 345 (Control of Fugitive Dust from Construction and Demolition Activities). Rule 345 establishes limits on the generation of visible fugitive dust emissions at demolition and construction sites. The rule includes measures for minimizing fugitive dust from on-site activities and from trucks moving on- and off-site.

County Environmental Thresholds: The County's Air Quality Thresholds provide that a project would not have a significant impact on air quality if operation of the project would:

- Emit (from all project sources, mobile and stationary), less than the daily trigger (55 pounds per day of NO_x or ROC, 80 pounds per day for PM_{10}) for offsets set in the SBCAPCD New Source Review Rule, for any pollutant; and
- Emit less than 25 pounds per day of NO_x or ROC from motor vehicle trips only; and
- Not cause or contribute to a violation of any CAAQS or NAAQS (except O_3); and
- Not exceed the SBCAPCD health risk public notification thresholds adopted by the SBAPCD Board; and
- Be consistent with the adopted Federal and State Air Quality Management Plans.

The County has not established thresholds for temporary impacts associated with construction activities; however, some construction projects may have the potential for construction-related dust to cause a temporary nuisance. As such, the County's Grading Ordinance requires standard dust control conditions for all projects involving grading activities. Because the County is currently in *nonattainment* for the State's PM_{10} standard, dust mitigation measures are required for all discretionary construction activities, regardless of the significance of the fugitive dust impacts, based on policies within the 1979 Air Quality Attainment

Plan (SBCAPCD 2015). SBCAPCD also uses 25 tons per year (tpy) for any pollutant as a guideline for determining the significance of construction impacts.

Although quantitative thresholds of significance are not currently in place for short-term emissions, CEQA requires that short-term impacts such as exhaust emissions from heavy construction equipment and fugitive dust generation during grading be discussed in the environmental document. In the interest of public disclosure, the SBCAPCD recommends that construction-related NO_x, ROC, PM_{10} and $PM_{2.5}$ emissions from diesel and gasoline powered equipment, paving, and other activities be quantified. Emissions associated with maintenance were estimated using the California Emissions Estimator Model (CalEEMod) version 2016.3.2, except for helicopter-related emissions which were separately estimated using emissions factors obtained from the California Climate Action Registry and data from the Swiss Federal Office of Civil Aviation (FOCA) (see Attachment 4).

FOCA’s Guidance on the Determination of Helicopter Emissions (2013) was utilized in calculation emissions factors specific to an MD-500 (light lift) helicopter for both landing and take-off (LTO) and typical operations (i.e., flight, transport, etc.). Emissions factors for a Chinook CH-47 (heavy lift) helicopter were estimated by utilizing default air emissions factors provided in FOCA’s Helicopter Emissions Table (2017) for a Sikorsky CH-53G, which is considered a representative aircraft based on the twin turboshaft engine type of the two helicopters and similar engine shaft horsepower. The emissions factors for both helicopters were then multiplied by the frequency of LTOs and duration of helicopter operations or flight time. Based on the description of the proposed Project, it was assumed that debris net maintenance and heavy equipment transport would require two LTO events, with a total flight time of four hours for each helicopter, per maintenance event. Details regarding the calculation of these emissions, as well as the calculation of typical construction activities using CalEEMod, are provided in Attachment 4.

Impact Discussion:

a, c) ***Less than Significant.*** The debris nets are located approximately 0.25 miles, 0.8 miles, and 0.3 miles from the nearest residences in Cold Spring Canyon, San Ysidro Canyon, and Buena Vista Canyon. There are no other sensitive receptors, such as schools, hospitals, or libraries, within 1 mile of any of the trailheads or debris nets.

Minor debris accumulation maintenance activities would involve the use of picks, shovels, and small hydraulic splitters to split rock, if necessary, to re-establish the low-flow channel. Chainsaws may also be required for small tree trunks and branches. Minor maintenance activities would require an average of between one and four construction workers per debris net. The crew would be transported to the trailhead by light-duty trucks and hand tools and construction materials would be transported on foot using the existing trail system. Emissions associated with these minor maintenance activities would be negligible and would not approach SBCAPCD thresholds for construction emissions.

Major maintenance activities would include the use of helicopters to airlift heavy construction equipment (e.g., Spyder excavator or a 10-ton class excavator), necessary to remove rocky and woody debris from the stream channels. The airlift as well as the use of heavy construction equipment would result in criteria pollutant emissions and fugitive dust emissions. Reasonable worst-case construction emissions for major maintenance activities were estimated and are summarized in Tables 6 and 7 (see Attachment 4). The annual construction emissions would be well below the SBCAPCD thresholds. Therefore, the proposed maintenance activities would have a less than significant impact associated with emission of criteria pollutants. Additionally, given the distance from the debris net (i.e., more than 0.25 miles), the proposed maintenance activities would not affect any sensitive receptors in the vicinity.

Table 6. Estimated Maximum Daily Emissions

Source	**Pollutant**						
	ROC (lbs/day)	**NO_x (lbs/day)**	**CO (lbs/day)**	**SO_2 (lbs/day)**	**PM_{10} (lbs/day)**	**$PM_{2.5}$ (lbs/day)**	**CO_2e (MT/year)**
Heavy Construction Equipment Emissions	1.35	11.79	13.52	0.02	2.44	0.84	9.03
Helicopter LTO Emissions	3.11	7.82	3.72	<0.01	0.19	0.17	0.37
Helicopter Operational Emissions	14.04	158.74	16.93	<0.01	3.6	3.24	1.08
Total	18.50	178.33	34.17	0.02	6.23	4.25	10.48

Source: Wood 2020; see Attachment 4.

Table 7. Estimated Annual Emissions (tons per year)

Source	**Pollutant**						
	ROC (tpy)	**NO_x (tpy)**	**CO (tpy)**	**SO_2 (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**	**CO_2e^1 (MT/year)**
Standards Maintenance Activities	<0.01	0.05	0.06	<0.01	0.01	<0.01	9.03
Helicopter LTO Emissions	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.37
Helicopter Operational Emissions	0.03	0.32	0.03	<0.01	<0.01	<0.01	1.08
Total	0.03	0.38	0.09	<0.01	<0.01	<0.01	10.48
SBCAPCD Threshold	*25*	*25*	*25*	*25*	*25*	*25*	*N/A*
Threshold Exceeded?	No	No	No	No	No	No	N/A

Notes: [1] SBCAPCD thresholds apply to ROC, NO_x, CO, SO_x, PM_{10}, and $PM_{2.5}$. See Section 4.3b, *Air Quality – Greenhouse Gas Emissions* for further discussion regarding GHG emissions and consistency with the County's Energy and Climate Action Plan (ECAP)
Source: Wood 2020; see Attachment 4.

b) ***No Impact.*** The use of heavy construction equipment during major maintenance activities would potentially result in the generation of objectionable odors associated with off-road diesel equipment exhaust emissions. Although diesel fumes from heavy construction equipment are sometimes found to be objectionable, the operation of heavy construction equipment would be temporary. Additionally, the potential odors associated with the operation a heavy construction equipment would only be experienced for a short duration for trail users passing the debris net locations. The proposed Project would not result in new long-term operational activities that would generate sources of objectionable odors. Additionally, the proposed Project would not result in the generation of smoke or ash during the proposed maintenance activities. Therefore, the proposed maintenance activities would have no impact.

Cumulative Impacts: The proposed Project would contribute incrementally to cumulative pollutant emissions in the community of Montecito. As previously described, reconstruction or repair of as many as 400 residences as well as public infrastructure (e.g., roads, bridges, new or expanded flood control detention basins) would entail tens of thousands of heavy haul truck trips and other construction-related vehicle traffic that may coincide with emissions from vehicles, heavy construction equipment, and/or helicopter operations associated with the proposed Project. However, because of limited emissions, the contribution of the proposed Project to cumulative impacts would be incremental and not cumulatively considerable.

Mitigation and Residual Impact: No mitigation measures required. There would be no residual impacts associated with the implementation of the proposed maintenance activities.

4.3b AIR QUALITY – GREENHOUSE GAS EMISSIONS

Greenhouse Gas Emissions - Will the project:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X		
b. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			X		

Existing Setting: GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6) and nitrogen trifluoride (NF_3). GHGs trap heat in the atmosphere and regulate the Earth's temperature, referred to as "the greenhouse effect." However, human activities – including fossil fuel combustion, waste disposal, energy use, and land use changes – have accelerated GHG emission above pre-industrial levels (U.S. Global Change Research Program 2018). The global mean surface temperature increased by approximately 1.8 °F in the past 80 years, and is likely to reach a 2.7 °F increase between 2030 and 2050 at current global emission rates (International Panel on Climate Change [IPCC] 2018).

The largest source of GHG emissions from human activities in the U.S. is from fossil fuel combustion for electricity, heat, and transportation. Specifically, the *Inventory of U.S. Greenhouse Gasses and Sinks: 1990-2017* (USEPA 2019) states that the primary sources of GHG emissions from fossil fuel combustion in 2017 included electricity production (35 percent), transportation (36.5 percent), industry (27 percent), and commercial and residential end users (17 to 19 percent, respectively). Factoring in all sources of GHG emissions, the energy sector accounts for 84 percent of total emissions in addition to agricultural (8 percent), industrial processes (5.5 percent), and waste management (2 percent) sources.

The County's *Final Environmental Impact Report (EIR) for the Energy and Climate Action Plan (ECAP)* (PMC 2015) and the *2016 Greenhouse Gas Emissions Inventory Update and Forecast* (County of Santa Barbara Long Range Planning Division 2018) include a detailed description of the existing regional setting as it pertains to GHG emissions. Regarding non-stationary sources of GHG emissions within Santa Barbara County specifically, the transportation sector produces 38 percent of the total emissions, followed by the building energy (28 percent), agriculture (14 percent), off-road equipment (11 percent), and solid waste (9 percent) sectors (County of Santa Barbara Long Range Planning Division 2018).

The GHG emissions from human activities have led to a rise in the average global temperature, which has the potential to substantially change the Earth's climate. More frequent and intense weather and climate-related events are expected to damage infrastructure, ecosystems, and social systems across the U.S. (U.S. Global Change Research Program 2018). California's Central Coast is expected to experience changes in precipitation patterns, reduced foggy days, increased extreme heat days, exacerbated drought and wildfire conditions, and acceleration of sea level rise leading to increased coastal flooding and erosion (Langridge 2018).

Climate change results from GHG emissions "…generated globally over many decades by a vast number of different sources" rather than from GHG emissions generated by any one project (County of Santa Barbara 2008). As defined in CEQA Guidelines Section 15355 and discussed in CEQA Guidelines Section 15130, "…a cumulative impact consists of an impact which is created as a result of the combination of the [proposed] project…evaluated…together with other projects causing related impacts." Therefore, by definition, climate change is considered a cumulative impact under CEQA.

County Environmental Threshold: CEQA Guidelines Section 15183.5(a) states:

> "Lead agencies may analyze and mitigate the significant effects of greenhouse gas emissions at a programmatic level, such as in…a separate plan to reduce greenhouse gas emissions. Later project-specific environmental documents may tier from…that existing programmatic review…a lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project complies with the requirements in a previously adopted plan…"

The County's ECAP, adopted in 2015, is a GHG emission reduction plan. The County has been implementing the ECAP's emission reduction measures since 2016. However, the County is not projected to meet the 2020 GHG emission reduction goal contained within the ECAP, and the ECAP is undergoing an update. Therefore, at this time, a significance threshold is more appropriate for project-level GHG emission analysis, rather than tiering off the ECAP's EIR.

CEQA Guidelines Section 15064.4(a) states "[a] lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of GHG emissions resulting from a project." CEQA Guidelines Section 15064.4(b) further states:

> "A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:
>
> 1. The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
> 2. Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project…"

A lead agency may determine that a project's incremental contribution to an existing cumulatively significant issue, such as climate change, is not significant based on supporting facts and analysis (CEQA Guidelines Section 15130[a][2]). A project's contribution to a significant cumulative impact would be rendered less than significant if the project is required to implement or fund its fair share of a mitigation measure designed to alleviate the cumulative impact (CEQA Guidelines Section15130[a][3]). Such determinations must be based on analysis in the environmental document with substantial evidence to demonstrate that the required mitigation represents the project's "fair-share" contribution towards alleviating the cumulative impact.

The County does not have an adopted GHG emission significance threshold for sources other than industrial stationary sources. Therefore, significance thresholds from other California jurisdictions or agencies can be appropriately applied to land use projects within Santa Barbara County, as long as substantial evidence is provided to describe why the selected threshold is appropriate (CEQA Guidelines Section 15064.7[d]).

In 2012, San Luis Obispo County Air Pollution Control District (SLO County APCD) established an annual significance threshold of 1,150 metric tons of carbon dioxide equivalent (MT CO_2e/yr). This significance threshold is approximately equivalent to the operational GHG emissions associated with a 70-unit residential subdivision in an urban setting (49-unit rural development) or a 40,000-square-foot strip mall in an urban setting (SLO County APCD 2012). The County selected the SLO County APCD threshold of 1,150 MT CO_2e/yr as the most appropriate threshold to determine significance of cumulative impacts from GHG emissions for this proposed Project. The rationale for applying the SLO County APCD GHG emissions significance threshold is discussed below.

Threshold Applicability:

- The threshold applies to GHG emissions that are not industrial stationary sources, but that are subject to discretionary approvals by the County, where the County is the lead agency.
- The threshold was developed to be consistent with Assembly Bill 32 (California Global Warming Solutions Act of 2006), which established the State of California's 2020 GHG emissions reduction goal.
- The selected threshold considers GHG emissions comprehensively by measuring in annual metric tons of CO_2e.
- The threshold assessed historical and potential future land use development trends in San Luis Obispo County to establish the significance threshold. San Luis Obispo County and Santa Barbara County have similar historical and potential future land use development trends.
- The threshold applies to GHG emissions from residential and commercial land use projects.
- The threshold assumes that construction emissions will be amortized over the life of a project and added to the operational emissions.
- The threshold does not apply to GHG that are emitted throughout the life cycle of products that a project may produce or consume.

Emissions for the proposed Project were estimated using CalEEMod Version 2016.3.2, except for helicopter-related emissions which were separately estimated using emissions factors obtained from the California Climate Action Registry and data from FOCA (see Attachment 4).

Impact Discussion:

a-b) ***Less than Significant.*** As described in Section 4.3a, *Air Quality,* minor maintenance activities would be expected to result in negligible emissions, including GHG emissions. Major maintenance activities would include the use of helicopters to airlift heavy construction equipment (e.g., Spyder excavator or a 10-ton class excavator) that would remove large boulders, rocks, tree trunks, and branches from the stream channels. The helicopter operations as well as the use of heavy construction equipment would result in approximately 10.48 MT CO_2e/year. Given that no minor or major maintenance activities have been required since the original installation of the nets in April and September 2019, this GHG annual emissions estimate is likely conservative. Consequently, the short-term construction-related GHG emissions associated with the proposed Project would be minor and less than significant.

Cumulative Impacts: The proposed Project would not result in a long-term source of GHG emissions that would contribute substantially to cumulative impacts associated with global climate change. As previously described, reconstruction or repair of as many as 400 residences as well as public infrastructure (e.g., roads, bridges, new or expanded flood control detention basins) would entail tens of thousands of heavy haul truck trips and other construction-related vehicle traffic that may coincide with GHG emissions from vehicles, heavy construction equipment, and/or helicopter operations associated with the proposed Project. However, because of infrequent requirement for maintenance and the limited GHG emissions associated with each maintenance activity, the contribution of the proposed Project to cumulative impacts would be considered incremental and not cumulatively considerable.

Mitigation and Residual Impact: No mitigation measures required. There would be no residual impacts associated with the implementation of the proposed maintenance activities.

4.4 BIOLOGICAL RESOURCES

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
Flora					
a. A loss or disturbance to a unique, rare or threatened plant community?		X			
b. A reduction in the numbers or restriction in the range of any unique, rare or threatened species of plants?		X			
c. A reduction in the extent, diversity, or quality of native vegetation (including brush removal for fire prevention and flood control improvements)?		X			
d. An impact on non-native vegetation whether naturalized or horticultural if of habitat value?		X			
e. The loss of healthy native specimen trees?		X			
f. Introduction of herbicides, pesticides, animal life, human habitation, non-native plants or other factors that would change or hamper the existing habitat?				X	
Fauna					
g. A reduction in the numbers, a restriction in the range, or an impact to the critical habitat of any unique, rare, threatened or endangered species of animals?			X		
h. A reduction in the diversity or numbers of animals on-site (including mammals, birds, reptiles, amphibians, fish or invertebrates)?		X			
i. A deterioration of existing fish or wildlife habitat (for foraging, breeding, roosting, nesting, etc.)?		X			
j. Introduction of barriers to movement of any resident or migratory fish or wildlife species?				X	
k. Introduction of any factors (light, fencing, noise, human presence and/or domestic animals) which could hinder the normal activities of wildlife?				X	

Existing Setting: The following description of the existing setting for biological resources is based on the Biological Resources Assessment prepared by SES (2019) including the associated surveys conducted in September and December 2018 (see Attachment 3). Additional construction monitoring information is also summarized from the Construction Completion Report for Debris Flow Nets SY-18, CS-11, CS-18, and BV-4 (June 2019) and the Construction Completion Report for Debris Flow Nets – SY-7a and BV-10 (November 2019).

Flora

The vegetation communities within the vicinity of the six debris net locations are consist primarily of arroyo willow thicket, western sycamore woodland, white alder grove, scarlet monkey flower seep, California bay forest, coast live oak woodland, big-pod ceanothus chaparral, and canyon sunflower scrub, which is currently dominant as an early successional species (see Table 8). As a result of the Thomas Fire and debris flows, the woodland/forest communities along the stream channel are sparse but are regenerating. Over 100 plant species were observed within or surrounding the debris net locations during the September and

December 2018 field surveys. A comprehensive list of vascular plant species observed in the Survey Area is provided in Attachment 3.

Table 8. Summary of Vegetation Communities and Cover

Net Location	Field-assessed Vegetation Alliance	Field-assessed Vegetation Association	Adjacent Alliances	Percent Total Non-vascular Cover	Percent Total Vascular Vegetation Cover
Cold Spring Creek					
CS-11	Arroyo willow thicket/ Western sycamore woodland	Scarlet monkey flower seep	Coast live oak woodland	85	15
CS-18	Arroyo willow thicket/ Canyon sunflower scrub	California bay forest/ Western sycamore woodland	Coast live oak woodland	65	35
San Ysidro Creek					
SY-7a	Canyon sunflower scrub	California bay forest	Coast live oak woodland	95	5
SY-18	Arroyo willow thicket	California bay forest	Coast live oak woodland	85	15
Buena Vista Creek					
BV-4	Arroyo willow thicket/ Western sycamore woodland	Canyon sunflower scrub	Big-pod ceanothus chaparral	70	30
BV-10	While alder grove	Western sycamore woodland	Coast live oak woodland	60	40

White Alder Grove (*Alnus rhombifolia* Forest Alliance)

White alder (*Alnus rhombifolia*) groves occur in riparian corridors, incised canyons, seeps, stream banks, mid-channel bars, floodplains, and terraces (Sawyer et al. 2009). White alder was dominant to co-dominant in the channel and lower banks at BV-10. Saplings of this species were commonly observed in many of the stream corridors, particularly Buena Vista Creek and San Ysidro Creek.

Western Sycamore Woodland (*Platanus racemosa* Woodland Alliance)

Western sycamore (*Platanus racemosa*) woodlands occur in gullies, intermittent streams, springs, seeps, along streambanks, and on terraces adjacent to floodplains (Sawyer et al. 2009). Western sycamore is one of the dominant tree species in all of the stream corridors. Many of the western sycamores damaged in the fire and debris flows are re-sprouting from the base and saplings are present throughout the stream channels. Western sycamore was dominant to co-dominant in the tree stratum at 11 of the proposed 13 net locations.

Coast Live Oak Woodland (*Quercus agrifolia* Woodland Alliance)

Coast live oak is a drought-resistant evergreen tree ranging from 20 to 80 feet in height, with massive spreading branches and a dense canopy of thick, waxy leaves. Many of the coast live oaks damaged in the fire and debris flows are re-sprouting from branches or the base and saplings are present along hillsides and along the stream channels. Coast live oaks are a long-lived species and can survive for 300 years or more. Although seemingly ubiquitous on the central coast of California, coast live oak woodlands are limited in distribution to a 50-mile wide swath along the coast from Mendocino County to northern Baja California and are absent from the interior ranges and Sierra Nevada (Sawyer et al. 2009).

Coast live oak woodlands are generally present along the upper slopes of the stream corridors. In many locations, coast live oak trees also extend downslope to the edges of the creek banks and co-dominate the tree canopy with western sycamore. Common understory species in this community include canyon sunflower (*Venegasia carpesioides*), poison oak (*Toxicodendron diversilobum*), toyon (*Heteromeles arbutifolia*), and giant wild rye (*Elymus condensatus*).

Populations of the special-status plant species Plummer's baccharis (*Baccharis plummerae*) – a California Native Plant Society (CNPS) California Rare Plant Rank (CRPR) 4.3 species – were present along slopes in the understory of the coast live oak woodland community. Plummer's baccharis was observed at CS-11 and SY-7a.

California Bay Forest (*Umbellularia californica* Forest Alliance)
California bay (*Umbellularia californica*) forests occur on alluvial benches, streamsides, valley bottoms, coastal bluffs, inland ridges, steep north-facing slopes, and rocky outcrops. In the Santa Ynez Mountains, they generally occupy either semi-riparian settings or rocky recesses on upper slopes (Sawyer et al. 2009). California bay trees are co-dominant in the tree canopy at SY-7a, SY-18, and CS-18. Many of the California Bay trees damaged in the fire and debris flows are also re-sprouting along hillsides and along the stream channels.

Big pod Ceanothus Chaparral (*Ceanothus megacarpus* Shrubland Alliance)
Big pod ceanothus (*Ceanothus megacarpus*) chaparral is present along the upper slopes of the canyons at BV-4. This community is either dominated by big pod ceanothus or it is co-dominant with laurel sumac (*Malosma laurina*). Other shrub species commonly observed in this community include holly-leaf cherry (*Prunus ilicifolia*), toyon, giant wild rye, poison oak, and chaparral yucca (*Hesperoyucca whippleyi*). These chaparral communities are well adapted to fire with many species such as big pod ceanothus resprouting from burls or stumps.

Arroyo Willow Thicket (*Salix lasiolepis* Shrubland Alliance)
Arroyo willow (*Salix lasiolepis*) is a riparian shrub or tree that grows to 25 feet in height. Arroyo willows form thickets along stream banks and benches, slope seeps, and drainages. Arroyo willow was the dominant or co-dominant species at all of the net locations. Red willow (*Salix laevigata*), sand bar willow (*Salix exigua*), Fremont cottonwood (*Populus fremontii*), and mulefat (*Baccharis salicifolia*) were also frequently observed in the stream channels at all net locations. This riparian vegetation is also recovering, although the deep scouring of the stream channels has inhibited full reestablishment.

Canyon Sunflower Scrub (*Venegasia carpesioides* Shrubland Alliance)
Canyon sunflower is one of the most abundant species in the stream corridors and is present at every net location. Seedlings of this species establish readily after fire or other disturbances and have been found to proliferate significantly after fire in mesic areas (Sawyer et al. 2009). Canyon sunflower comprises the dominant cover in the channel at CS-18 and SY-7a, and particularly on hillsides surrounding the stream channels. As other habitats recover, the dominance of canyon sunflower is expected to decline. Other species frequently observed in this community include California blackberry (*Rubus ursinus*), poison oak, golden yarrow (*Eriophyllum confertiflorum*), deerweed (*Acmispon glaber*), and mugwort (*Artemisia douglasiana*).

Scarlet Monkey Flower Seeps (*Erythranthe [Mimulus] cardinali*s Herbaceous Alliance)
Scarlet monkey flower occurs in moist to wet places along streams and seepage areas (Baldwin et al. 2012). At the time of the field surveys, it was in bloom and was one of the most abundant herbaceous species in the creek corridors. Scarlet monkey flower dominated the cover at CS-11. Other species frequently observed in relatively dense cover in this community include giant flowered phacelia (*Phacelia grandiflora*), Douglas' nightshade (*Solanum douglasii*), smilo grass (*Stipa miliacea*), coast morning-glory

(*Calystegia macrostegia* ssp. *cyclostegia*), California figwort (*Scrophularia californica*) and common horsetail (*Equisetum arvense*).

Sensitive or Natural Communities

Coast live oak woodland, arroyo willow thickets, and other riparian habitats (e.g., western sycamore woodland, California bay forest) present in the stream corridors and at the debris net locations are considered valuable biological resources and are classified as ESH pursuant to the County's Environmental Thresholds and Guidelines Manual. All of these plant communities are considered rare by CDFW (CDFW 2019). Individual mature coast live oak trees (6 inches or greater diameter at breast height) are considered sensitive by the County and are provided protection by the Comprehensive Plan Conservation Element Oak Tree Protection Supplement (2009).

Non-native Plant Infestations

Several notable non-native plant infestations were documented in the stream corridors during the field surveys. All of the non-native plant species noted below are considered invasive by the California Invasive Plant Council (Cal-IPC).

Saltcedar (*Tamarix ramosissima*) seedlings were observed in all of the creeks surveyed and were particularly abundant in San Ysidro Creek. In Cold Spring Creek, saltcedar, greater periwinkle (*Vinca major*), and tree tobacco (*Nicotiana glauca*) were observed at CS-11 and CS-18. Four fig (*Ficus carica*) saplings are also becoming established at CS-18.

Special Status and Sensitive Plant Species

Nineteen special-status plant species have been previously recorded within the four-quadrangle area surrounding the debris nets. Table 9 lists special status plants that have a reasonable possibility to occur in the vicinity of debris nets based on habitat suitability and requirements, elevation and geographic range, soils, topography, surrounding land uses, and proximity of known occurrences in the California Natural Diversity Database (CNDDB) database.

Plummer's baccharis was the only special status species that was documented during field surveys. A small population was documented in Cold Springs Canyon near the western top support anchor for CS-11. Another small population was documented in Santa Ynez Canyon near the eastern top support anchor for SY-7a. The plants were flagged during installation of the debris and were not disturbed during construction activities at either of these locations. Plummer's baccharis is native to California and has been documented in Los Angeles, Santa Barbara, Ventura, and San Luis Obispo Counties, as well as Anacapa Island and Santa Cruz Island. It blooms in May, August, September, and October, and the species can be found in in rocky habitats, broad-leafed upland forests, chaparral, cismontane woodland, and coastal scrub habitat (CNPS 2020).

Table 9. Special-status Plant Species within the Vicinity of the Debris Nets

Common Name *Scientific Name*	**Listing Status/Rarity Ranking**	**Habitat Requirements/Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near Debris Net Locations**
Plummer's baccharis *Baccharis plummerae* ssp. *plummerae*	CRPR 4.3 G3, S3	Rocky slopes near beach, sea bluffs, brushy canyons. Elevation range: 0 – 6,100 feet. Blooming period: August – November.	Yes	Observed and mapped at CS-11 and SY-7a during the September 2018 field surveys.
Late-flowered mariposa lily *Calochortus fimbriatus*	CRPR 1B.3 G3, S3	Dry, open coastal woodland and chaparral. Elevation range: 0 – 3,000 feet. Blooming period: July – August.	No	Suitable coast live oak woodland and chaparral habitat for late-flowered mariposa lily is present along the trails above the stream channels and upland areas surrounding the debris net locations. This species was observed in bloom along the trail in Buena Vista Canyon during September 2018 surveys. No late-flowered mariposa lily were observed at the debris net locations and this species would not be expected to occur in the stream channels.
Umbrella larkspur *Delphinium umbraculorum*	CRPR 1B.3 G3, S3	Oak woodland and chaparral prefers moist locations. Elevation range: 1,320 – 5,300 feet. Blooming period: April –June.	Yes	Suitable habitat for umbrella larkspur is present in the creek corridors and around the debris net locations. This species would not have been detectable at the time of the September 2018 surveys. Spring surveys should be conducted to confirm presence/absence of this species in the stream corridors.
Ojai fritillary *Fritillaria ojaiensis*	CRPR 1B.2 G2, S2	Occurs on rocky slopes and in river basins. Known from mesic broadleaf upland forest, chaparral, and lower	Yes	Suitable habitat for Ojai fritillary is present in the creek corridors and around the debris net locations. This species

Common Name ***Scientific Name***	**Listing Status/Rarity Ranking**	**Habitat Requirements/Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near Debris Net Locations**
		montane coniferous habitats. Elevation range: 990 – 1,650 feet. Blooming period: February – May.		would not have been detectable at the time of the September 2018 surveys. Spring surveys should be conducted to confirm presence/absence of this species in the stream corridors.
Mesa horkelia *Horkelia cuneata* var. *puberula*	CRPR 1B.1 G4, S1	Dry, sandy, coastal chaparral. Elevation range: 200 – 2,900 feet. Blooming period: March – July.	No	Suitable chaparral habitat for mesa horkelia is present in upland areas above the stream channels. Mesa horkelia is a perennial species that would have been detectable at the time of the September 2018 surveys. No mesa horkelia was observed at the debris net locations and this species would not be expected to occur in the stream channels.

Notes:

Federal:
FE – Federally listed Endangered
FT – Federally listed Threatened
FC – Federal Candidate Species
WL – USFWS Watch list
BCC – USFWS Bird of Conservation Concern
MTBA – Migratory Bird Treaty Act

State:
SE – State listed Endangered
ST – State listed Threatened
SC – State Candidate Species
SR – State Rare Species
SA – State Special Animal
FP – CDFW Fully Protected Species
SSC – CDFW Species of Special Concern
WL – CDFW Watch List

California Native Plant Society Rare Plant Rank (CRPR)
1B – Rare, threatened, or endangered in CA and elsewhere
0.1 – Seriously endangered in California
2 – Rare, threatened, or endangered in CA but common elsewhere
0.2 – Fairly endangered in California
4 – Limited distribution (Watch-list)
0.3 – Not very endangered in California

Global/State Rarity Ranking
G1/S1 – Critically imperiled. At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
G2/S2 – Imperiled. At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
G3/S3 – Vulnerable. At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
G4/S4 – Apparently Secure. Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5/S5 – Demonstrably Secure. Common; widespread and abundant.
1 – Unless otherwise noted, habitat, elevation, and blooming period for special-status plant species is from The Jepson Manual, Second Edition (2012) and CNPS 2018.

Source: SES 2019.

Fauna

Wildlife species inhabiting the area surrounding the debris nets include common species such as California treefrog (*Pseudacris cadaverina*), western fence lizard (*Sceloporus occidentalis*), and red-tailed hawk (*Buteo jamaicensis*). A list of all wildlife species observed within the Cold Springs Creek, Santa Ynez Creek, and Buena Vista Santa Ynez Creek, is included in Attachment 3.

Bird species typically associated with foothill canyon riparian and chaparral habitats were observed during field surveys. Examples include California quail (*Callipepla californica*), red-tailed hawk (*Buteo jamaicensis*), Anna's huminghbird (*Calypte anna*), northern flicker (*Colaptes auratus*) acorn woodpecker (*Melanerpes formicivorus*), black phoebe (*Sayornis nigricans*), Stellar's jay (*Cyanocitta stelleri*), western scrub jay (*Aphelocoma californica*), Canyon wren (*Ctherpes mexicanus*), spotted towhee (*Pipilo maculatus*), California towhee (*Pipilo crissalis*), and dark-eyed junco (*Junco hyemalis*).

Photograph 14. *A wildlife camera in Buena Vista Canyon captured three mountain lion cubs passing under the net on May 5, 2020.*

Two amphibian species were observed during field surveys, California treefrog (*Pseudacris cadaverina*) and Baja California treefrog (*Pseudacris hypochondriaca*). Four reptile species were recorded including California striped racer (*Coluber lateralis*), coast mountain kingsnake (*Lampropeltis zonata*), western fence lizard (*Sceloporus occidentalis*), and southern alligator lizard (*Elgaria multicarinata*).

Evidence (i.e., scat, and tracks) indicated the presence of grey fox (*Urocyon cinereoargentes*) and mule deer (*Odocoileus hemionus*). A wildlife camera in Buena Vista Canyon also captured three mountain lion cubs (*Puma concolor*) passing under one of the debris nets on May 5, 2020.

No special-status wildlife species were observed during the September and December 2018 field surveys. However, seven special-status wildlife species have to the potential to occur within the vicinity of the debris nets, as summarized in Table 10.

Table 10. Special-status Wildlife Species within the Vicinity of the Debris Nets

Common Name *Scientific Name*	**Listing Status/Rarity Ranking**	**Habitat Requirements/ Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near the Debris Net Locations**
Southern California steelhead Distinct Population Segment	FE, SSC, G5, S1	Occurs in coastal streams less than 8,000 feet in elevation.	Yes	Southern California steelhead are known to occur historically in Cold Spring Creek and San Ysidro Creek, but are not able to access the debris net locations due to impassible barriers

Common Name *Scientific Name*	**Listing Status/Rarity Ranking**	**Habitat Requirements/ Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near the Debris Net Locations**
Oncorhynchus mykiss irideus				downstream of the debris net locations. Nevertheless, portions of Cold Spring and San Ysidro Creek have been designated critical habitat by the National Marine Fisheries Service (NMFS).
California red-legged frog *Rana draytonii*	FT, SSC, G2, S2	Found primarily in coastal drainages of central California, from Marin County, California, to northern Baja California, Mexico. Uses a variety of aquatic, riparian, and upland habitats. Requires a pond, slow-flowing stream reach, or deep pool within a stream with vegetation or other material to which egg masses may be attached. Uses both riparian and upland habitats for foraging, shelter, cover. Will also use small mammal burrows and moist leaf litter as refugia.	Yes	California red legged frogs have been documented 0.35 miles north of the confluence of Hot Springs Creek and Cold Spring Creek (CDFW 2018). California red legged frogs have also been recorded in the main stem of Montecito Creek (SES 2005). The likelihood of occurrence of this species at the debris net locations is considered moderate.
Northern (silvery) legless lizard *Anniella pulchra*	SSC, G3, S3	Inhabits moist soil in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks. Leaf litter under trees and shrubs in sunny areas and dunes stabilized with bush lupine and mock heather often indicate suitable habitat. Can also be found under surface	Yes	Suitable stream terrace habitat with sycamores and oaks are present along the stream corridors and at the debris net locations. Debris present in the channels could provide surface cover as well. The closest known occurrence is Sandyland, northeast El Estero, 2 miles northwest of Carpinteria (CDFW 2018). The likelihood of occurrence of this species at the debris net locations is considered moderate.

Common Name *Scientific Name*	**Listing Status/Rarity Ranking**	**Habitat Requirements/ Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near the Debris Net Locations**
		objects such as rocks, boards, driftwood, and logs.		
Southwestern pond turtle *Actinemys pallida*	SSC, G3, S3	Inhabits permanent or nearly permanent bodies of water in many habitat types; at elevations below 6,000 feet. Requires basking sites such as partially submerged logs, vegetation mats, or open mud banks. Needs suitable upland nesting sites with silty soils for egg laying.	Yes	Closest documented occurrence of southwestern pond turtle is from the Andre Clark Bird Refuge, 0.3 miles southeast of Highway 101 at Salinas Street (CDFW 2018). The likelihood of occurrence of this species at the debris net locations is considered moderate.
Coast range newt *Taricha torosa*	SSC, G4, S4	Occurs in coastal drainages. Breeds in ponds, reservoirs, and slow flowing streams.	Yes	Coast range newt was documented in Cold Spring Creek near the Mountain Drive bridge in 2000 and 2006 (CDFW 2018). There are several records in the Santa Barbara Natural History Museum (SBNHM) files, also from Cold Spring Creek. The stream offer suitable habitat and therefore, the likelihood of occurrence of this species at the debris net locations is considered high.
Two-striped garter snake *Thamnophis hammondii*	SSC, G4, S3	Generally found around pools, creeks, cattle tanks, and other water sources. Often in rocky areas in oak woodland, chaparral, brushland and coniferous forests.	Yes	The closest documented occurrence of two-striped garter snake is from Rattlesnake Canyon, 1 mile north of Las Canoas Road (CDFW 2018). There is suitable habitat for this species in the stream channels. A juvenile two-striped Garter snake was observed 300 feet upstream of SY-7a work area during installation of the debris net in October 2019.
Cooper’s hawk *Accipiter cooperii*	WL, MBTA. G5, S4	Nests in oak, riparian, and non-native woodlands. Frequents a wide variety of	Yes	Closest documented occurrences of Cooper’s hawk are from Mission Canyon in Santa Barbara (CDFW 2018). The

Common Name ***Scientific Name***	**Listing Status/Rarity Ranking**	**Habitat Requirements/ Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near the Debris Net Locations**
		habitats while hunting.		likelihood of occurrence of this species at the debris net locations is considered high.

Notes:

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FT – Federally listed Threatened
FC – Federal Candidate Species
WL – USFWS Watch list
BCC – USFWS Bird of Conservation Concern
MTBA – Migratory Bird Treaty Act

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SC – State Candidate Species
SR – State Rare Species
SA – State Special Animal
FP – CDFW Fully Protected Species
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G4/S4 – Apparently Secure. Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5/S5 – Demonstrably Secure. Common; widespread and abundant.

Source: SES 2019.

Environmental Thresholds: Santa Barbara County's Environmental Thresholds and Guidelines Manual includes guidelines for the assessment of biological resource impacts. The following thresholds are applicable to this project:

Riparian Habitats: Project-created impacts may be considered significant due to: direct removal of riparian vegetation; disruption of riparian wildlife habitat, particularly wildlife dispersal corridors and or understory vegetation; or intrusion within the upland edge of the riparian canopy leading to potential disruption of animal migration, breeding, etc. through increased noise, light and glare, and human or domestic animal intrusion; or activities which disrupts critical time periods for fish and other wildlife species.

Oak Woodlands and Forests: Project-created impacts may be considered significant due to habitat fragmentation, removal of understory, alteration to drainage patterns, disruption of the canopy, removal of a significant number of trees that would cause a break in the canopy, or disruption in wildlife movement in and through the woodland.

Other Rare Habitat Types: The County's Environmental Thresholds and Guidelines Manual recognizes that not all habitat-types found in the County are addressed by the habitat-specific guidelines. Impacts to other habitat types or species may be considered significant, based on substantial evidence in the record, if they substantially: 1) reduce or eliminate species diversity or abundance; 2) reduce or eliminate the quality of nesting areas; 3) limit reproductive capacity through losses of individuals or habitat; 4) fragment, eliminate, or otherwise disrupt foraging areas and/or access to food sources; 5) limit or fragment range and movement; or 6) interfere with natural processes, such as fire or flooding, upon which the habitat depends.

Impact Discussion:

a) ***Less than Significant with Mitigation.*** The debris net locations are within deeply scoured creek channels filled with boulders and cobble, generally lacking in instream vegetation and surrounded by riparian habitats and oak woodlands that are designated by CDFW as sensitive natural communities. Although no maintenance has been required to date in spite of relatively heavy rainfall in 2020, the potential exists for major maintenance operations to disturb sensitive plant communities. The proposed maintenance activities could involve use of maintenance crews with hand tools and handheld power tools or use of helicopter airlifts and the use of heavy construction equipment within or in close proximity to these habitats. MM BIO-1 would require a qualified biologist to survey the work areas prior to the initiation of any maintenance activities or materials staging at each of the debris net locations to identify special-status plant species and vegetation communities. MM BIO-5 would require a qualified biologist to lead a worker orientation for all maintenance crews before the initiation of any maintenance activities or materials staging, emphasizing the presence of special-status species and vegetation communities. MM FP-1 would require, to the maximum extent practicable, staging areas be designated within open areas away from existing vegetation. With the implementation of these mitigation measures, the potential for loss or disturbance of a unique, rare or threatened plant community would be less than significant. These conditions of approvals proved effective for protecting Plummer's baccharis during the original installation of the debris nets.

b) ***Less than Significant with Mitigation.*** The proposed maintenance activities could result in disturbance to special-status plant species Plummer's baccharis, which are present near maintenance areas at CS-11 and SY-7a, close to the anchor points for the debris nets. Other special status plant species listed in Table 9 also have the potential to occur within close proximity of the debris nets. MM BIO-1 would require a qualified biologist to survey the work areas at each of the debris nets locations to identify and flag all special-status plant species. If special-status plant species cannot be avoided during maintenance, the number and species of special status plants impacted shall be documented. Mitigation shall include at a minimum relocation of any specimens that cannot be avoided to a suitable site within the immediate vicinity. If relocation of any specimens cannot be achieved or is deemed infeasible, a suitable site within the immediate vicinity shall be identified, and affected species shall be replaced at a minimum ratio of three plantings per affected individual via seeding or container plants or a mixture of both. MM BIO-5 would require a qualified biologist to lead a worker orientation for all maintenance crews emphasizing the presence of special-status species and vegetation communities. With the implementation of these mitigation measures, the potential for loss or disturbance of a unique, rare or threatened plant community would be less than significant. As previously described, these conditions of approvals proved effective for protecting Plummer's baccharis during the original installation of the debris nets.

Photograph 15. *Plummer's baccharis individuals were identified and flagged for avoidance at CS-11 during pre-construction surveys conducted prior to the installation of the debris nets.*

c-e) ***Less than Significant with Mitigation.*** The proposed Project may result in minor short term disturbance or trampling of native and non-native vegetation in the staging areas around the debris nets, particularly during major maintenance activities involving helicopter airlifts and the use of heavy construction equipment. The re-distribution of debris downstream would be completed under the supervision and direction of a qualified geomorphologist and a qualified biologist, with the intent of mimicking the natural geomorphology of the stream and enhancing habitat. For example, fine materials would be placed between the 2-year flow delineation and the 100-year flow delineation. Large rocks would be placed at the toe-slopes of the creek banks to promote bank stabilization, encourage riparian cover, and create roughness elements that restore habitat and reduce overall flood potential. As such, debris would be thoughtfully re-distributed in a way that would not adversely impact native vegetation. MM BIO-1 would require a qualified biologist to survey the work areas at each of the debris net locations to identify special-status plant species and vegetation communities. MM BIO-5 would require a qualified biologist to lead a worker orientation for all maintenance crews emphasizing the presence of special-status species and vegetation communities. MM FP-1 would require, to the maximum extent practicable, staging areas be designated within open areas away from existing vegetation. With the implementation of these mitigation measures, the potential for a reduction in the extent, diversity, or quality of native vegetation would be less than significant.

With respect to healthy native specimen trees, planned maintenance activities are unlikely to require tree removal as such activity would generally be confined to open stream channel and previously cleared staging areas. In the event that a major maintenance event would require tree trimming, MM BIO-2 would require, to the maximum extent feasible, damage to or removal of oak trees shall be avoided as part of net maintenance activities. The area protected from disturbance should include the area 6 feet outside of the dripline of an oak. If a tree or its Critical Root Zone (CRZ) is damaged during net maintenance, the Applicant must follow the guidelines in MM BIO-2, including the County protocol for replacing the damaged trees. With the implementation of this mitigation measure, impacts to specimen trees would be less than significant.

f) ***No Impact.*** Pursuant to the original Emergency Permits and Development Plan the Applicant has the committed to the implementation of an Invasive Plant Management Program, to compensate for 2.61 acres of temporary impacts to ESH associated with the initial installation of the debris nets. The proposed Invasive Plant Management Program would include twice-annual removal of target invasive species for a period of 5 years or until the debris nets are removed. The non-native plants targeted for management were observed becoming established and spreading in the stream channels during field surveys. All of the target plant species are considered invasive by the Cal-IPC. Target species are listed below along with their Cal-IPC rating (i.e., High, Moderate, or Limited):

- Giant reed (*Arundo donax*) (High)
- Black mustard (*Brassica nigra*) (Moderate)
- Cape ivy (*Delairea odorata*) (High)
- Fig (*Ficus carica*) (Moderate)
- Sweet fennel (*Foeniculum vulgare*) (Moderate)
- Tree tobacco (*Nicotiana glauca*) (Moderate)
- Castor bean (*Ricinus communis*) (Limited)
- Saltcedar (*Tamarix ramosissima*) (High)
- Greater periwinkle (*Vinca major*) (Moderate)

Removal of the target invasive plant species would be conducted by maintenance crews walking the stream channels and hand pulling plants or removing plants with the assistance of hand tools (e.g., trowels, shovels, hand-held trimmers). The crews would be trained on what species would be targeted for removal and supervised by a qualified restoration specialist and/or qualified biologist. Plant removal efforts will be timed appropriately to reduce invasive species seed bank (i.e., before plants set seed). All plants will be bagged and disposed of appropriately off-site and no motorized equipment or herbicide will be used. Therefore, there would be no adverse impact related to non-native or invasive species.

g) ***Less than Significant.*** No special-status wildlife species were observed during the September and December 2018 field surveys. However, seven special-status wildlife species have to the potential to occur within the vicinity of the debris nets, including two federally listed species (refer to Table 10).

The federally endangered Southern California steelhead are known to occur historically in Cold Spring Creek and San Ysidro Creek, but are not able to access the debris net locations due to impassible barriers downstream. Therefore, there is little to no possibility of incidental take for this species. Additionally, as described in Section 1, *Request/Project Description,* maintenance activities would be intended to retain spawning gravels within the channel for the federally endangered Southern California steelhead in order to maintain potential habitat. Therefore, implementation of the proposed maintenance activities would not adversely affect the range, habitat, or population within Cold Spring Creek and San Ysidro Creek.

Photograph 16. *During initial installation of the debris nets, a two-striped garter snake relocated from SY-18 work area to a downstream location. Two striped garter snakes are California Species of Special Concern.*

The Biological Resources Assessment identified on previously recorded occurrence of California red legged frog in Cinquefoil Creek, located approximately 0.35 miles north of the confluence of Cold Spring and Hot Springs Creeks. Adult California red legged frogs have also been observed in Montecito Creek, below the confluence with Cold Spring/Hot Springs Creeks during nighttime surveys conducted in September of 2005 (SES 2005). There is also an unpublished record within San Ysidro Canyon from 1982 (Santa Barbara Natural History Museum, unpublished data). Each of the four drainages with existing debris nets provides suitable habitat for California red legged frog; however, if present, local populations were likely to be affected by the Thomas Fire and subsequent debris flow (SES 2019). California red legged frog could be killed or injured if present in the work areas.

The potential for incidental injury or mortality to California red legged frog and other special status wildlife species would be reduced through the implementation of MM BIO-3, which would involve a pre-maintenance survey for special-status species to be conducted by a qualified biologist. Any sensitive species found in the work area during the pre-maintenance survey shall be left to leave on their own or shall be relocated by the qualified biologist off-site to an area that provides suitable habitat conditions, which would be identified by the qualified biologist and confirmed by the County in coordination with the USFWS and CDFW, prior to any ground disturbing activities. Similarly, with respect to nesting birds afforded protection under the Migratory Bird Treaty Act (MBTA), as mandated by MM BIO-4, the qualified biologist shall conduct a pre-maintenance survey of the proposed maintenance areas and adjacent habitats within 7 days of the initiation of maintenance activities (i.e., mobilization, staging, vegetation clearing, or excavation) to avoid impacts to nesting raptors and other birds during the bird nesting season (February 1 to August 31). Additionally, MM BIO-5 would require a qualified biologist to lead a worker orientation for all maintenance crews emphasizing the presence of special-status species and vegetation communities. With the implementation of these mitigation measures, there would be no reduction in the numbers, range, or habitat for any special-status species.

h-i) ***Less than Significant with Mitigation.*** As previously described, wildlife species inhabiting the area surrounding the debris nets include common species such as California treefrog, western fence lizard, and red-tailed hawk. A complete list of all wildlife species observed within the Cold Springs Creek, Santa Ynez Creek, and Buena Vista Santa Ynez Creek during the September and December 2018 surveys, is included in Attachment 3.

Minor maintenance activities would be limited to the use of hand tools and handheld power tools. These activities would have limited potential to directly or indirectly affect wildlife or their habitat. Major maintenance activities would involve the use of heavy construction equipment that could trample small wildlife species (e.g., amphibians and reptiles). However, MM BIO-3 would involve a pre-maintenance survey for special-status species to be conducted by a qualified biologist. Any wildlife species found in the work area during the pre-maintenance survey would be re-located by the qualified biologist off-site to an area that provides suitable habitat conditions, identified by the qualified biologist. MM BIO-5 would require a qualified biologist to lead a worker orientation for all maintenance crews emphasizing the presence of wildlife species and their habitats. Additionally, as previously described, MM FP-1 would require, to the maximum extent practicable, staging areas be designated within open areas away from existing vegetation. This would further limit the potential for adverse impacts to upland habitats.

Photograph 17. *During initial installation of the debris nets, coast range newts were relocated from work areas at CS-11 and CS-18 to downstream locations in Cold Spring Creek throughout construction.*

All maintenance work would be directed and supervised by a qualified biologist. If wildlife species are identified, the biologist would stop or re-direct work to allow the individuals to leave on their own or to re-locate the individual to an area that provides suitable habitat conditions. Additionally, as described in Section 1, *Request/Project Description*, if a temporary dewater and diversion system is required upstream and downstream exclusion nets would be set in place to ensure no aquatic or amphibious species enter the diversion pipes.

These conditions of approval proved effective for during the original installation of the debris nets. As described in the Construction Completion Report, wildlife found in the work areas (e.g., California treefrog and Baja California treefrog) were removed from the work area by a qualified biologist. No wildlife, including special-status wildlife species, were harmed during the construction of the debris nets.

j-k) ***No Impact.*** As with the debris flow on January 9, 2018, debris flows introduce barriers to movement for wildlife species, particularly aquatic species that depend on the low-flow channel. With the implementation of MM BIO-8, the proposed maintenance activities – which would be directed and supervised by a qualified geomorphologist and a qualified biologist – would re-distribute large boulders, rocks, tree trunks, branches and other debris in a manner that mimics natural stream deposition and is favorable to wildlife. During the proposed maintenance activities human presence and noise may temporarily disrupt the behavior of wildlife within the vicinity. However, the proposed Project does not include any new permanent development or long-term elements (e.g., light, fencing, noise, human presence and/or domestic animals) which could affect the wildlife activities. The proposed Project involves the maintenance of existing debris nets to remove backfilled debris and maintain 3 to 5 feet of freeboard between the bottom of the net and the water surface. The proposed maintenance of the debris nets would ensure continued movement of aquatic and terrestrial wildlife underneath and around the debris nets. Therefore, the proposed maintenance activities would not introduce any long-term barriers to movement or any other factors that would adversely impact to wildlife.

Cumulative Impacts: As previously described, reconstruction or repair of as many as 400 residences as well as public infrastructure (e.g., roads, bridges, new or expanded flood control detention basins) would result in ground disturbance and vegetation removal that may have the potential to impact special-status species and sensitive habitats. The proposed Project – particularly the proposed major maintenance activities – also has the potential to impact sensitive species and habitats. However, the implement MM BIO-1 through MM BIO-8 would reduce impacts to less than significant with mitigation. Therefore, when considered with other cumulative projects in the region – including reconstruction efforts associated with the debris flows – the proposed Project would not contribute to a considerable cumulative impact.

Mitigation and Residual Impact: The following mitigation measures would reduce the potentially significant impacts to biological resource impacts to a less than significant level.

MM BIO-1: **Pre-maintenance Vegetation Surveys and Avoidance of Special-Status Plant Species.** A County-approved and CDFW-qualified biologist shall be contracted by the Applicant to supervise all debris net maintenance. Prior to the commencement of any maintenance activities or materials staging, the qualified biologist shall conduct a vegetation survey and flag all special-status plant populations (e.g., Plummer's baccharis) located near debris net locations. The qualified biologist shall be present during ground disturbance maintenance activities to ensure that special-status plants are avoided. If special-status plant species cannot be avoided, the number and species of special status plants impacted shall be documented by the qualified biologist. Mitigation shall include at a minimum relocation of any individuals that cannot be avoided to a suitable site within the immediate vicinity. If relocation of any individuals cannot be achieved or is determined to be infeasible by the qualified biologist, a suitable site within the immediate vicinity shall be identified, and affected species shall be replaced at a minimum ratio of three plantings per affected individual via seeding or container plants or a mixture of both. To protect the genetic integrity of the native plant populations, all native plants and seed materials used for plantings must be collected from the local watershed or the foothills of Montecito. Relocated or replacement plants shall be monitored quarterly by a qualified biologist each year for a minimum of 3 years to ensure the success of mitigation. Criteria for successful mitigation shall be at least 70-percent survival of the restored species.

Plan Requirements and Timing: The qualified biologist shall conduct the vegetation survey prior to the commencement of any maintenance activities or materials staging. If relocation or replacement of impacted special-status plant species is required, a Restoration Plan, including proposed replacement planting areas and seedlings or container plants, shall be prepared by the qualified biologist and reviewed and approved by the County Planning and Development Department.

Monitoring: The County Planning and Development Department would approve the qualified biologist and ensure that the qualified biologist is present to direct and supervise all required maintenance activities. County Planning and Development Department permit compliance staff shall spot check in the field throughout maintenance activities and at least once during each major maintenance activity. A maintenance completion report shall be prepared by the qualified biologist and submitted to the County Planning and Development Department for review following the completion of maintenance activities.

MM BIO-2: **Tree Damage or Removal.** To the maximum extent feasible, damage to or removal of oak trees shall be avoided as part of net maintenance activities. If it becomes necessary to remove a tree, the tree shall be boxed and replanted. If the qualified biologist determines that it is not feasible to replant the tree, it shall be replaced on a 10:1 basis (15:1 for blue oaks [*Quercus douglasii*] or valley oaks [*Quercus lobate*]), with trees with 10-gallon or larger size saplings grown from locally obtained seed. If replacement trees cannot all be accommodated on site, a plan must be approved by the County Planning and Development Department for replacement trees to be planted off site.

Plan Requirements and Timing: During the pre-maintenance vegetation survey, the qualified biologist shall evaluate whether tree removal would be necessary to complete the required maintenance activities.

Monitoring: County Planning and Development Department staff shall ensure that the Applicant follows all required conditions of tree replacement, as deemed appropriate by the qualified biologist.

MM BIO-3: **Wildlife Surveys and Avoidance or Relocation.** Prior to each day of maintenance activities, the qualified biologist shall conduct a wildlife survey to identify any aquatic or terrestrial wildlife species. Any individuals found in the work area during the survey shall be left to leave on their own or shall be relocated by the qualified biologist off-site to an area that provides suitable habitat conditions, which would be identified by the qualified biologist and confirmed by the County Planning and Development Department in coordination with the USFWS and CDFW, if necessary.

Plan Requirements and Timing: The wildlife survey would occur each day prior to the initiation of maintenance activities. The Applicant and maintenance crews shall adhere to all recommendations of the qualified biologist (e.g., setbacks).

Monitoring: County Planning and Development Department permit compliance staff shall spot check in the field throughout maintenance activities and at least once during each major maintenance activity. Wildlife survey results shall be summarized in a maintenance completion report that shall be prepared by the qualified biologist and submitted to the County Planning and Development Department for review following the completion of maintenance activities.

MM BIO-4: **Nesting Birds.** To avoid disturbance of nesting birds, including raptorial species, protected by the MBTA and Sections 3503, 3503.5, and 3513 of the California Fish and Game Code, maintenance activities shall occur outside of the bird nesting season (February 1 through August 31), whenever feasible. If maintenance activities must occur during the bird nesting season, then a pre-construction nesting bird survey shall be performed by the qualified biologist. Pre-construction surveys for nesting birds shall occur within the area to be disturbed and shall extend outward from the disturbance area by 500 feet. The distance surveyed from the disturbance may be reduced if natural boundaries render a 500-foot survey radius infeasible, such as a steep ledge or rocky area. If any occupied or active bird nests are found, a buffer shall be established and demarcated by the qualified biologist with bright orange construction fencing, flagging, construction lathe, or other means to mark the boundary. The buffer shall be 300 feet for non-raptors and 500 feet for raptors, unless otherwise determined by the qualified biologist and approved by the County. Buffer reductions shall be based on the known natural history traits of the bird species, nest location, nest height, existing pre-construction level of disturbance in the vicinity of the nest, and proposed maintenance activities. All construction workers shall be notified as to the location of the buffer zone and to avoid entering the buffer zone during the nesting season. No ground disturbing activities or vegetation removal shall occur within this buffer until the qualified biologist has confirmed that nesting is completed, the young have fledged and are no longer dependent on the nest, or the nest fails, and there is no evidence of a second nesting attempt; thereby determining the nest unoccupied or inactive. If birds protected under the MBTA or the California Fish and Game Code are found to be nesting in construction equipment, that equipment shall not be used until the young have fledged and are no longer dependent on the nest, and there is no evidence of a second nesting attempt. The nesting bird survey shall be conducted no more than 72 hours prior to the commencement of maintenance activities (i.e., mobilization, staging, vegetation clearing, or excavation).

Plan Requirements and Timing: If maintenance must occur within the nesting season, then the pre-construction nesting bird survey shall be conducted no more than 1 week (7 days) prior to commencement of maintenance activities. Active nests shall be monitored by the qualified biologist at a minimum of once per week until it has been determined that the nest is no longer being used by either the young or adults, and there is no evidence of a second nesting attempt. Bird survey results and buffer recommendations shall be submitted to the County Planning and Development Department for review and approval prior to commencement of any maintenance activities (e.g., grading). The qualified biologist shall prepare weekly monitoring reports, which shall document nest locations, nest status, actions taken to avoid impacts, and any necessary corrective actions taken. Active nest locations shall be marked on an aerial map and provided to construction workers on a weekly basis after each survey is conducted. Active nests shall not be removed without written authorization from USFWS and CDFW.

Monitoring: County Planning and Development Department permit compliance staff shall spot check in the field throughout during maintenance activities and at least once during each major maintenance activity. Wildlife survey results shall be summarized in a maintenance completion report that shall be prepared by the qualified biologist and submitted to the County Planning and Development Department for review following the completion of the survey and before maintenance shall commence. County Planning and Development Department permit compliance staff shall spot check attendance in the field during maintenance activities.

MM BIO-5: **Work Orientation.** Prior to the commencement of maintenance activities or staging, the qualified biologist shall provide worker orientation for all maintenance contractors (including site supervisors, equipment operators, and maintenance crews) which emphasizes the presence of special-status species within and/or adjacent to the debris net locations, identification of those species, their habitat requirements, applicable regulatory policies and provisions regarding their protection, measures being implemented to avoid and/or minimize impacts, and penalties for noncompliance will be conducted.

Plan Requirements and Timing: The qualified biologist shall conduct the training prior to the commencement of any maintenance activities or staging.

Monitoring: The Applicant shall provide a work orientation sign-in sheet to the County Planning and Development Department. County Planning and Development Department permit compliance staff shall spot check attendance in the field using the orientation sign-in sheet.

MM BIO-6: **Staging Areas.** All maintenance equipment shall be limited to designated work and staging areas. Minor adjustments may be made in the field in consideration of topography and current flow conditions, with the approval of the qualified biologist.

Plan Requirements and Timing: The qualified biologist shall evaluate proposed staging areas before any equipment can be brought to or staged near the debris net locations. Proposed staging areas shall be shown on a site plan submitted to the County Planning and Development Department prior to issuance of the follow-up Zoning Clearance.

Monitoring: County Planning and Development Department permit compliance staff shall spot check in the field throughout maintenance activities and at least once during each major maintenance activity.

MM BIO-7: **Spill Prevention and Water Quality Management.** No equipment, diesel fuel, or grout shall be staged or stored within the stream channel. Fueling of equipment shall not be done within 100 feet of the active channel. Stationary equipment and fluid storage vessels shall be equipped with secondary containment. A spill containment and cleanup kit shall be on-site at each location while work is in progress. No maintenance shall occur within 24 hours of an NWS forecasted 0.25-inch rain event. All heavy construction equipment shall be maintained in proper working condition and shall be free of drips and leaks of coolant, hydraulic, and petroleum products. All heavy construction equipment shall also be power-washed before mobilization to the debris net locations site. Trash and food items shall be kept in closed containers and removed daily.

Plan Requirements and Timing: These requirements shall be discussed during the orientation so that all maintenance crews are aware of all BMPs. All BMPs related to cleaning and fueling of heavy construction equipment must be completed before maintenance begins. All equipment shall be inspected by the qualified biologist before being moved to the staging areas.

Monitoring: County Planning and Development Department permit compliance staff shall spot check in the field throughout maintenance activities and at least once during each major maintenance activity.

MM BIO-8: **Sediment and Rocky Materials.** Sediment controls shall be installed downstream from the work area when accumulated material from behind the net is re-distributed. Once the low-flow channel has been reestablished, soil and rock shall be cast to the side of the active channel. If feasible, a temporary retention basin may be used to control turbidity. Large boulders, rocks, and coarse materials shall be re-distributed in a manner that mimics natural stream deposition and is favorable to wildlife. Re-distribution of accumulated material shall be completed under the supervision of a qualified geomorphologist and a qualified biologist.

Plan Requirements and Timing: The qualified geomorphologist and qualified biologist shall be on-site during all maintenance activities to ensure that accumulated sediment is re-distributed appropriately. The maintenance completion report shall summarize the re-distribution of debris downstream.

Monitoring: County Planning and Development Department permit compliance staff shall spot check in the field throughout maintenance activities and at least once during each major maintenance activity. The maintenance completion report shall be submitted to the County Planning and Development Department for review following the completion of maintenance activities.

4.5 CULTURAL RESOURCES

Will the proposal:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
a. Cause a substantial adverse change in the significance of any object, building, structure, area, place, record, or manuscript that qualifies as a historical resource as defined in CEQA Section 15064.5?		X			

Will the proposal:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
b. Cause a substantial adverse change in the significance of a prehistoric or historic archaeological resource pursuant to CEQA Section 15064.5?		X			
c. Disturb any human remains, including those located outside of formal cemeteries?		X			
d. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in the Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: 1) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or 2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.		X			

Existing Setting: The Barbareño Chumash resided throughout the South Coast from Carpinteria west to Point Conception. The coastal areas along the Santa Barbara Channel represent the highest density of prehistoric occupation along the West Coast. Larger tribal villages are recorded closer to the coastline, particularly at the confluence with creeks and/or estuaries. Smaller temporary campsites and special activity areas (e.g., plant gathering/processing and hunting areas) were located in higher elevations within the foothills of the Santa Ynez Mountains, often in close proximity to fresh water sources such as Cold Springs Creek.

Pursuant to the requirements of Assembly Bill (AB) 52, the County contacted the local Native American tribal representatives of the Barbareño/Ventureño Band of Mission Indians and the Santa Ynez Band of Chumash Indians (SYBCI) to formally notify the tribes of a consultation opportunity. The County sent a letter and an e-mail e-mail communication on July 6, 2020 to Julie Tumamait-Stenslie, Chair, Barbareño/Ventureño Band of Mission Indians, Kenneth Kahn, Tribal Chairman, SYBCI and Freddie Romero, SYBCI Cultural Resources Coordinator. Both tribes formally requested consultation. During follow up phone calls with the Barbareño/Ventureño Band of Mission Indians on July 9 and July 21, 2020 as well as a follow up e-mail on July 22, 2020 Chair Tumamait-Stenslie requested the preparation of a Phase I Cultural Resources Survey to determine the potential for buried cultural resources to occur within the vicinity of the debris nets. During a follow up phone call with the SYBCI on July 8, 2020 Mr. Romero indicated that he was satisfied no adverse effects would occur as a result of the proposed Project. However, he requested to be notified of any changes to the proposed Project, or if any cultural materials are inadvertently discovered. Neither tribe identified the presence of any significant Tribal Cultural Resource.

As previously described in Section 3.0, *Environmental Setting*, an archaeological site records and literature search of the CHRIS CCIC, University of California, Santa Barbara, was conducted on August 20, 2020. The records search identified all previously conducted cultural resource surveys and any known archaeological sites located within a 0.5-mile buffer around each of the six debris nets. The search found that the areas around four of the debris nets had not previously been investigated, and that the area around the two nets at Cold Springs Canyon (CS-11 and CS-18), had been previously investigated eight times. Two prehistoric archaeological sites, one historic-period archaeological site, and one archaeological site with a prehistoric and historic component have been recorded within the 0.5- mile radius of CS-11 and CS-18. However, there are no prehistoric or historic-period archaeological resources that have been recorded within the stream channel or immediately adjacent upland areas that would be affected by the proposed maintenance activities.

On August 1 and 3, 2020, an intensive ground surface survey was conducted at all six debris net locations including the areas 50 feet upstream and downstream of the debris nets. No previously unrecorded prehistoric or historic-period resources were identified during this survey (see Section 4.5, *Cultural Resources*). Between 60 and 100 percent of ground surfaces within the canyons and upland were visible during the survey (e.g., not obstructed by shrubs or other thick understory vegetation), giving a reliable indication of the absence of archaeological resources. All six locations were determined to have been substantially modified during the 2018 debris flow, indicating that the potential for intact prehistoric archaeological resources in the canyons is very low.

County Environmental Thresholds: The County's Cultural Resources Guidelines contains guidance for the identification, significance evaluation, and mitigation of impacts to cultural resources, including archaeological, historic, and tribal cultural resources. In accordance with the requirements of CEQA, these guidelines specify that if a resource cannot be avoided, it must be evaluated for importance pursuant to CEQA Section 15064.5(a)(3). Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the significance criteria for listing in the California Register of Historical Resources: (A) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage; (B) Is associated with the lives of persons important in our past; (C) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or (D) Has yielded, or may be likely to yield, information important in prehistory or history. The resource also must possess integrity of at least some of the following: location, design, setting, materials, workmanship, feeling, and association.

CEQA defines cultural resources that meets one or more of these criteria as "historical resources." Specifically, a "historical resource" is a cultural resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources, or included in or eligible for inclusion in a local register of historical resources, as defined in subdivision (k) of Section 5020.1, or deemed significant pursuant to criteria set forth in subdivision (g) of Section 5024.1. As such, any cultural resource that is evaluated as significant under CEQA criteria, whether it is an archaeological resource of historic or prehistoric age, a historic built environment resource, or a tribal cultural resource, is termed a "historical resource."

CEQA Guidelines Section 15064.5(b) states that "a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment." As defined in CEQA Guidelines Section 15064.5(b), substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired. The significance of an historical resource is materially impaired when a project:

1. Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources;
2. Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources; or
3. Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by a lead agency for purposes of CEQA.

For the built environment, a project that follows the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings or the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings (Weeks and Grimmer 1995), is generally considered as mitigated to a less than a significant impact level on the historical resource.

Impact Discussion:

a-d) ***Less than Significant with Mitigation***. There are no built historical resources present at any of the six debris net locations or in the surrounding vicinity. Given that the six debris nets are located within active, deeply scoured creek channels, the potential for intact prehistoric archaeological resources to exist within the canyons is very low. Any such resources would be located on terraces above the active creek channel, in areas not subject to erosion and flooding. In response to input received from Chair Tumamait-Stenslie, Barbareño/Ventureño Band of Mission Indians during the AB 52 consultation process, MM CUL-1 would require the presence of a County-approved archaeological monitor and a Native American monitor during all maintenance activities in compliance with the provisions of the County Archaeological Guidelines. As described in *Required Avoidance and Minimization Measures*, as a condition of approval for the Development Plan, the Applicant shall stop or redirect work immediately in the event archaeological remains are encountered during grading, construction, landscaping, or other construction-related activities, as described further in MM CUL-2 and MM CUL-3. The County-approved archaeological monitor and Native American monitor shall evaluate the significance of the find in compliance with the provisions of the County Archaeological Guidelines and conduct appropriate mitigation to be funded by the Applicant. In the unlikely event that potential human remains are identified during excavations or grading, all activity in the vicinity of the find would be immediately suspended and redirected elsewhere. All steps required to comply with Public Resources Code 5097.98 would be implemented. With the implementation of MM CUL-1, MM CUL-2, and MM CUL-3 impacts to archaeological, prehistoric, and historic resources, as well as human remains, would be less than significant with mitigation.

Cumulative Impacts: As previously described, reconstruction or repair of as many as 400 residences as well as public infrastructure (e.g., roads, bridges, new or expanded flood control detention basins) would result in construction activities and ground disturbance that may have the potential to impact historic built resources or buried archaeological resources. Based on the lack of known archaeological resources in the vicinity of the debris nets, the proposed Project would not be expected to result in impacts to known archaeological, prehistoric, and tribal resources. Nevertheless, the implementation of MM CUL-1, MM CUL-2, and MM CUL-3 would reduce impacts to less than significant with mitigation. Therefore, when considered with other cumulative projects in the region – including reconstruction efforts associated with the debris flows – the proposed Project would not contribute to a considerable cumulative impact.

Mitigation and Residual Impact: While highly unlikely, the implementation of the following mitigation measures would reduce potentially significant impacts to cultural resources to less than significant:

MM CUL-1: **Cultural Resource Monitors.** The Applicant shall be responsible for funding a qualified archaeological monitor to be approved by the County Planning and Development Department as well as a Native American monitor. The qualified archaeological monitor and Native American monitor shall be present during all maintenance activities in compliance with the provisions of the County Archaeological Guidelines.

Plan Requirements and Timing: Prior to the issuance of subsequent Zoning Clearances by the County, the Applicant shall submit a contract or Letter of Commitment between the Applicant and the archaeological monitor for review and approval by the County Planning and Development Department. This contract or Letter of Commitment shall include a project description and scope of work, and once approved, shall be executed by the Applicant.

Monitoring: The Applicant shall provide County Planning and Development Department permit compliance staff with the name and contact information for the County-approved archaeological monitor and Native American monitor prior to the issuance of subsequent Zoning Clearances by the County. County Planning and Development Department permit compliance staff shall spot check in the field throughout during maintenance activities and at least once during each major maintenance activity.

MM CUL-2: **Stop Work at Encounter.** The Applicant and/or their agents, representatives, or contractors shall stop or redirect work immediately in the event archaeological remains are encountered during any maintenance activities. The approved archaeological monitor and Native American monitor shall evaluate the significance of the find in compliance with the provisions of the *County of Santa Barbara Cultural Resource Guidelines*. If the cultural resources are determined to be significant, a mitigation plan shall be prepared and conducted by a County-qualified archaeologist subsequent to review and approval by the County of Santa Barbara. All excavations will be monitored by a local Chumash tribal observer.

Plan Requirements and Timing: This condition shall be identified as a condition of approval in Development Plan Case No. 19DVP-00000-00036. If archaeological remains are discovered, maintenance activities shall stop or be redirected immediately. The Applicant shall immediately contact the County Planning and Development Department.

Monitoring: County Planning and Development Department permit compliance staff shall spot check in the field throughout during maintenance activities and at least once during each major maintenance activity.

MM CUL-3: **Encountering Human Remains.** Consistent with CEQA Guidelines Section 15064.5(e), if human remains are accidentally discovered or recognized during maintenance activities, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the Native American Heritage Commission (NAHC). The NAHC shall then identify the person(s) thought to be the Most Likely Descendent of the deceased Native American, who shall then help determine what course of action should be taken in dealing with the remains. Per Public Resources Code 5097.98, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred, as prescribed in this section (Public Resources Code 5097.98), with the most likely descendants regarding their recommendations, if applicable, taking into account the possibility of multiple human remains.

Plan Requirements and Timing: This condition shall be identified as a condition of approval in Development Plan Case No. 19DVP-00000-00036. If human remains are discovered, maintenance activities would stop immediately. The Applicant shall immediately contact the County Planning and Development Department. The County Planning and Development Department would be responsible for contacting the County Coroner.

Monitoring: County Planning and Development Department permit compliance staff shall ensure that no further disturbance shall occur until the County Coroner has made all necessary findings as to origin and disposition pursuant to Public Resources Code Section 5097.98.

4.6 ENERGY

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
a. Substantial increase in demand, especially during peak periods, upon existing sources of energy?			X		
b. Requirement for the development or extension of new sources of energy?				X	

Existing Setting: Private electrical and natural gas utility companies provide service to customers in the unincorporated areas of the County. The local efforts that support energy efficiency include the adoption of the ECAP (County of Santa Barbara 2015a) and the creation of the Energy and Sustainability Initiatives Division (County of Santa Barbara 2015b).

The debris nets are located in the Santa Ynez Mountains within Cold Springs Canyon, San Ysidro Canyon, and Buena Vista Canyon. The existing debris nets do not require the use of electricity or natural gas and no associated infrastructure (e.g., above ground or buried electrical or natural gas lines) is present within the vicinity.

County Environmental Thresholds: The County has not established significance thresholds for electrical and/or natural gas service impacts. Private electrical and natural gas utility companies provide service to customers in Central California and Southern California, including the unincorporated areas of the County.

Impact Discussion:

a) ***Less than Significant.*** The proposed maintenance activities could include the infrequent and temporary use of light-duty trucks, power tools, heavy construction equipment, generators, and a helicopter all of which would be fueled by gasoline and diesel. Use of these fuels would create a negligible demand on existing energy sources when considered in the context of regional supplies. However, given that the proposed Project would not include any permanent development, there would be no long-term commitment of electricity, natural gas, or transportation fuels. Therefore, the overall impact on energy use would be less than significant.

b) ***No Impact.*** The proposed maintenance of the debris nets would not require any long-term or permanent increase in energy demand and would not require utility service, development of new sources of energy, or the extension of energy sources. Therefore, no impact on energy infrastructure would occur.

Cumulative Impacts: The proposed Project would create a negligible demand on existing energy sources. Therefore, when considered with other cumulative projects in the region – including reconstruction efforts associated with the debris flows – the proposed maintenance activities would not contribute to a cumulatively considerable impact on energy resources.

Mitigation and Residual Impact: No mitigation is required. Residual impacts associated with the proposed maintenance activities would remain less than significant.

4.7 FIRE PROTECTION

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
a. Introduction of development into an existing high fire hazard area?		X			
b. Project-caused high fire hazard?		X			
c. Introduction of development into an area without adequate water pressure, fire hydrants or adequate access for fire fighting?			X		
d. Introduction of development that will hamper fire prevention techniques such as controlled burns or backfiring in high fire hazard areas?			X		
e. Development of structures beyond safe Fire Dept. response time?			X		

Existing Setting: Due to relatively low annual precipitation, highly flammable vegetation, and high velocity "sundowner" and "Santa Ana" winds, the County has routinely experienced major wildfires that can threaten residents' safety and damage property. One of the most recent examples in the region was the Thomas Fire, which burned approximately 281,893 acres. Following the Thomas Fire in December 2017, a subsequent storm event on January 9, 2018 resulted in substantial debris flows along several creeks in the south coast of Santa Barbara County. The debris flows impacted expansive areas within the community of Montecito, resulting in 23 fatalities, damage to or loss of more than 400 homes and dozens of businesses, and temporary but prolonged closure of U.S. Highway 101.

According to information obtained from the California Department of Forestry and Fire Protection (CAL FIRE), the debris nets are located in a State and local High Fire Hazard Area (CAL FIRE 2020; Santa Barbara County 1993). The County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) also designates critical hazard areas of the County, as areas subject to greater threat from wildfire, and identifies these areas based on slope, vegetation, ability to respond to fire threats, and localized weather conditions to assist in preparation of County hazard mitigation and response planning (County of Santa Barbara Office of Emergency Management 2017). The debris nets are located within an area designated as being at risk to extreme threat to wildfire.

The debris net locations occur within the service area of the Montecito Fire Protection District (MFPD). The Cold Springs Trailhead, San Ysidro Trailhead, and Buena Vista Trailhead are located approximately 1.7, 3.4, and 3.7 miles, respectively, from the MFPD Station No. 2, located at 2300 Sycamore Canyon Road.

County Environmental Thresholds: The County's Environmental Thresholds and Guidelines Manual does not include specific thresholds for fire protection. Additionally, the County Fire Department Standards do not apply to the proposed Project, as the proposed Project would not include any proposed structures over 5,000 square feet and would not include development of any new residential or access roads.

Impact Discussion:

a-b) ***Less than Significant with Mitigation***. The proposed maintenance activities would not introduce any new permanent development or structures into an existing High Fire Hazard Area. However, the potential exists that operation of handheld power tools (e.g., chainsaws) or heavy construction equipment (e.g., Spyder excavators and 10-ton class excavators) could cause sparks that could potentially lead to accidental ignition of a wildfire. The most intensive maintenance activities would generally occur during the wet season immediately following a storm event. During this period, the risk of wildfire ignition would be considered low due to the wetted fuels. However, re-distribution of debris downstream of the debris would also occur during the dry season following major maintenance activities. In this scenario, the introduction of machinery and equipment – particularly in between the 2-year and 100-year delineated flow – could increase risk of wildfire hazard or result in ignition of a fire – particularly in upland areas with grass, shrubs, or other similar fuel types. Implementation of MM FP-1 would reduce the risk of wildfire hazard through various requirements intended to reduce the potential for accidental spark or ignition during the proposed maintenance activities. Implementation of MM FP-1 would reduce the potentially significant impact to fire protection to less than significant with mitigation.

c-e) ***Less than Significant***. The proposed maintenance activities would not introduce any new permanent development or structures into an existing High Fire Hazard Area or otherwise reduce the ability of MFPD to provide fire protection services. Pursuant to the conditions of the original Emergency Permits and Development Plan, parking during maintenance activities shall not occur at the trailheads. Maintenance crews and monitors shall be shuttled to each canyon and shall hike into each debris net location. If maintenance crews cannot access the debris net locations by foot, they would be airlifted to the debris net locations along with the required heavy construction equipment and other equipment and construction materials necessary to accomplish the required major debris accumulation maintenance activities. As such, the proposed maintenance activities would not affect access or the existing response times of MPFD. Additionally, while there are no fire service lines or fire hydrants, the proposed maintenance activities would not obstruct or preclude the use of existing regional water sources use to fight wildfires. Therefore, implementation of the proposed Project would have a less than significant impact on fire protection.

Cumulative Impacts: The proposed Project would not introduce new permanent development or structures into the existing High Fire Hazard Area, or otherwise affect the existing access or response time of MFPD Station No. 2. Further, the implementation of MM FP-1 would reduce the risk of wildfire hazard through various requirements intended to reduce the potential for accidental spark or ignition during the proposed maintenance activities. Therefore, when considered with other cumulative projects in the region – including reconstruction efforts associated with the debris flows – implementation of the proposed Project would not contribute to a cumulatively considerable impact.

Mitigation and Residual Impact: The implementation of the following mitigation measure would reduce potentially significant impacts related to fire protection to a less than significant:

MM FP-1: **Fire Protection.** During debris net maintenance, all appropriate measures shall be taken to minimize the potential for brush fires from use of heavy construction equipment, vehicles with catalytic converters, mechanized hand tools, etc. These measures shall include, but shall not be limited to:

- To the maximum extent practicable staging areas for handheld power tools and/or heavy construction equipment shall be designated within open areas away from existing vegetation and in areas of reduced risk of ignition;
- Maintenance crews shall be required to have an extinguisher on-site during maintenance activities involving the use of handheld power tools or heavy construction equipment.
- Personnel shall be briefed on the dangers of wildfire and be able to respond accordingly should the need arise;
- On-site supervisor(s) shall have a cell phone, satellite phone, or other means of initiating a 911 response time in a timely manner in the event of a wildfire and/or medical emergency;
- All dead and decadent vegetation immediately surrounding the debris nets shall be removed at the discretion of the qualified biologist and all soil disturbance other than debris removal should be kept at a minimum;
- Smoking shall be prohibited during maintenance activities other than in a designated staging area; and
- All equipment maintenance and refueling shall occur off-site or within the designated staging area.

Plan Requirements and Timing: This condition shall be identified as a condition of approval in Development Plan Case No. 19DVP-00000-00036. The Applicant and/or their agents, representatives, or contractors shall demonstrate all required provisions for fire protection to the County Planning and Development Department prior to issuance of subsequent Zoning Clearances by the County. The name and telephone number of the on-site supervisor shall be provided to the County Planning and Development Department as well as the MFPD prior to issuance of subsequent Zoning Clearances.

Monitoring: County Planning and Development Department permit compliance staff shall spot check in the field throughout maintenance activities and at least once during each major maintenance activity.

4.8 GEOLOGIC PROCESSES

Will the proposal result in:	Poten. Signif.	Less than Signif. with Mitigation	Less Than Signif.	No Impact	Reviewed Under Previous Document
a. Exposure to or production of unstable earth conditions such as landslides, earthquakes, liquefaction, soil creep, mudslides, ground failure (including expansive, compressible, collapsible soils), or similar hazards?			X		
b. Disruption, displacement, compaction or overcovering of the soil by cuts, fills or extensive grading?			X		
c. Exposure to or production of permanent changes in topography, such as bluff retreat or sea level rise?				X	

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
d. The destruction, covering or modification of any unique geologic, paleontologic or physical features?				X	
e. Any increase in wind or water erosion of soils, either on or off the site?			X		
f. Changes in deposition or erosion of beach sands or dunes, or changes in siltation, deposition or erosion which may modify the channel of a river, or stream, or the bed of the ocean, or any bay, inlet or lake?			X		
g. The placement of septic disposal systems in impermeable soils with severe constraints to disposal of liquid effluent?				X	
h. Extraction of mineral or ore?				X	
i. Excessive grading on slopes of over 20%?				X	
j. Sand or gravel removal or loss of topsoil?				X	
k. Vibrations, from short-term construction or long-term operation, which may affect adjoining areas?			X		
l. Excessive spoils, tailings or over-burden?				X	

Existing Setting: As described further in the General Report of Findings (KANE GeoTech, Inc. 2018; see Attachment 1) bedrock within the Santa Ynez Mountains is almost entirely composed of interbedded sandstone and shale strata. These beds exhibit differential weathering causing large, blocky sandstone overhangs seen throughout the area. The blocks eventually weather and fall, resulting in sandstone boulders of various sizes that collect within the drainages. The Santa Ynez Mountains are covered in Quaternary alluvial deposits including flood plain deposits and large, prominent alluvial fan resulting from earlier debris flow events (KANE GeoTech, Inc. 2018). The soils at CS-11, CS-18, SY-7, and BV-11 are made up of stony fine sandy loam at shallow depths, and loam and unweathered bedrock at deeper depths (USDA 2020). The soils at SY-18 and BV-8 are largely similar, but with more unweathered bedrock (USDA 2020).

County Environmental Thresholds: Pursuant to the County's Geologic Constraints Guidelines, impacts related to geological resources may have the potential to be significant if the project involves any of the following characteristics:

1. The project site or any part of the project is located on land having substantial geologic constraints, as determined by the County Planning and Development Department. Areas constrained by geology include parcels located near active or potentially active faults and property underlain by rock types associated with compressible/collapsible soils or susceptible to landslides or severe erosion. "Special Problems" areas designated by the Board of Supervisors have been established based on geologic constraints, flood hazards and other physical limitations to development.
2. The project results in potentially hazardous geologic conditions such as the construction of cut slopes exceeding a grade of 1.5 horizontal to 1 vertical.
3. The project proposes construction of a cut slope over 15 feet in height as measured from the lowest finished grade.
4. The project is located on slopes exceeding 20 percent grade.

Impact Discussion:

a) ***Less than Significant.*** The debris nets are located in close proximately to the Mission Ridge Fault in the western area of Montecito, while the extensive Santa Ynez Fault runs along the entire width of the Santa Ynez Mountain above Montecito (KANE GeoTech, Inc. 2018). Additionally, as evidenced by the debris flow on January 9, 2018, the Project site is susceptible to landslides and mudslides – particularly following the Thomas Fire in December 2017.

The existing debris nets are intended to limit to the potential for mobilization of sediments and prevent catastrophic debris flows. The proposed maintenance activities would not result in any pavements, structures, or other permanent development or land uses that would expose people to additional threat from seismic or geologic hazards. In addition, the proposed Project would not result in an increase in population or employment opportunities within this region. Therefore, the proposed maintenance activities would not pose seismic risks beyond those that already exist in the region and impacts would be less than significant.

b) ***Less than Significant.*** The proposed maintenance activities could result in excavation within the low-flow channel and side casting of debris to above the low flow channel. Under the direction and supervision of a qualified geomorphologist and a qualified biologist, the material excavated during re-establishment of the low-flow channel would be side-cast in a manner that does not impede the low-flow channel and maximizes the potential for habitat restoration. Restoration activities would include maintaining flow conditions within the stream channel, mimicking natural deposition of material, and creating pools and eddies. The distance for re-distribution downstream shall depend on the professional judgment of the qualified geomorphologist and the qualified biologist taking into account the amount of debris and precise channel topography downstream (refer to *Debris Types and Placement*). Impacts related to disruption, displacement, compaction or overcovering of the soil by cuts, fills or extensive grading would be less than significant.

c) ***No Impact.*** The proposed Project is not located immediately adjacent to the coastline and would not be impacted by bluff retreat or sea level rise. Therefore, no impact would occur as a result of the proposed maintenance activities.

d) ***No Impact.*** There are no known unique geologic, paleontological, or other physical resources within the debris net locations. The canyons is made of bedrock, which is a material that is unlikely to be impressionable for fossils. Any such resources that could be impacted by maintenance activities are likely to have been destroyed or damaged and carried downstream during scouring associated with the January 9, 2018 debris flow. Therefore, there would be no impacts to unique geological features.

e-f) ***Less than Significant.*** The intent of the existing debris nets authorized under the original Emergency Permits and Development Plan is to capture large boulders, rocks, tree trunks, branches, and mudflows in order to prevent catastrophic debris flows downstream. Following the original installation of the nets in April and September 2019, no substantial maintenance activities have been required. In order to provide additional time for the recovery of the watershed affected by the Thomas Fire (i.e., re-growth of vegetation necessary to stabilize exposed soils), the Applicant has proposed the continued maintenance of the six Geobrugg flexible debris nets for an additional 3 years, for a cumulative total of 5 years of maintenance activities. The proposed maintenance of the debris nets would not result in an increase in wind or water erosion. BMPs would be implemented to minimize downstream turbidity originating from the maintenance activities, such as straw wattles, silt fencing, and filter fabric. These BMPs would be installed prior to the use of picks, shovels, small hydraulic splitters, chainsaws, or any other hand tools or handheld power tools that could result in soil erosion. The goal of the proposed maintenance activities – which would be directed and supervised by a qualified geomorphologist and a qualified biologist as described in Section 1, Request/Project Description – is to restore the stream channel. Bedload material shall be re-distributed – under the direction and supervision of a qualified geomorphologist and a qualified biologist – anywhere within the 100-year flow delineation, with preference given to areas inside the 2-year flow delineation.

Placement of some large rocks below the 2-year flow delineation would promote aggradation, which would benefit the channel morphology in areas that have experienced major incision. Additionally, placement of suitable material below the 2-year flow delineation would keep habitat forming features (e.g., small boulders, cobbles, etc.) in the channel. If larger material is placed outside the 2-year delineation, it would take longer to mobilize and has the potential to promote further incision in the stream channel before being re-mobilized at a lower probability high flow event (i.e., 10-year to 100-year events). Large rocks would be placed at the toe-slopes of the creek banks to promote bank stabilization, encourage riparian cover, and create roughness elements that restore habitat and reduce overall flood potential.

g-j, l) ***No Impact.*** The proposed Project does not propose or require septic systems, extraction of minerals or ore, grading, or sand, gravel, or topsoil removal for any proposed development. Therefore, implementation of the proposed Project would have no impact.

k) ***Less than Significant.*** During major maintenance activities, hydraulic splitters or a hydraulic excavator-mounted hammer may be needed to break down immobile material and remove debris. These heavy pieces of equipment may cause temporary and localized vibrations within the canyon. Any such vibrations would be short-term, would occur during daylight hours, and would not be felt be any sensitive receptors within the region (e.g., the nearest residence is located more than 0.25 miles from the debris net location, far beyond the extent of any potential vibration). Therefore, impacts associated with the proposed maintenance activities would be less than significant.

Cumulative Impacts: As previously described, reconstruction or repair of as many as 400 residences as well as public infrastructure (e.g., roads, bridges, new or expanded flood control detention basins) would entail substantial ground disturbance and tens of thousands of heavy haul truck trips for soil export. The proposed Project – particularly major maintenance activities – would also result in substantial ground disturbance associated with the re-distribution of debris. However, this debris would be re-distributed within the stream channels directed and supervised by a qualified geomorphologist and a qualified biologist as described in Section 1, *Request/Project Description*. Additionally, given that the proposed Project would not result any permanent development, it would not contribute to geological or public safety hazards. Therefore, when considered with other cumulative projects in the region – including reconstruction efforts associated with the debris flows – the proposed Project would not contribute to a cumulatively considerable effect on geologic hazards within the County.

Mitigation and Residual Impact: No mitigation measures required. Residual impacts associated with the proposed maintenance activities would remain less than significant.

4.9 HAZARDOUS MATERIALS/RISK OF UPSET

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
a. In the known history of this property, have there been any past uses, storage or discharge of hazardous materials (e.g., fuel or oil stored in underground tanks, pesticides, solvents or other chemicals)?				X	
b. The use, storage or distribution of hazardous or toxic materials?		X			
c. A risk of an explosion or the release of hazardous substances (e.g., oil, gas, biocides, bacteria, pesticides, chemicals or radiation) in the event of an accident or upset conditions?		X			

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
d. Possible interference with an emergency response plan or an emergency evacuation plan?			X		
e. The creation of a potential public health hazard?		X			
f. Public safety hazards (e.g., due to development near chemical or industrial activity, producing oil wells, toxic disposal sites, etc.)?				X	
g. Exposure to hazards from oil or gas pipelines or oil well facilities?				X	
h. The contamination of a public water supply?				X	

Existing Setting: The debris net locations and the surrounding vicinity are located within the Santa Ynez Mountains in the undeveloped areas of Cold Springs Canyon, San Ysidro Canyon, and Buena Vista Canyon. None of these areas have experienced previous soil or groundwater contamination and none of these locations have been used for the frequent or long-term storage of a hazardous waste or material.

County Environmental Thresholds: The County's Public Safety Thresholds address involuntary public exposure from projects involving significant quantities of hazardous materials. The threshold addresses the likelihood and severity of potential accidents to determine whether the safety risks of a project exceed significant levels.

Impact Discussion:

a) ***No Impact.*** As previously described, none of the debris net locations have experienced previous soil or groundwater contamination (e.g., these locations are not listed on the EnviroStor or GeoTracker). Beyond the gasoline, diesel, and hydraulic fluids that were used under the supervision of a qualified biologist during the initial installation of the debris nets, there is no evidence that hazardous materials were used, stored, or spilled on-site in the past. During the installation of the six debris nets there were no documented accidental releases of hazardous materials. No aspects of the proposed Project would include or require the use of hazardous materials at levels that would constitute a significant hazard to human health or the environment. Therefore, the proposed Project would have no impact related to any past uses, storage, or discharge of hazardous materials.

b-c, e) ***Less than Significant with Mitigation.*** Maintenance activities would involve the use of light-duty vehicles, handheld power tools, heavy construction equipment, generators, and a helicopter that would introduce gasoline, diesel, and/or hydraulic fluid. In particular, heavy construction equipment used for major debris accumulation maintenance may include the transport and temporary on-site storage of petroleum products for the purpose of fueling construction equipment. Further, all transport, handling, use, and disposal of substances such as petroleum products would comply with applicable Federal, State, and local health and safety regulations. As with the original installation of the debris nets in April and September 2019, crews would install temporary BMPs (e.g., secondary containment) to avoid potential accidental spills. Additionally, MM BIO-7 would ensure that no equipment or diesel fuel would be staged or stored within the stream channel; no fueling of equipment

Photograph 18. *During the initial installation of the debris nets, temporary secondary containment structures were successfully used to ensure that there were no accidental spills associated with heavy construction equipment. Similar BMPs would be installed during all maintenance activities involving the use of power tools or heavy construction equipment.*

would occur within 100 feet of the stream channel; all stationary equipment and fluid storage vessels would be equipped with secondary containment; and a spill containment and cleanup kit would be on-site at each debris net location while work is in progress. Therefore, with the implementation of MM BIO-7, impacts associated with hazardous materials would be less than significant with mitigation.

d) ***Less than Significant.*** The proposed maintenance activities would not substantially impact the surrounding transportation network. Pursuant to the conditions of the original Emergency Permits and Development Plan, parking during construction, maintenance, and removal activities shall not occur at the trailheads. Maintenance crews and monitors shall be shuttled to each canyon and shall hike into each debris net location. If maintenance crews cannot access the debris net locations by foot, they would be airlifted to the debris net locations along with the required heavy construction equipment and other equipment and construction materials necessary to accomplish the required major debris accumulation maintenance activities. As described in Section 4.7, *Fire Protection* the proposed maintenance activities would not affect access or the existing response times of the MPFD. Similarly, the proposed maintenance activities would not interfere with an emergency response plan or an emergency evacuation plan.

f-g) ***No Impact.*** There are no oil wells or toxic disposal sites within 2 miles of the debris net locations (State Water Resources Control Board [SWRCB] 2020). Therefore, the proposed maintenance activities would not have the potential to encounter, result in exposure to, or otherwise impact oil wells or toxic disposal sites.

h) ***No Impact.*** There are no Montecito Water District facilities (e.g., reservoirs, waterlines, etc.) or other domestic water resources within 3 miles of any debris net. Therefore, the proposed Project would not pose a risk to public water supplies.

Cumulative Impacts: As previously described, reconstruction or repair of as many as 400 residences as well as public infrastructure (e.g., roads, bridges, new or expanded flood control detention basins) would result in the temporary use of hazardous materials during construction. Similarly, the proposed Project would also involve the temporary use of hazardous materials; however, the implementation of MM BIO-7 would reduce the risk of accidental spills during the proposed maintenance activities. Further, in the highly unlikely event of a spill, it would occur in a localized area within the undeveloped canyon, which would provide for expedient containment and clean-up. Therefore, when considered with other cumulative projects in the region – including reconstruction efforts associated with the debris flows – the proposed Project would not contribute to a cumulatively considerable impact.

Mitigation and Residual Impact: With the implementation of MM BIO-7 impacts related to hazards and hazardous materials would be reduced to less than significant.

4.10 LAND USE

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
a. Structures and/or land use incompatible with existing land use?				X	
b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X	

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
c. The induction of substantial growth or concentration of population?				X	
d. The extension of sewer trunk lines or access roads with capacity to serve new development beyond this proposed project?				X	
e. Loss of existing affordable dwellings through demolition, conversion or removal?				X	
f. Displacement of substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X	
g. Displacement of substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X	
h. The loss of a substantial amount of open space?				X	
i. An economic or social effect that would result in a physical change? (i.e. Closure of a freeway ramp results in isolation of an area, businesses located in the vicinity close, neighborhood degenerates, and buildings deteriorate. Or, if construction of new freeway divides an existing community, the construction would be the physical change, but the economic/social effect on the community would be the basis for determining that the physical change would be significant.)				X	
j. Conflicts with adopted airport safety zones?				X	

Existing Setting: As described in Section 3.0, *Exiting Setting* the Project site is located in the Montecito Community Plan Area. All of the debris nets location are located in parcels designated as Mountainous Areas (MA) and zoned Resource Management (RMZ). The surrounding parcels have similar land use designations and zoning (refer to Table 3). As described in Section 4.1, *Aesthetics/Visual Resources*, the debris nets are located approximately 0.25 miles, 0.8 miles, and 0.3 miles from the nearest areas zone for residential uses to Cold Spring Canyon, San Ysidro Canyon, and Buena Vista Canyon.

County Environmental Thresholds: The County's Environmental Thresholds and Guidelines Manual (County of Santa Barbara 2018) does not include specific thresholds for land use. Generally, a significant impact may occur if a project would be potentially inconsistent with policies and standards adopted by an agency for the purposes of environmental protection or would result in substantial growth inducing effects.

Impact Discussion:

a-b) ***No Impact.*** The County Planning and Development Department prepared a Comprehensive Plan consistency analysis associated with Development Plan Case No. 19DVP-00000-00005. This analysis included an evaluation of all applicable policies of the Comprehensive Plan, including the Montecito Community Plan, and with all requirements of the MLUDC (see Attachment 5). While the proposed maintenance activities would occur for an additional period of 3 years under the proposed Project, these activities would be identical to the original maintenance activities described and evaluated in the Comprehensive Plan consistency analysis prepared for Development Plan Case No. 19DVP-00000-00005. The proposed Project would not be incompatible with any existing land uses or otherwise conflict with any applicable land use plan, policy, or regulation (see Attachment 5) and implementation of the proposed

Project would have no impact. Impacts to ESH were evaluated under the Development Plan and the implementation of MM BIO-1 through MM BIO-8 would ensure consistency with all ESH policies during the proposed maintenance activities.

c-j) ***No Impact.*** The proposed maintenance activities would not induce growth and would not result in the loss of affordable housing, or a significant displacement of people. Further the proposed Project is limited to maintenance activities and would not result in any permanent development. Pursuant to the conditions of the original Emergency Permit, the Applicant was required to post a performance security to cover the full costs of all obligations under the Emergency Permit, including removal of all of the nets. Therefore, following the implement of the proposed maintenance activities, the proposed Project would not result in the long-term loss of open space. Additionally, the proposed Project does not involve the extension of any sewer trunk lines, and would not conflict with any airport safety zones. Therefore, implementation of the proposed Project would have no impact.

Cumulative Impacts: The proposed Project would not be incompatible with any existing land uses or otherwise conflict with any applicable land use plan, policy, or regulation. Therefore, when considered with other cumulative projects in the region – including reconstruction efforts associated with the debris flows – the proposed maintenance activities would not contribute to a cumulatively considerable impact on land use.

Mitigation and Residual Impact: No mitigation is required. Residual impacts associated with the proposed maintenance activities would remain less than significant.

4.11 NOISE

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
a. Long-term exposure of people to noise levels exceeding County thresholds (e.g. locating noise sensitive uses next to an airport)?				X	
b. Short-term exposure of people to noise levels exceeding County thresholds?		X			
c. Project-generated substantial increase in the ambient noise levels for adjoining areas (either day or night)?		X			

Existing Setting: Ambient noise levels at each of the debris net locations is characteristic of an undeveloped natural setting, with infrequent and temporary noise generated by trail users along the trail system. The Santa Barbara County Noise Element identified an ambient noise level of less than 60 A-weighted decibels (dBA) Community Noise Equivalent Level (CNEL) for the entire Montecito Community Plan Area north of East Valley Road.[8,9] Traffic levels in this area are relatively low characteristic with low density residential development (i.e., 3 acre and larger parcels). South of East Valley Road, traffic levels are slightly elevated and contribute to slightly louder noise levels. The Santa Barbara County noise Element identified an ambient noise level between 60 and 64 dBA CNEL in the commercial district of Montecito. The Santa Barbara County Noise Element establishes 65 dBA CNEL as the acceptable residential exterior noise level.

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[8] The most common weighting that is used in noise measurement is A-Weighting. Like the human ear, this effectively cuts off the lower and higher frequencies that the average person cannot hear. A-weighted measurements are expressed as dBA or dB(A).

[9] CNEL represents the average of A-weighted sound levels occurring during a 24-hour period and accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night (i.e., “penalizing” night-time noises). Noise between 10:00 p.m. and 7:00 a.m. is weighted by adding 10 dBA to take into account the greater annoyance of night-time noises. Additionally, noise between the hours of the 7:00 p.m. and 10:00 p.m. is weighted by adding 5-dBA.

As described in Section 2, *Project Location* the debris nets at Cold Springs Canyon are located approximately 0.25 miles from the Cold Springs Trailhead near the fork in the West and East Cold Spring Trails. SY-18 is located approximately 0.4 miles from the San Ysidro Trailhead, and SY-7a is located approximately 1.7 miles from the trailhead near the San Ysidro Trail and where San Ysidro Creek splits into three tributaries. BV-4 is located approximately 0.5 miles from the Buena Vista Trailhead on Park Lane near where the Buena Vista Trail splits and meets the Edison Catway, and BV-10 is located approximately 0.3 miles from the Buena Vista Trailhead (refer to Table 1 and Figure 1). As described in Section 4.1, *Aesthetics/Visual Resources*, the debris nets are visible for short periods along the trails that parallel the creeks, including the Cold Spring Trail, San Ysidro Trail, and Buena Vista Trail. As described in Section 4.3a, *Air Quality*, the debris nets are located approximately 0.25 miles, 0.8 miles, and 0.3 miles from the nearest residences to Cold Spring Canyon, San Ysidro Canyon, and Buena Vista Canyon. There are no other sensitive receptors, such as schools, hospitals, or libraries, within 1 mile of any of the trailheads or debris nets.

The proposed maintenance schedule would comply with the Montecito Community Plan's construction operation hours of 7:00 a.m. to 4:30 p.m. Monday through Friday, with no maintenance activities on weekends or holidays (County of Santa Barbara 1997).

County Environmental Thresholds: Noise is defined as unwanted or objectionable sound that is measured on a logarithmic scale and commonly expressed in dBA. For example, a soft whisper measures at 30 dBA and a lawn mower measures at 100 dBA at 5 feet. In noise-sensitive settings, the sounds generated at night are often more intrusive than sounds generated during the day. This is the case because outdoor background noise levels and indoor household activities are lower at night, making individual noise events stand out more sharply. The CNEL referenced in County thresholds accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night (i.e., "penalizing" night-time noises).

The County's Noise Thresholds specify that a project that would generate noise levels in excess of 65 dBA CNEL for exterior exposure and 45 dBA CNEL for interior exposure may have a significant impact on surrounding noise sensitive land uses. The thresholds identify noise-sensitive land uses to include residential dwellings and recreational areas (e.g., public parks and trails). The County's Noise Threshold also indicate that project construction, involving heavy construction equipment typically generate noise levels up to 90 dBA CNEL, which may be experienced 1,600 feet from the activity source.

Impact Discussion:

a) ***No Impact.*** The proposed maintenance activities would generate noise adjacent to existing trails that parallel the creeks, including the Cold Spring Trail, San Ysidro Trail, and Buena Vista Trail. As described further below, this would result in short-term noise to trail users along the trail system. However, the nearest residences are located more than 0.25 miles from the debris nets and other sensitive receptors are located more than 1 mile from the debris nets. Therefore, with the exception of trail users along the trail system, no other sensitive receptor would experience noise as a result of the proposed maintenance activities. In general, maintenance activities would infrequent and short-term maintenance. Further, the proposed maintenance activities would not involve any new permanent development or new land uses that would result in a long-term increase in ambient noise levels. Therefore, the proposed Project would have no impact related to long-term noise exposure.

b-c) ***Less than Significant with Mitigation.*** As previously described, the proposed maintenance activities would involve the use of light-duty trucks, hand tools, handheld power tools, generators, heavy construction equipment, and a helicopter. This construction equipment, particularly power tools (e.g., small hydraulic splitters) and 10-ton class excavators required for major maintenance activities may generate noise that could exceed County thresholds. For example, an excavator can generate a maximum sound level (L_{max}) of approximately 81 dBA at 50 feet. A hydraulic hammer can generate a L_{max} of approximately 90 dBA at 50 feet. However, this noise would be intermittent with power tools and heavy construction equipment in operation in discrete periods throughout the day. For example, a hydraulic hammer would be required to break down large boulders and would not be in operation throughout the entire construction day from 7:00 a.m. to 4:30 p.m. Similarly, the typical L_{max} for helicopters are between 95 and 110 dBA. Helicopters would be used infrequently to airlift heavy construction equipment and other materials to the debris net locations, as required. Helicopters may hover over the debris net locations for short periods during drop-offs, but this would generally only occur at the beginning and end of the major maintenance activities.

As described in the County's Noise Thresholds, noise from maintenance activities proposed within 1,600 feet of sensitive receptors, including schools, residential development, commercial lodging facilities, hospitals or care facilities, would generally result in a potentially significant impact. With the exception of the existing trails that parallel the creeks, there are no other sensitive receptors located within 0.25 miles of the debris nets. While noise levels along the trails could exceed 81 dBA adjacent to the debris nets, the proposed maintenance schedule would comply with the Montecito Community Plan's construction operation hours of 7:00 a.m. to 4:30 p.m. Monday through Friday, with no maintenance activities on weekends or holidays. Therefore, heavy construction equipment would not be in operation during the most popular weekend hiking days. Additionally, in the event of a debris flow that would trigger major maintenance activities, it is also likely that the trails would be used less frequently used by trail users (particularly during the wet season) due to access and safety concerns. With the implementation of MM REC-1, which requires signage and early notification of the Montecito Trails Foundation and Parks Division the impacts of noise on trail users along the trail system would be less than significant with mitigation.

Cumulative Impacts: The proposed Project would contribute incrementally to cumulative noise in the community of Montecito. Reconstruction or repair of as many as 400 residences as well as public infrastructure (e.g., roads, bridges, new or expanded flood control detention basins) would involve temporary, but prolonged increases in ambient noise associated with heavy construction equipment and tens of thousands of heavy haul truck trips. The proposed maintenance activities and the associated light-duty vehicles, handheld power tools, generators, heavy construction equipment, and/or helicopter operations would contribute to this increase in noise. However, the nearest residences or other sensitive land uses are located more than 0.25 miles from the debris net locations. Further, implementation of MM REC-1 would ensure that impacts to trail users along the existing trails that parallel the creeks would be less than significant with mitigation. When considered with the other cumulative projects in the region – which generally include development projects in the community of Montecito further removed from the trail system – the proposed Project would not contribute in a considerable cumulative impact.

Mitigation and Residual Impact: As previously described, maintenance activities would be infrequent and short-term. The implementation of MM REC-1 would reduce potential noise impacts to trail users along the existing trails that parallel the creeks. With the implementation of this mitigation measure, residual noise impacts to sensitive receptors would be less than significant.

4.12 PUBLIC FACILITIES

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
a. A need for new or altered police protection and/or health care services?				X	
b. Student generation exceeding school capacity?				X	

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
c. Significant amounts of solid waste or breach any national, state, or local standards or thresholds relating to solid waste disposal and generation (including recycling facilities and existing landfill capacity)?				X	
d. A need for new or altered sewer system facilities (sewer lines, lift-stations, etc.)?				X	
e. The construction of new storm water drainage or water quality control facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X	

Existing Setting: Major public services include emergency services, law enforcement, fire protection, schools, library, solid waste management, water, wastewater, and specialized facilities such as landfills. Fire protection issues are addressed in Section 4.7, *Fire Protection*, Recreation issues are discussed in Section 4.13, *Recreation*, and transportation issues are discussed in Section 4.14, *Transportation/Circulation*.

County Environmental Thresholds: The County's Environmental Thresholds and Guidelines Manual (County of Santa Barbara 2018) does not include specific thresholds for public facilities. However, The County's Solid Waste Thresholds describe that a project would result in significant impacts to landfill capacity if it would generate 196 tons per year (tpy) of solid waste. This volume represents 5 percent of the expected average annual increase in waste generation, and is therefore considered a significant portion of the remaining landfill capacity. In addition, construction and demolition waste from remodels and rebuilds is considered significant if it exceeds 350 tons. A project which generates 40 tpy of solid waste would have an adverse effect on solid waste generation, and mitigation via a Solid Waste Management Plan is recommended. Additionally, the County's school threshold describes that a project would have a have a significant impact if it would generate sufficient students to require an additional classroom.

Impact Discussion:

a-e) ***No Impact.*** The proposed maintenance activities would not involve any new permanent development and therefore, would have no impact on the local population or associated existing police protection, health care services, or public school capacity. Beyond the implementation of BMPs and the potential need for temporary dewatering and stream diversion during major maintenance activities, the proposed Project would not affect and would not require no new storm water drainage or water quality control facilities. Additionally, the proposed maintenance activities would involve the re-distribution of debris and would not generate solid waste in excess of County thresholds or cause the need for new or altered sewer system facilities. Therefore, there would be no impacts to these services.

Cumulative Impacts: The proposed Project would have no impact on public facilities. Therefore, when considered with other cumulative projects in the region, the proposed maintenance activities would not contribute to a cumulatively considerable impact.

Mitigation and Residual Impact: No mitigation is required. Residual impacts associated with the proposed maintenance activities would remain less than significant.

4.13 RECREATION

Will the proposal result in:	Poten. Signif.	Less than Signif. with Mitigation	Less Than Signif.	No Impact	Reviewed Under Previous Document
a. Conflict with established recreational uses of the area?		X			
b. Conflict with biking, equestrian and hiking trails?		X			
c. Substantial impact on the quality or quantity of existing recreational opportunities (e.g., overuse of an area with constraints on numbers of people, vehicles, animals, etc. which might safely use the area)?		X			

Existing Setting: As described in Section 2, *Project Location* the debris nets at Cold Springs Canyon are located approximately 0.25 miles from the Cold Springs Trailhead near the fork in the West and East Cold Spring Trails. SY-18 is located approximately 0.4 miles from the San Ysidro Trailhead, and SY-7a is located approximately 1.7 miles from the trailhead near the San Ysidro Trail and where San Ysidro Creek splits into three tributaries. BV-4 is located approximately 0.5 miles from the Buena Vista Trailhead near where the Buena Vista Trail splits and meets the Edison Catway, and BV-10 is located approximately 0.3 miles from the Buena Vista Trailhead (refer to Table 1 and Figure 1). As described in Section 4.1, *Aesthetics/Visual Resources*, the debris nets are visible for short periods along the trails that parallel the creeks, including the Cold Spring Trail, San Ysidro Trail, and Buena Vista Trail. However, the debris nets do not obstruct or otherwise interfere with the use of these trails.

County Environmental Thresholds: The County's Environmental Thresholds and Guidelines Manual does not identify any specific thresholds for impacts to parks and recreation. Therefore, the thresholds of significance are based on Appendix G of the CEQA Guidelines.

Impact Discussion:

a-c) ***Less than Significant with Mitigation.*** In the event that major maintenance activities are required, helicopters and heavy equipment could interfere with, but would not prohibit the use of the foothill trail system. Pursuant to the conditions of the original Emergency Permits and Development Plan, parking during construction, maintenance, and removal activities shall not occur at the trailheads. Maintenance crews and monitors shall be shuttled to each canyon and shall hike into each debris net location. If maintenance crews cannot access the debris net locations by foot, they would be airlifted to the debris net locations along with the required heavy construction equipment and other equipment and construction materials necessary to accomplish the required major debris accumulation maintenance activities. During major maintenance activities, the Applicant would have monitors on the trails near the debris net locations that would hold trail users for minutes at a time in order for helicopters to safely drop-off heavy construction equipment and other materials. The monitors would have radios for communications to ensure hiker safety and to reduce the time of impacts on any recreational trail. If extended temporary trail closure is necessary, the conditions of the original Emergency Permits and Development Plan requires the Applicant to coordinate with the Montecito Trails Foundation and Parks Division to ensure adequate noticing has occurred in the community of Montecito. However, in the event of a debris flow that would trigger major debris accumulation maintenance activities, it is also likely that the trails would be used less frequently used by trail users (particularly during the wet season) due to access and safety concerns. Therefore, with the implementation of MM REC-1 impacts to recreation less than significant with mitigation.

Cumulative Impacts: The proposed Project would contribute incrementally to disruptions in the use of the existing trail system. Reconstruction or repair of as many as 400 residences as well as public infrastructure (e.g., roads, bridges, new or expanded flood control detention basins) has resulted in construction workers parking along roadway shoulders that typically support trail users. As such, it has become more difficult in the years following the debris flow to find parking in close proximity to the trailheads. Additionally, ground disturbing activities associated with the reconstruction efforts may result in short-term temporary trail closures within the vicinity. However, the implementation of implementation of MM REC-1 and MM REC-2 would ensure that impacts to trail users along the existing trails that parallel the creeks would be less than significant with mitigation. When considered with the other cumulative projects in the region, the proposed Project would not contribute in a considerable cumulative impact.

Mitigation and Residual Impact: The following mitigation measures would reduce the impacts of the proposed Project on recreational resources to a less than significant level:

MM REC-1: **Trail Access:** In order to ensure public safety and access, as feasible, during maintenance activities the Applicant shall:

- Post signs at the affected trailheads at least 72 hours prior to maintenance activities to warn trail users to use caution and avoid the canyons. The date, maintenance activities, and contact information shall be made available on the signs.
- Notify the Montecito Trails Foundation and Parks Division at least 72 hours before each instance of helicopter use.
- Use a monitor at the trail to hold trail users for minutes at a time in order for helicopters to safely drop debris net equipment during construction. The monitors shall have radios for communications to ensure hiker safety and to reduce the time of impacts on any recreational trail.
- If trails are temporarily closed during construction, maintenance, or removal activities, the Applicant shall coordinate with the Montecito Trails Foundation and Parks Division to ensure adequate noticing has occurred in the Montecito community.

Plan Requirements and Timing: The Applicant would be required to notify the Montecito Trails Foundation and Park Division and post signage at least 72 hours before maintenance activities.

Monitoring: County Planning and Development Department permit compliance staff shall spot check in the field throughout maintenance activities and at least once during each major maintenance activity.

MM REC-2: **Construction Parking:** Parking during construction, maintenance, and removal activities shall not occur in trailhead parking areas by construction crews or biological monitors. Crews and monitors shall be required to be shuttled to each canyon and walk into each net location.

Plan Requirements and Timing: The Applicant would be required to include this requirement in the proposed scope of work for contractors and communicate it during any pre-construction meetings or orientations.

Monitoring: County Planning and Development Department permit compliance staff shall spot check in the field throughout maintenance activities and at least once during each major maintenance activity.

4.14 TRANSPORTATION/CIRCULATION

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
a. Generation of substantial additional vehicular movement (daily, peak-hour, etc.) in relation to existing traffic load and capacity of the street system?			X		
b. A need for private or public road maintenance, or need for new road(s)?			X		
c. Effects on existing parking facilities, or demand for new parking?			X		
d. Substantial impact upon existing transit systems (e.g. bus service) or alteration of present patterns of circulation or movement of people and/or goods?			X		
e. Alteration to waterborne, rail or air traffic?			X		
f. Increase in traffic hazards to motor vehicles, bicyclists or pedestrians (including short-term construction and long-term operational)?			X		
g. Inadequate sight distance? Ingress/egress? General road capacity? Emergency access?			X		
h. Impacts to Congestion Management Plan system?				X	

Existing Setting: The Cold Springs Trailhead is located on East Mountain Drive in Montecito, with approximately seven parking spots at the terminus of East Mountain Drive and street parking on the western side of East Mountain Drive. The trailhead is an approximately 2-mile drive from State Route 192, and 3 miles to U.S. Route 101. The San Ysidro Trailhead is located off of a different portion of East Mountain Drive, off of Park Lane. There are approximately five designated parking spots at the trailhead, as well street parking on both sides of East Mountain Drive. The San Ysidro Trail starts approximately 0.8 miles from the trailhead, splitting from the Edison Cataway. The trailhead is less than 1 mile from State Route 192 and an approximately 2.5-mile drive from U.S. Route 101. The Buena Vista trailhead is also located on Park Lane and there is street parking on both sides. The trailhead is a little under 1 mile from State Route 192 and approximately 2.8 miles from U.S. Route 101.

County Environmental Thresholds: According to the County's Environmental Thresholds and Guidelines Manual (County of Santa Barbara 2018), a significant traffic impact would occur when:

- The addition of project traffic to an intersection increases the volume to capacity (V/C) ratio by the value provided below, or sends at least 15, 10 or 5 trips to an intersection operating at LOS D, E or F.

Level of Service (including project)	**Increase in Volume/Capacity Greater Than**
A	0.20
B	0.15
C	0.10

Level of Service (including project)	**Increase in Volume/Capacity Greater Than**
	Or the addition of:
D	15 trips
E	10 trips

- Project access to a major road or arterial road would require a driveway that would create an unsafe situation, or would require a new traffic signal or major revisions to an existing traffic signal.
- Project adds traffic to a roadway that has design features (e.g., narrow width, road side ditches, sharp curves, poor sight distance, inadequate pavement structure) or receives use which would be incompatible with substantial increases in traffic (e.g. rural roads with use by farm equipment, livestock, horseback riding, or residential roads with heavy pedestrian or recreational use, etc.) that will become potential safety problems with the addition of project or cumulative traffic. Exceeding the roadway capacity designated in the Circulation Element may indicate the potential for the occurrence of the above impacts.
- Project traffic would utilize a substantial portion of an intersection(s) capacity where the intersection is currently operating at acceptable levels of service (A-C) but with cumulative traffic would degrade to or approach LOS D (V/C 0.81) or lower. Substantial is defined as a minimum change of 0.03 for intersections which would operate from 0.80 to 0.85 and a change of 0.02 for intersections which would operate from 0.86 to 0.90, and 0.01 for intersections operating at anything lower.

SB 743 changed transportation impact analysis under the CEQA Guidelines by requiring the use of vehicle miles traveled (VMT) rather than LOS or similar measures of vehicle capacity or traffic congestion to evaluate transportation impacts. Therefore, the County must update its Environmental Thresholds and Guidelines Manual to shift from LOS to VMT-based metrics, pursuant to SB 743 and CEQA Guidelines Section 15064.3.

The County has developed: 1) new methodologies and metrics for estimating VMT; 2) screening criteria for projects assumed to have a less-than-significant impact on VMT; 3) thresholds of significance; and 4) feasible mitigation measures to reduce VMT. County staff will present the proposed amendment to the Environmental Thresholds and Guidelines Manual to the County Planning Commission on August 12, 2020. Staff anticipates presenting the County Planning Commission's recommendations to the Board of Supervisors for adoption in September 2020.

The County released interim guidance titled, Advisory: Determining the Significance of Transportation Impacts under CEQA (Long Range Planning, June 2020), for projects sent out for public review prior to the Board's adoption of the Environmental Thresholds and Guidelines Manual.

Impact Discussion:

a, c, f) ***Less than Significant.*** Given that no maintenance activities have been required since the original installation of the nets in April and September 2019, it is anticipated that maintenance activities would be limited in frequency. Additionally, if and when maintenance activities are required, they would be temporary and short-term. Pursuant to the conditions of the original Emergency Permits and Development Plan, parking during construction, maintenance, and removal activities shall not occur at the trailheads. Maintenance crews and monitors shall be shuttled to each canyon and shall hike into each debris net location. If maintenance crews cannot access the debris net locations by foot, they would be airlifted to the debris net locations along with the required heavy construction equipment and other equipment and construction materials necessary to accomplish the required major debris accumulation maintenance activities.

Therefore, transportation impacts would be limited to light-duty truck trips to remote areas to drop off small equipment and crew members. If necessary, for major maintenance activities heavy construction equipment would be airlifted by helicopter and would not require any heavy haul truck trips. Similarly, no sediment or other debris would be hauled off-site. The short-term increase in trips on local roadways would result in negligible effects on roadway capacity and traffic congestion.

According to a technical advisory on evaluating transportation impacts from the State of California Governor's Office of Planning and Research (OPR), "[a]bsent substantial evidence indicating that a project would generate a potentially significant level of vehicle miles traveled (VMT), or inconsistency with a Sustainable Communities Strategy (SCS) or general plan, projects that generate or attract fewer than 110 trips per day[10] generally may be assumed to cause a less than significant transportation impact" (OPR 2017). Therefore, because the proposed maintenance activities would generate fewer trips than the OPR's threshold of 110 trips per day, impacts related to VMT would be less than significant.

b, d, e, g) ***Less than Significant.*** Short-term temporary light-duty traffic that would be generated by the Project would not result in significant impacts to public streets that would require new roads or a significant amount of increased roadway maintenance. The proposed maintenance would not permanently increase vehicle traffic to or from the site or significantly adversely affect pedestrian, bicycle, or transit access, or any other type of transportation facility. The proposed Project would not affect air traffic operations. No railway or navigable waterways are located on or adjacent to the Project site. Light-duty trucks accessing the trailheads to drop off maintenance crews and monitors would not pose any complications to ingress or egress at the trailhead parking areas and would not block emergency access. Therefore, the Project would result in less than significant impacts to transit or transportation.

h) ***No Impact.*** Roadways and intersections in the vicinity of the trailheads operate at acceptable LOS and are not subject to Congestion Management Plan requirements. Implementation of the proposed Project would not affect roadway or intersection operations, and no impacts would occur in this regard.

Cumulative Impacts: As previously described, reconstruction or repair of as many as 400 residences as well as public infrastructure (e.g., roads, bridges, new or expanded flood control detention basins) would entail tens of thousands of heavy haul truck trips For example, the Santa Barbara County Flood Control & Water Conservation District. is pursuing expansion of several flood detention basins such as that along Cold Springs Creek, located approximately 0.25 miles downstream for the debris net locations along this creek. These activities could involve export of over 100,000 cy of soil. In contrast proposed Project would result in minimal vehicle trips associated with shuttling maintenance crews and construction equipment. Therefore, given the minimal number of truck trips associated with the proposed maintenance activities when considered with cumulative projects in the region the proposed Project would not contribute to cumulatively considerable impacts to transportation/circulation.

Mitigation and Residual Impact: No mitigation measures required. Residual impacts associated with the proposed maintenance activities would remain less than significant.

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[10] "CEQA provides a categorical exemption for existing facilities, including additions to existing structures of up to 10,000 square feet, so long as the project is in an area where public infrastructure is available to allow for maximum planned development and the project is not in an environmentally sensitive area. (CEQA Guidelines Section 15301[e][2]) Typical project types for which trip generation increases relatively linearly with building footprint (i.e., general office building, single tenant office building, office park, and business park) generate or attract an additional 110-124 trips per 10,000 square feet. Therefore, absent substantial evidence otherwise, it is reasonable to conclude that the addition of 110 or fewer trips could be considered not to lead to a significant impact" (OPR 2017).

4.15 WATER RESOURCES/FLOODING

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
a. Changes in currents, or the course or direction of water movements, in either marine or fresh waters?			X		
b. Changes in percolation rates, drainage patterns or the rate and amount of surface water runoff?			X		
c. Change in the amount of surface water in any water body?			X		
d. Discharge, directly or through a storm drain system, into surface waters (including but not limited to wetlands, riparian areas, ponds, springs, creeks, streams, rivers, lakes, estuaries, tidal areas, bays, ocean, etc.) or alteration of surface water quality, including but not limited to temperature, dissolved oxygen, turbidity, or thermal water pollution?			X		
e. Alterations to the course or flow of flood water or need for private or public flood control projects?				X	
f. Exposure of people or property to water related hazards such as flooding (placement of project in 100 year flood plain), accelerated runoff or tsunamis, sea level rise, or seawater intrusion?				X	
g. Alteration of the direction or rate of flow of groundwater?				X	
h. Change in the quantity of groundwater, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations or recharge interference?				X	
i. Overdraft or over-commitment of any groundwater basin? Or, a significant increase in the existing overdraft or over-commitment of any groundwater basin?				X	
j. The substantial degradation of groundwater quality including saltwater intrusion?				X	
k. Substantial reduction in the amount of water otherwise available for public water supplies?				X	
l. Introduction of storm water pollutants (e.g., oil, grease, pesticides, nutrients, sediments, pathogens, etc.) into groundwater or surface water?		X			

Existing Setting: As described in Section 3, *Environmental Setting*, the community of Montecito is located with the Mission Creek-Front Santa Barbara Channel watershed (HUC 180600130203), which spans approximately 110 square miles, including the front country of the Santa Ynez Mountains to the Pacific Ocean from Goleta Slough to Summerland (USEPA 2020). The existing debris nets are located within four delineated drainages depicted as “blue-line streams” on the Santa Barbara and Carpinteria USGS 7.5-minute quadrangles.

All four drainages originate on and drain the south slopes of the Santa Ynez Mountains, ultimately outletting into the Pacific Ocean. Refer to Table 4 for a summary of stream characteristics at the debris net locations.

After a significant fire season in December 2017, a low-pressure system moved from the ocean to the mainland on January 8, 2018, bringing heavy rain to Montecito and prompting mandatory evacuations throughout Santa Barbara, Ventura, and Los Angeles counties. Approximately 4 inches of rain fell in a 2-day period, including one 5-minute window where 0.5 inches of rain fell, causing several major debris flows (Schleuss et al. 2018). The debris flows were up to 15 feet in height, completely overwhelming the canyons. The canyon walls were completely reshaped, and as of spring 2018, only 5-10 percent of the vegetation had recovered (KANE GeoTech, Inc. 2018). The streambed has since been restored and vegetation continues to recover.

Water Resources Thresholds: According to the County's Surface and Storm Water Quality Significance Guidelines a significant water quality impact is presumed to occur if the project:

- Is located within an urbanized area of the County and the project construction or redevelopment individually or as a part of a larger common plan of development or sale would disturb 1 or more acres of land;
- Increases the amount of impervious surfaces on a site by 25 percent or more;
- Results in channelization or relocation of a natural drainage channel;
- Results in removal or reduction of riparian vegetation or other vegetation (excluding non-native vegetation removed for restoration projects) from the buffer zone of any streams, creeks or wetlands;
- Is an industrial facility that falls under one or more of categories of industrial activity regulated under the National Pollution Discharge Elimination System (NPDES) Phase I industrial storm water regulations (facilities with effluent limitation; manufacturing; mineral, metal, oil and gas, hazardous waste, treatment or disposal facilities; landfills; recycling facilities; steam electric plants; transportation facilities; treatment works; and light industrial activity);
- Discharges pollutants that exceed the water quality standards set forth in the applicable NPDES permit, the Central Coast RWQCB's Basin Plan or otherwise impairs the beneficial uses[11] of a receiving water body;
- Results in a discharge of pollutants into an "impaired" water body that has been designated as such by the SWRCB or the Central Coast RWQCB under Section 303(d) of the Federal Water Pollution Prevention and Control Act (i.e., CWA); or
- Results in a discharge of pollutants of concern to a receiving water body, as identified by the Central Coast RWQCB.

Additionally, a project would have a significant effect on water resources if it would exceed established threshold values which have been set for each overdrafted groundwater basin. These values were determined based on an estimation of a basin's remaining life of available water storage. If the project's net new consumptive water use (i.e., total consumptive demand adjusted for recharge less discontinued historic use) exceeds the threshold adopted for the basin, the project's impacts on water resources are considered significant.

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[11] Beneficial uses for the County are identified by the Central Coast RWQCB in the Water Quality Control Plan for the Central Coastal Basin, or Basin Plan, and include (among others) recreation, agricultural supply, groundwater recharge, fresh water habitat, estuarine habitat, support for rare, threatened or endangered species, preservation of biological habitats of special significance.

A project is also deemed to have a significant effect on water resources if a net increase in pumpage from a well would substantially affect production or quality from a nearby well.

Impact Discussion:

a-c) ***Less than Significant.*** Minor maintenance activities would involve the use of picks, shovels, and small hydraulic splitters to split rock, if necessary, to re-establish the low-flow channel. These activities would restore the 3-foot freeboard between the bottom of the debris nets and the water surface, thereby restoring the course and direction of water movements. Major maintenance activities may involve the installation of a temporary dewatering or diversion system. Dewatering would involve the contractor – under the supervision of a qualified biologist – installing an upstream diversion with plastic sheeting, sandbags, cofferdam, and diversion pipes to bypass the net location and debris distribution (i.e., work) areas. Water detained behind the upstream cofferdam would be pumped and piped past the work areas and discharged below the downstream cofferdam. Details regarding the timing and plan specifications of each dewatering and stream diversion system would be developed by the contractor – with guidance from a qualified geomorphologist and a qualified biologist – based on the extent and type of material accumulated as well as the streamflow volume. Dewatering and stream diversion plan sheets would be submitted to the County Planning and Development Department for approval prior to mobilization and major debris distribution. While the course and direction of water movement would be temporarily impacted during dewatering and diversion, these impacts would be temporary and major maintenance activities would ultimately restore the stream channel. Therefore, impacts associated with dewatering and diversion would be less than significant.

d) ***Less than Significant.*** Implementation of the proposed Project would be limited to infrequent and short-term maintenance activities. There would be no permanent development associated with the proposed Project and no potential for new sources of discharge that would directly or indirectly alter drainage into storm drains. Maintenance activities have the potential to disturb sediments on the slopes and in the stream beds, potentially resulting in erosion. In order to prevent sediment erosion during maintenance activities, BMPs would be installed to minimize downstream turbidity, such as straw wattles, silt fencing, and filter fabric. These measures would be installed prior to the use of picks, shovels, small hydraulic splitters, chainsaws, or any other hand tools or handheld power tools that could result in soil erosion. A qualified biologist would be present during all maintenance activities (refer to MM BIO-1) to ensure the stream channel is properly restored and that BMPs are implemented to reduce erosion and prevent impacts to surface water quality. The implementation of these BMPs would reduce impacts to surface water quality to less than significant.

e-f) ***No Impact.*** The County Planning and Development Department prepared a Comprehensive Plan Consistency analysis associated with Development Plan Case No. 19DVP-00000-00005. This analysis included an evaluation of all applicable policies including Land Use Element Flood Hazard Area Policy #1 through #3 as well as Montecito Community Plan Policy FD-M-2.1, -4.1, -4.2, and -4.5 (see Attachment 5). As described in the consistency analysis the existing debris net locations are not identified as being within the mapped floodway; however, the debris nets are located across creeks in Cold Spring Canyon, San Ysidro Canyon, and Buena Vista Canyon. The temporary debris nets serve as a private flood control project in that they are intended to reduce the potential for debris flow events and associated flooding while the local watershed recovers from the Thomas Fire. The temporary nets would capture debris close to the source and then allow material after a storm event to be placed back in the channel in a more controlled manner without impeding surface flow. The debris nets are designed with an opening of 3 to 5 feet from the ground to allow water and fine sediment passage. During maintenance activities hand crews or heavy construction equipment would remove material and place it on the downstream side of the nets so that debris material can return to the natural system. By capturing debris, the nets would minimize the threat of an on-site and downstream flood potential and allow the groundwater basin to recharge to the maximum extent feasible. Therefore, the Comprehensive Plan consistency analysis found that the proposed debris nets – including minor and major maintenance activities – is consistent with these policies and would result no adverse impacts with respect to flooding. Rather the debris nets maintenance would result in beneficial impacts to the downstream community of Montecito.

g-j) ***No Impact.*** Implementation of the proposed Project would be limited to infrequent and short-term maintenance activities. These activities would re-establish the low-flow channel and would not impact groundwater.

k) ***No Impact.*** As described in Section 4.9, *Hazardous Materials/Risk of Upset*, there are no Montecito Water District facilities or domestic water resources within 3 miles of any debris net. Additionally, the creeks ultimately outlet to the Pacific Ocean. Therefore, the proposed Project would not pose a risk to public water supplies.

l) ***Less than Significant with Mitigation.*** As described in Section 4.9, *Hazardous Materials/Risk of Upset*, maintenance activities would involve the use of light-duty vehicles, handheld power tools, generators heavy construction equipment, and a helicopters that would introduce gasoline, diesel, and/or hydraulic fluid. As with the original installation of the debris nets in April and September 2019, crews would install temporary BMPs (e.g., secondary containment) to avoid potential accidental spills. Additionally, MM BIO-7 would ensure that no equipment or diesel fuel would be staged or stored within the stream channel; no fueling of equipment would occur within 100 feet of the stream channel; all stationary equipment and fluid storage vessels would be equipped with secondary containment; and a spill containment and cleanup kit would be on-site at each debris net location while work is in progress. Therefore, with the implementation of MM BIO-7, impacts would be less than significant with mitigation.

Cumulative Impacts: As previously described, reconstruction or repair of as many as 400 residences as well as public infrastructure (e.g., roads, bridges, new or expanded flood control detention basins) would result in the temporary use of hazardous materials during construction. Similarly, the proposed Project would also involve the temporary use of hazardous materials; however, the implementation of MM BIO-7 would reduce the risk of accidental spills during the proposed maintenance activities. Further, in the highly unlikely event of a spill, it would occur in a localized area within the undeveloped canyon, which would provide for expedient containment and clean-up. Therefore, when considered with other cumulative projects in the region – including reconstruction efforts associated with the debris flows – the proposed Project would not contribute to a cumulatively considerable impact.

Mitigation and Residual Impact: With the implementation of MM BIO-7 impacts related to water resources and flooding would be reduced to less than significant.

5.0 INFORMATION SOURCES

5.1 County Departments Consulted:

Police, Fire, Public Works, Flood Control, Parks, Environmental Health, Special Districts,
Regional Programs, Other : ____

5.2 Comprehensive Plan:

X Seismic Safety/Safety Element
X Open Space Element
____ Coastal Plan and Maps
X ERME

X Conservation Element
X Noise Element
X Circulation Element
____

5.3 Other Sources:

✓ X Field work
X Calculations
____ Project plans
____ Traffic studies
X Records
____ Grading plans
____ Elevation, architectural renderings
X Published geological map/reports
X Topographical maps

____ Ag Preserve maps
X Flood Control maps
X Other technical references (reports, survey, etc.)
X Planning files, maps, reports
X Zoning maps
X Soils maps/reports
X Plant maps
____ Archaeological maps and reports
X Other

____

____

6.0 PROJECT SPECIFIC *(short- and long-term)* AND CUMULATIVE IMPACT SUMMARY

The proposed Project would not result in any short- or long-term adverse impacts that cannot be mitigated to less than significant levels with implementation of the conditions associated with the original Emergency Permits and Development Plan as well as the required mitigation measures identified herein. With the implementation of the required mitigation measures, the contribution of the proposed Project to adverse impacts would not be cumulatively considerable. The temporary debris nets serve as a private flood control project in that they are intended to reduce the potential for debris flow events and associated flooding while the local watershed recovers from the Thomas Fire. As such, the proposed maintenance would result in beneficial impacts with respect to downstream safety.

7.0 MANDATORY FINDINGS OF SIGNIFICANCE

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
1. Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, contribute significantly to greenhouse gas emissions or significantly increase energy consumption, or eliminate important examples of the major periods of California history or prehistory?		X			
2. Does the project have the potential to achieve short-term to the disadvantage of long-term environmental goals?			X		

Will the proposal result in:	**Poten. Signif.**	**Less than Signif. with Mitigation**	**Less Than Signif.**	**No Impact**	**Reviewed Under Previous Document**
3. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects and the effects of probable future projects.)		X			
4. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?				X	
5. Is there disagreement supported by facts, reasonable assumptions predicated upon facts and/or expert opinion supported by facts over the significance of an effect which would warrant investigation in an EIR?				X	

1. With implementation of the conditions associated with the original Emergency Permits and Development Plan as well as the required mitigation measures identified herein, the proposed Project would not have the potential to substantially affect individuals or populations of sensitive plant and wildlife species, contribute to cumulatively considerable GHG emissions, increase energy consumption, or affect important archaeological, cultural, or historic resources.

2. The proposed maintenance activities could include the infrequent and temporary use of light-duty trucks, power tools, generators, heavy construction equipment, and a helicopter all of which would be fueled by gasoline and diesel. Use of these fuels would create a negligible demand on existing energy sources when considered in the context of regional supplies. However, given that the proposed Project would not include any permanent development, there would be no long-term commitment of electricity, natural gas, or transportation fuels.

3. With implementation of the conditions associated with the original Emergency Permits and Development Plan as well as the required mitigation measures identified herein the potential environmental impacts of the proposed Project would not be significant. When considered with other cumulative projects in the region, the proposed Project would not contribute to a cumulatively considerable impact.

4. With implementation of the conditions associated with the original Emergency Permits and Development Plan as well as the required mitigation measures identified herein impacts to human beings associated with air quality, hazards, and noise would not be significant. The temporary debris nets serve as a private flood control project in that they are intended to reduce the potential for debris flow events and associated flooding while the local watershed recovers from the Thomas Fire. As such, the proposed maintenance would result in beneficial impacts with respect to downstream safety.

5. There is no known supportable disagreement or expert opinion that would warrant preparation of an EIR.

8.0 INITIAL REVIEW OF PROJECT CONSISTENCY WITH APPLICABLE SUBDIVISION, ZONING AND COMPREHENSIVE PLAN REQUIREMENTS

As described in Section 4.10, *Land Use* the County Planning and Development Department prepared a Comprehensive Plan consistency analysis associated with Development Plan Case No. 19DVP-00000-00005. This analysis included an evaluation of all applicable policies of the Comprehensive Plan, including the Montecito Community Plan, and with all requirements of the MLUDC (see Attachment 5). While the proposed maintenance activities would occur for an additional period of 3 years under the proposed Project, these activities would be identical to the original maintenance activities described and evaluated in the Comprehensive Plan consistency analysis prepared for Development Plan Case No. 19DVP-00000-00005. The proposed Project would not be incompatible with any existing land uses or otherwise conflict with any applicable land use plan, policy, or regulation (see Attachment 5).

9.0 RECOMMENDATION BY P&D STAFF

On the basis of the Initial Study, the staff of Planning and Development:

___ Finds that the proposed Project WILL NOT have a significant effect on the environment and, therefore, recommends that a Negative Declaration (ND) be prepared.

_X_ Finds that although the proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures incorporated into the REVISED PROJECT DESCRIPTION would successfully mitigate the potentially significant impacts. Staff recommends the preparation of an ND. The ND finding is based on the assumption that mitigation measures will be acceptable to the applicant; if not acceptable a revised Initial Study finding for the preparation of an EIR may result.

___ Finds that the proposed Project MAY have a significant effect on the environment, and recommends that an EIR be prepared.

___ Finds that from existing documents (previous EIRs, etc.) that a subsequent document (containing updated and site-specific information, etc.) pursuant to CEQA Sections 15162/15163/15164 should be prepared.

Potentially significant unavoidable adverse impact areas:

___With Public Hearing _✓_Without Public Hearing

PREVIOUS DOCUMENT:

PROJECT EVALUATOR: Ciara Ristig **DATE:** 9/18/2020

10.0 DETERMINATION BY ENVIRONMENTAL HEARING OFFICER

✓ I agree with staff conclusions. Preparation of the appropriate document may proceed.
__ I DO NOT agree with staff conclusions. The following actions will be taken:
__ I require consultation and further information prior to making my determination.

SIGNATURE:____________________ **INITIAL STUDY DATE**: ____________________

SIGNATURE: Alex Tuttle **NEGATIVE DECLARATION DATE**: 9/18/20

SIGNATURE:____________________ **REVISION DATE:** ____________________

SIGNATURE:____________________ **FINAL NEGATIVE DECLARATION DATE:** ________

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12.0 ATTACHMENTS

1. Revised General Report of Findings (KANE GeoTech, Inc) Site Plan
2. Revised Debris Distribution Net Management Plan (SES and SCHR 2020)
3. Revised Biological Resources Assessment (SES 2019)
4. Air Quality and GHG Analysis (Wood 2020)
5. Staff Report for Montecito Debris Flow Protection Plan (County of Santa Barbara 2019)

Montecito Debris Flow Mitigation

General Report of Findings

Montecito, California

Project No. KGT18-18

Prepared by:

KANE GeoTech, Inc.
7400 Shoreline Drive, Suite 6
Stockton, California 95219

Prepared for:

Partnership for Resilient Communities
Montecito, California

October 5, 2018
Revised October 23, 2018
Revised December 12, 2018

Montecito Debris Flow Mitigation

General Report of Findings

Montecito, California

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October 5, 2018
Revised October 23, 2018
Revised December 12, 2018

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EXECUTIVE SUMMARY

Montecito Debris Flow Mitigation

General Report of Findings

Montecito, California

As part of the response to deadly debris flows in Montecito, California following the Thomas Fire of 2017 - 2018, KANE GeoTech was retained to provide engineering design and construction oversight for the installation of debris flow mitigation. Existing infrastructure was overwhelmed by debris flows leading a number of fatalities and extremely high property losses. It was determined that relatively lightweight, flexible, debris nets could be installed quickly in the canyons to catch debris and significantly reduce the material entering the existing debris basins and streams in the Montecito community.

KANE GeoTech provided a phased approach to the mitigation of debris flow events. The first phase was a general overview of existing conditions in the canyons. Next, an assessment of each canyon was made to identify specific locations where debris nets could effectively retain debris flows materials. Seventy-one locations in the five canyons (Hot Spring, Cold Springs, San Ysidro, Buena Vista, and Romero) were selected. Of these, 13 sites were selected for initial permitting.

Geobrugg VX and “Super” VX nets were chosen to be installed. These nets have only lateral anchors and construction will have minimal disturbance in the creek beds. In addition, the nets are environmentally sound in that they are composed of open, high-strength, steel rings which are suspended several feet above the creek channel. During flows water and aquatic animals can move beneath the nets and in times of high water, through the rings. Only during catastrophic debris events do the nets function. They are designed to withstand the high impact and static pressures associate with stopping and retaining debris material.

In addition to engineering the debris nets, KANE GeoTech has produced a conceptual design for a debris flow monitoring/alerting system that works in concert with the debris nets that is being considered for installation in a subsequent construction phase.

KANE GeoTech has extensive experience in debris net engineering and geotechnical instrumentation. For this project it has worked closely with Geobrugg AG, Romanshorn, Switzerland; Access Limited Construction, Oceano, California; BGC Engineering, Golden, Colorado; and Storrer Environmental Services, Santa Barbara, California. Access Limited has worked with KANE GeoTech on a number of design/build debris net projects in the western United States. BGC Engineering is one of the world leaders with respect to hazard assessment associated with debris flows. Storrer Environmental has extensive experience on the Central Coast in assessing biological impacts and in environmental compliance monitoring.

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Montecito Debris Flow Mitigation

General Report of Findings

Montecito, California

Project No. KGT18-18

1. INTRODUCTION

1.1 General

KANE GeoTech, Inc. (KANE GeoTech) was retained by The Partnership for Resilient Communities (TPRC) to assess the debris flow channels and recommend debris flow mitigation to protect the structures and infrastructure in the debris flow hazard area. KANE GeoTech performed field work from May through September of 2018 at the Project site, Figure 1.

As described in this Report, 71 net sites have the potential to catch significant quantities of debris before it carried out into the community of Montecito in a debris event. Of these 71 sites, 13 were subsequently chosen for initial permitting.

This Report describes our work identifying the 71 sites, and also provides details of our activities directed toward gathering information necessary for permitting the 13 nets.

1.2 Previous Studies

During its KGT Phase 1 Initial Investigation preliminary investigation, KANE GeoTech had visited the site to assess each canyon from a helicopter. Following this initial aerial assessment of the area, KANE GeoTech selected locations in each canyon that were potential sites for debris flow mitigation. These areas were recorded in our KGT Phase 1 Initial Investigation Report, (KANE, 2018), and served as the basis of the KGT Phase 2 Site Investigation field investigation detailed in this Report.

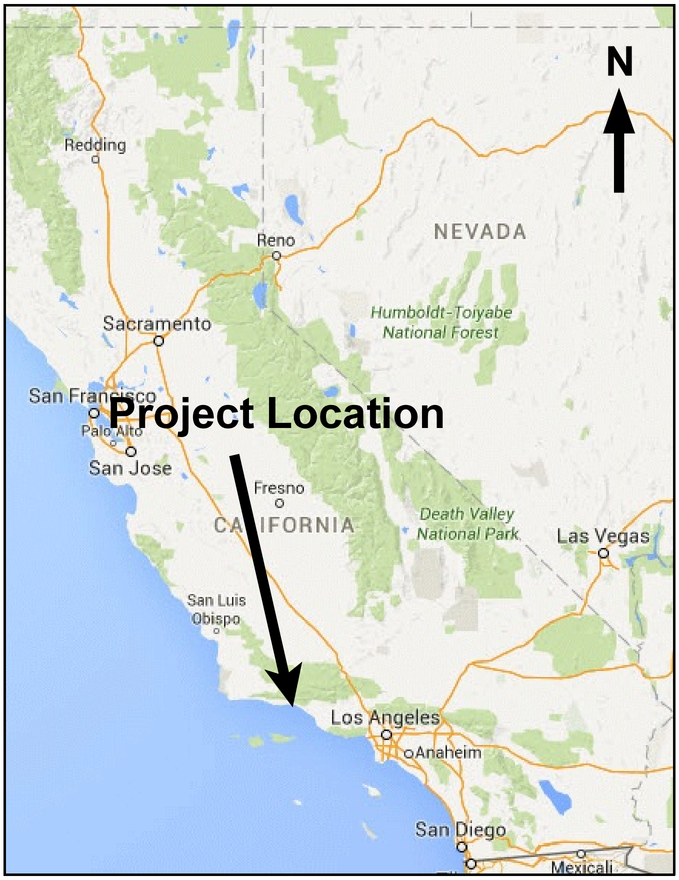

Figure 1. Project location in Santa Barbara County, California.

1.3 Purpose

The purpose of this Report is to summarize the KGT Phase 2 Site Investigation, KGT Phase 3 Net Engineering, and additional work. Included are details on the overall debris net Project, as well as the emergency instrumentation warning and monitoring system.

2. SCOPE OF WORK

KGT Phase 1 Initial Investigation has been completed. The following Scope of Work was proposed for KGT Phase 2 Site Investigation of the Montecito Debris Flow Mitigation Project. This Report is provided as a part of the KGT Phase 2 Site Investigation deliverable only. Five additional, canyon-specific reports have been prepared and submitted (KANE, 2018a; KANE, 2018b; KANE, 2018c; KANE, 2018d; KANE, 2018e)

2.1 Phase 2 – Site Investigation and Data Collection

1. **Site Investigation and Analyses.** KANE GeoTech personnel visited the Project site to obtain detailed information on site conditions at specific locations within the Canyons. KANE GeoTech investigated areas that were identified in KGT Phase 1 Initial Investigation as possible locations for mitigation structures.

   KANE GeoTech conducted debris flow analyses for each location identified during the detailed field investigations, to verify the suitability for the proposed mitigation options. We also teamed with an experienced geohazard contractor to perform a preliminary assessment of constructability at the sites.

   Verification anchors were planned to be installed and tested to determine the soil properties and strengths for design purposes.[1] This approach is anticipated to eliminate the need to test anchors during construction operations, resulting in overall time and cost savings for the Project.

2. **Report of Findings.** KANE GeoTech provides this detailed Report of Findings summarizing the site investigation and the analyses. This Report presents the results of the analyses and provides final recommendations for mitigation with estimated construction costs for each location. It also includes information from BGC Engineering, Inc. who KANE GeoTech contacted and worked with in developing the start of the risk assessment for Montecito.

   The KGT Phase 2 Site Investigation field work for was separated into five canyons: Cold Spring, Hot Springs, San Ysidro, Buena Vista, and Romero Canyons. Canyon-specific reports detailing each canyon net location are contained in KANE GeoTech, 2018a - 2018d.

3. **Project Review Meetings**. Project review meetings were held via telephone and in-person to discuss technical aspects and construction issues. These meetings are ongoing.

---

[1] Due to permitting issues, the verification test anchors could not be installed in time for this Report. They will be installed after permitting and the information used to obtain precise anchor depths during the construction phase (KGT Phase 3 Net Engineering).

2.2 Phase 3 – Engineering Design, Construction Drawings, and Specifications

1. **Description.** KANE GeoTech provided to TPRC Construction Drawings, Specifications and Calculations, for TPRC to submit to the permitting agencies. This information is necessary for the approval and subsequent construction of the debris nets in Montecito. Seven nets will be installed in Buena Vista Canyon and two each in Cold Spring, San Ysidro and Romero Canyons. This is a total of 13 nets installed.

2. **Site Work.** KANE GeoTech personnel worked with Storrer Environmental Services (Storrer) personnel to assess the 13 initial net locations for footprint, accessibility by construction equipment, and locations of construction material staging. We also worked with Access Limited Construction (Access) personnel, visiting each of the 13 net locations to further discuss constructability issues and obtain final measurements for engineering design.

3. **Engineering Design.** KANE GeoTech utilized the information obtained during the site visits, as well as other available information, to design the debris flow mitigation systems required. KANE GeoTech provided a Calculation Report containing engineering calculations, stamped by a registered Civil Engineer experienced in debris flow mitigation, used for the engineering design.

4. **Construction Drawings.** KANE GeoTech provided a complete set of engineered Construction Drawings, stamped by a registered California Civil Engineer experienced in debris flow mitigation suitable for the construction of the debris flow nets. The Drawings consisted of layout and construction details.

5. **Specifications.** KANE GeoTech provided Construction Specifications, stamped by a registered California Civil Engineer experienced in debris flow mitigation suitable for the construction of the debris flow mitigation and be delivered electronically.

6. **Project Review Meetings**. Project review meetings were held via telephone and in-person to discuss technical aspects and construction issues. These meetings are ongoing.

For convenience and continuity, a description fo Phase 4 is included below. This work will be conducted once permits are obtained.

2.3 Phase 4 – Construction

1. **Construction Oversight.** KANE GeoTech will provide construction oversight services including a pre-construction meeting, system layout inspection, and quality assurance testing. We will also supply daily construction oversight to streamline the construction process and keep it on schedule. KANE GeoTech will provide a final inspection of the installed debris flow mitigation system, including a letter of acceptance stamped by a registered California Civil Engineer. Daily field reports describing the progress made each day will be supplied to the TPRC.

3. SITE DESCRIPTION

3.1 Background

The Project site is located in Santa Barbara County, California. The Project location is within the Santa Ynez mountains located north of the community of Montecito. This area was a part of the 281,893 acres burned during the 2017-2018 Thomas Fire, (CalFire, 2018).The focus of the project consists of the five major watersheds that contributed to large debris flows that impacted Montecito January 9, 2018, Figure 2.

Following the loss of anchoring vegetation as a result of the Thomas Fire, heavy, intense rainfall led to rapid erosion of the topsoil of the Santa Ynez Mountain slopes. The debris flows consisted of large sandstone boulders, cobbles, sand, and silt. The flows were most likely originated at higher elevations in the steep areas of the Santa Ynez Mountains. As the flows advanced downstream, large amounts of additional material were scoured from the canyon channel beds and sides of connecting channels. As larger amounts of fine material were added to the flow, the energy drastically increased, enabling the flow to scour more material and entrain large boulders that were previously embedded in the main canyon channels and side channels, Figure 3.

The Montecito debris flows resulted in overflowing of all debris basins and plugging of culverts and bridges throughout Montecito. As a result of the flow de-channelization, the high-energy flows spread laterally over areas of the town resulting in 23 deaths, and numerous residential homes and commercial buildings damaged or destroyed.

3.2 Potential Debris Flow Volumes

It is estimated that approximately two million cubic yards of material was cleared from the city of Montecito following the January 9 debris flows. Despite the significant burn damage from the

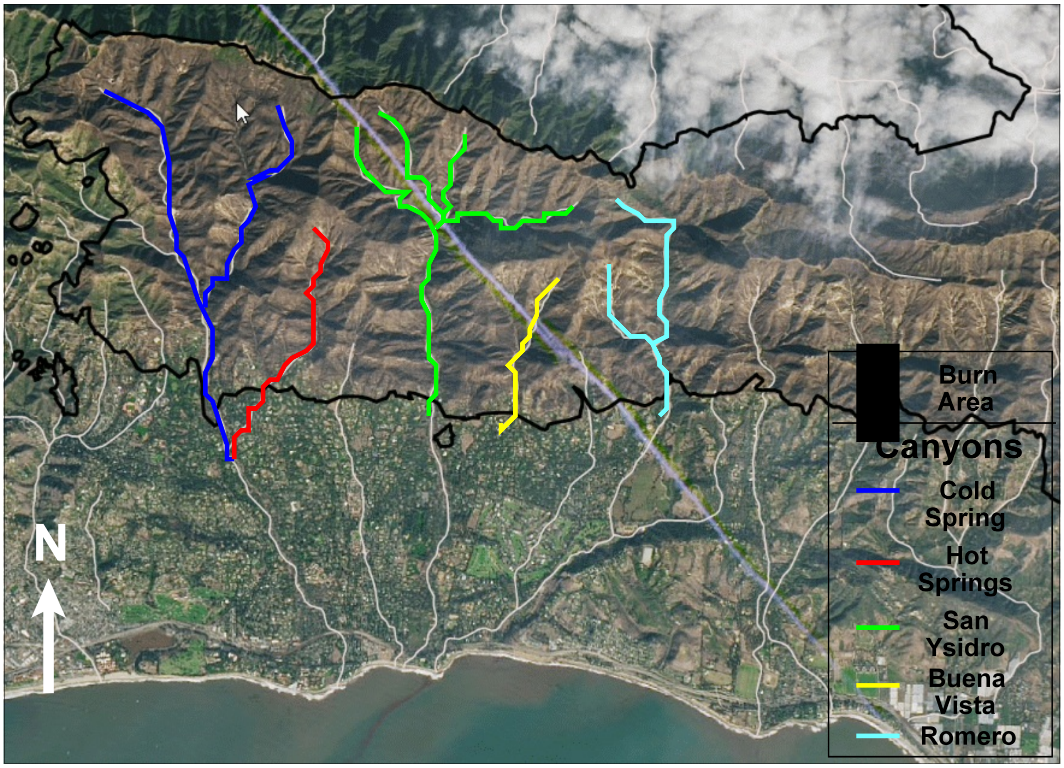

Figure 2. Primary drainages in the Santa Ynez Mountains that contributed to debris flows.

Thomas Fire in the Santa Ynez Mountains, it was predicted that at least 20-30% of the area would be re-vegetated by Spring of 2018. Unfortunately, the current estimate is that a mere 5-10% of the vegetation has re-established, leaving a large amount of un-anchored material in the burn area ready to mobilize with intense precipitation rates, Figure 4.

Figure 3. Massive boulder transported by a debris flow in Buena Vista Creek channel.

There are four debris basins located within Montecito: Cold Springs, Montecito Creek, San Ysidro, and Romero, Figure 5. Cold Spring and San Ysidro debris basins were previously scheduled for removal within the next 10 years. However, it is understood, following the devastation from recent debris flow events, that the basins will be left in place and will potentially expanded and upgraded for environmental purposes. The fifth canyon, Buena Vista, does not have a debris basin, and it is our understanding there is no future plan to construct one. Montecito Creek Basin, located approximately two miles from the project canyons, provides no protection to the residences to its north.

Figure 4. Rapid erosion on bare slope in Romero Canyon.

4. GEOLOGY

Montecito is located in the approximately five mile wide area between the Pacific Coast and the Santa Ynez Mountains. Lower elevations in this area are composed of thick, Quaternary alluvial deposits including flood plain deposits and large, prominent alluvial fan resulting from earlier debris flow events.

The Santa Ynez Mountains are a part of the Transverse Ranges of Southern California. Bedrock is almost entirely composed of interbedded sandstone and shale strata ranging from the Jurassic Franciscan formation to Eocene sandstone and shale. These beds exhibit differential weathering causing large, blocky sandstone overhangs seen throughout the area. The blocks eventually weather and fall, resulting in sandstone boulders of various sizes to collect in the drainages. These boulders weather spheroidally. The bedding dip varies throughout the site and is governed by the extensive folding and faulting in the area. The Mission Ridge Fault is located in the western area

Figure 5. Debris basins located within the limits of Montecito, California.

of Montecito, while the extensive Santa Ynez Fault runs along the entire width of the Santa Ynez Mountain above Montecito. Vertical and overturned beds are found in the south-eastern area of the Santa Ynez Mountains of Montecito, (Dibblee, 1966). The Santa Ynez Mountains are just south of the northward thrusting Santa Ynez Fault and associated fault zones. The result is a left-lateral displacement. Other faults in the area are the result of large synclinal and anticlinal folds. The Santa Ynez Mountains are covered in Quaternary Alluvium of varying thickness. The alluvium above Paleocene to Miocene age formations, result in the ubiquitous sandstone and shale found in the Mountains. The oldest units mapped from the Paleocene, including the Anita, Sierra Blanca, and Juncal Formations, are predominantly shale.

The Middle Eocene Juncal Formation also contains the widespread Camino Cielo Sandstone member. These are overlain by the Upper Eocene Matilija and Cozy Dell formations which are comprised of buff sandstone and gray clay shale with minor sandstone beds, respectively. These units originated in a marine environment, indicated by the presence of turbidites. Turbidites are the result of gravity-induced turbidity flows, essentially underwater debris flows, depositing great amounts of clastic sediment into deeper ocean waters.

Above the Upper Eocene formations lie the younger Oligocene Coldwater Formation. The Coldwater is a sandstone containing thinner beds of sandy siltstone deposited in a coastal-shallow marine environment. Above the Coldwater is the non-marine Sespe Formation, predominantly red sandstone, shale, and conglomerate (Olson, 1982). The youngest, Miocene units of this sequence include the thin Vaqueros Formation (mostly buff sandstone) and the Rincon Shale.

The stratigraphy of the area reveals a period of land subsidence followed by a major classic influx that was succeeded by marine transgression. These events are illustrated in the rock record in the form of marine deposits (the Anita through the Juncal formations), the shallower deposits of the Matilija, and the deeper marine deposits of the Cozy Dell and the older part of the Coldwater. In the later years of the development of the Coldwater formation, the increase of sediment on the continent led to a shallower deposition of sediments, partially due to tectonic uplift (Van de Kamp, 1974). This resulted in the deposition of the Sespe Formation, evident in fanglomerate[2] deposits associated with alluvial fans which can be seen throughout the canyons. The area was exposed to displacement thrust faulting associated with disharmonic folding as the Santa Ynez Mountains continued to be uplifted and eroded (Olson, 1982).

5. SITE EVALUATION

5.1 Net Locations

Beginning May 29, 2018 and continuing through September 2018, KANE GeoTech investigated the five Montecito canyons to assess the suitability for flexible debris flow protection systems and to collect the data required for analyses for net design. KANE GeoTech began the detailed evaluation of each site by thoroughly reviewing topographic maps, preexisting trails, and local routes through every canyon.

To complete the site investigations, KANE GeoTech personnel developed a field methodology by hiking from the trail head to the back of each of the five canyons to mark preliminary net locations. While hiking downstream back toward the trail head after the preliminary assessment of the entire canyon, final net locations were noted, measured, and other data recorded. This method allowed the evaluation of the entire canyon, ending near the source material at higher elevations. Observing the canyon in its entirety allowed a full reconnaissance, optimizing net locations prior to collecting specific data.

Locations were chosen at significant "choke points" within each canyon. These sites were where debris material would be forced through the channel at a narrow point but had a relatively large, flat area upstream to store a large amount of debris, Figure 6. After choosing prime locations for flexible debris flow nets, KANE GeoTech personnel took rough measurements of channel dimensions,

Figure 6. Choke-point in channel with upslope storage.

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[2] Conglomeratic rock containing rock fragments of various types and sizes that is deposited in an alluvial an.

videoed each area with use of the DJI Mavic Pro Drone, and marked the locations with a handheld Garmin GPS, Figures 7 and 8. A total of 71 net potential net locations were identified. All net numbers and GPS locations are provided in Appendix A. Please see Canyon-Specific Reports for images with net locations shown.

Figure 7. KANE GeoTech geologists and engineers hiking a canyon. Note the large boulders remaining in the channel.

6. DEBRIS FLOW NET DESIGN

6.1 Background

Geobrugg Debris Flow Protection Systems (Roth, 2004) were selected for the Project site. Geobrugg is the global leading manufacturer of flexible debris flow protection systems and has been involved in substantial research regarding debris flow mitigation (Wendeler, 2016). After catastrophic flooding in Switzerland in 2005, the Swiss government partnered with Geobrugg to conduct a major research program to determine if the nets could be used as light weight, low-cost, environmentally sound replacements for concrete check dams and debris basins.

Geobrugg debris nets have been installed in hundreds of locations around the world to protect people and infrastructure in a low-impact, environmentally sound way. Figure 9 shows a debris net installed in Camarillo Springs, California protecting the community from debris flow.

The principle behind debris nets is to catch debris flows close to the source, usually in mountain canyons, stop the massive flow, and then, if desired, allow the material to be placed back in the channel to allow natural process to return it safely to the rock/hydrologic cycles.

The basic debris flow protection system consists of a custom ring net engineered to resist the velocities and dynamic and static pressures unique to debris flows. Support

Figure 8. KANE GeoTech geologist in Romero Canyon channel. Note large amounts of fine to boulder debris in channel.

ropes are installed into channel banks and transfer debris impact and pressure loads from ring nets to the ground. Excessive energy is absorbed by net braking elements in the support ropes. In addition, the ring net in the system allows the passage of water and fine sediment, eliminating the need to consider any bulking factor when determining net height.

Flexible debris nets can be constructed rapidly with minimal environmental impact and can be combined with the existing debris basins to maximize material storage in the canyons. They have a small construction footprint and do not change channel flow unless a debris flow event occurs.

Figure 9. Geobrugg VX debris net protecting the community of Camarillo Springs, California. The net is easily cleaned after filling.

There are two basic versions of the Geobrugg debris net systems. The VX net which is intended for relatively narrow (up to 40-ft wide), Figure 10. The UX net is installed in wider channels (up to 90-ft wide) and has posts to keep the top net support rope from sagging. In wide channels where foundations cannot be constructed, such as in the Montecito canyons, a “Super VX” net can be installed, Figure 11. It is a essentially a VX net with additional and stronger top net support ropes. Due to the environmental conditions in the Canyons above Montecito, Super VX nets will be constructed, rather than UX nets, to eliminate the need for foundations in the channel beds.

6.3 Debris Flow Net Design

6.3.1 Debris Flow Net Design Methodology

Existing methods for determining debris flow volumes are meant for large watersheds and large-scale structures such as basins and bridges impacted by timber (Bradley, et al., 2005). Conventional debris flow net design is based on field observations (Duffy and Peilia, 1999) and full-scale testing in controlled situations (De Natale, et al., 1996; Muraishi and Sano, 1997). Other publications related to the design of debris flow protection systems includes Mitzuyama, et al. (1992), Rickenmann (1999, 2001), and PWRI (1988).

Figure 10. Post-fire VX net installed above running stream on the Nambé Pueblo, New Mexico. Note basal opening allowing water and fish passage beneath.

Figure 11.“Super VX” debris net installed in British Columbia, Canada. Note freeboard beneath net to allow stream flow and animal traffic. Basal opening freeboard is adjustable to eliminate construction excavation in stream channel.

As a result of its extensive research, Geobrugg (2003) developed a methodology suitable for the design of its debris flow net systems. A peak discharge is calculated and the flow velocity can be estimated. Once the mass and velocity are known, the design pressures can be determined. Finally, the design height is calculated. It should be noted that debris flows tend to be linear features so that after an initial dynamic impact, additional surges add only a quasi-static load to the net, instead of a fully dynamic load. In addition, the debris material already impacted and de-watered on the net serves to absorb some of the energy of subsequent surges. The result is that much of the debris flow material is not against the net, resulting in decreased energy absorption and height requirements, Figure 12.

Geobrugg has developed a software program, DEBFLOW, which determines the appropriate Geobrugg debris flow system as a function of the characteristics of a given debris flow basin and channel. The DEBFLOW program is based on the Geobrugg methodology, full scale testing in controlled situations, and finite element modeling.

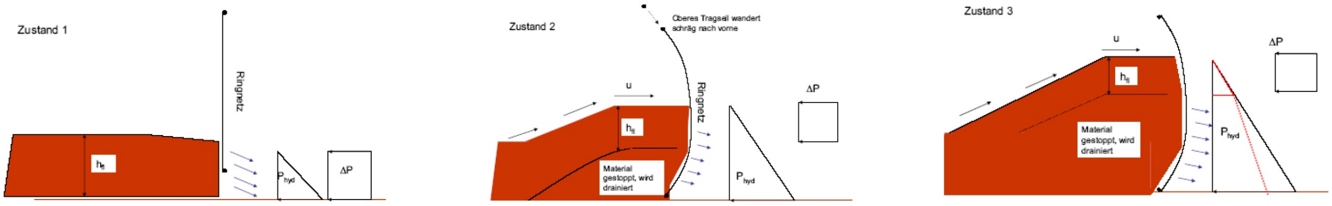

Figure 12. Schematic showing successive impact pressures from a debris flow being applied to a net. The net and its anchorages must be designed to withstand dynamic and static (Rankine) pressures. Note that successive debris impacts after the first flow lose energy by having to go up the previous flow and also stop debris material back up in the channel.

6.3.2 Debris Net Engineering

In order to produce installation plans for the nets, it is necessary to consider strength of the anchoring rock and, if required, the design of foundations for the posts. Design loads are supplied to the engineer by Geobrugg as a result of their testing and finite element modeling. Rock and soil properties are determined during the field investigation at each installation site.

Anchor design for UX and VX nets consists of determining the depth required to support the loads on the wire ropes. Previous work by the Post Tension Institute (PTI) (2014) gives a methodology for anchor design that is used for soil walls, tie-back walls, slope post-tensioning, slope stabilization system design, and rockfall and debris net anchor design. The PTI provides design charts with a recommended shear, or bond, strength for a particular rock/grout combination as determined by the geologist. The data comes from thousands of actual installations. Figure 14 is an example of PTI tabulated data. Equation (1) is then used to calculate a nominal design depth for the anchor.

For example, a weathered and fractured sandstone, as found in the Santa Ynez Mountains, will have a bond strength of 100-psi to 120-psi, Figure 13. The maximum test load for a debris net anchor is given by Geobrugg at 80,000-lbs. Using Equation (1), and assuming a 4-in drill hole and minimum bond strength of 100-psi, the necessary depth to hold the anchor in the fractured sandstone is 10.6-ft. This is well-within the capability of a small rock drill.

$$L_b = \frac{2\ P}{\pi\ d\ \tau_w} \qquad (1)$$

where:

L_b = *depth required for anchor*
2 = *PTI recommended Factor of Safety*
P = *design load for the anchor*
π = 3.14
d = *drill hole diameter*
τ_w = *working bond stress along the interface between the rock and grout* (*interface shear strength*)

Another example, might be the weathered and fractured shale found in the Santa Ynez Mountains. Using Figure 13, a soft shale will have bond strengths of 30-psi to 120-psi. Using the very conservative value of 30-psi, an anchor in shale in a 4-in hole would have to be drilled to a maximum of 35-ft. This is not out of the range of the typical drill.

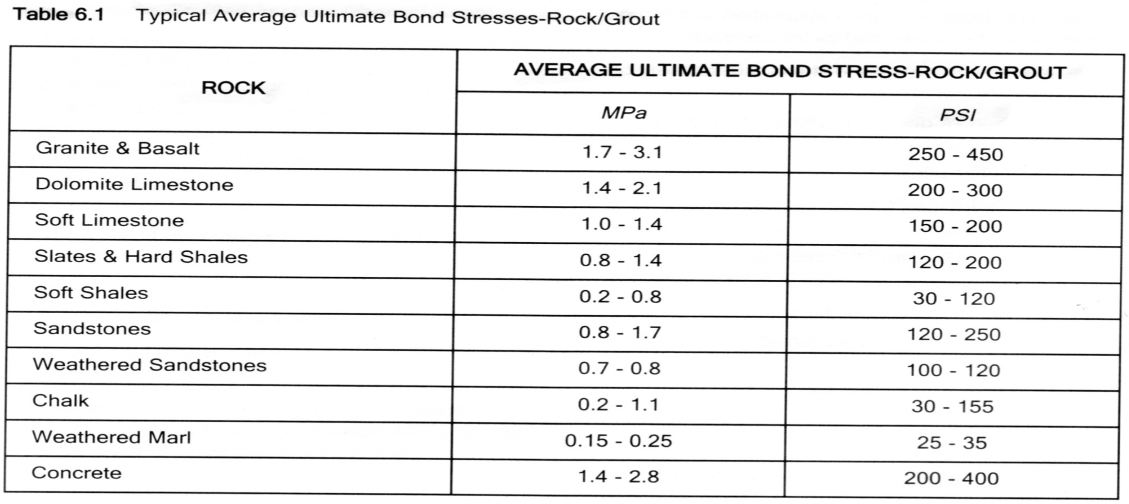

Table 6.1 Typical Average Ultimate Bond Stresses-Rock/Grout

ROCK	AVERAGE ULTIMATE BOND STRESS-ROCK/GROUT	
	MPa	*PSI*
Granite & Basalt	1.7 - 3.1	250 - 450
Dolomite Limestone	1.4 - 2.1	200 - 300
Soft Limestone	1.0 - 1.4	150 - 200
Slates & Hard Shales	0.8 - 1.4	120 - 200
Soft Shales	0.2 - 0.8	30 - 120
Sandstones	0.8 - 1.7	120 - 250
Weathered Sandstones	0.7 - 0.8	100 - 120
Chalk	0.2 - 1.1	30 - 155
Weathered Marl	0.15 - 0.25	25 - 35
Concrete	1.4 - 2.8	200 - 400

Figure 13. Table from PTI showing estimated bond strengths between rock and anchor grout.

Rather than estimate the bond strength, it is better, when possible, to perform actual field test anchors to determine the bond strength. Verification anchors are sacrificial anchors installed in typical sections of rock. The anchors are drilled to various depths and tested. The load at pullout can then be back-calculated to determine the actual bond strength for the particular rock in the field. KANE GeoTech has found that PTI bond strengths tend to be very conservative and time and money can be saved by performing verification tests prior to net installation. Verification anchor testing will be conducted for the Montecito project to ensure quality in anchor installation.

6.4 Debris Flow Volume Storage Determination

Debris flow volume storage area is based on field observations and measurements of channel geometry. For DEBFLOW analyses, the calculated volume of sediment detained by each net is based primarily on a uniform geometry of each net and channel gradient. This assumes the storage area is a trapezoidal prism extending upstream from the net. This volume estimate does not take into account changes in channel shape upstream from each net location. However, sites were chosen to maximize storage area, so the volume estimates should be considered minimum values of sediment retained. Each net location identified in the field is within one of the five canyons identified in KGT Phase 1 Initial Investigation, at locations where channel geometry is constricted and upstream geometry widens to provide maximum storage capacity.

For this project, the approximate net locations, channel geometries, and estimated debris flow volumes were determined by KANE GeoTech from its field investigation and examination of WERT and BAER Reports, Table 1. Conservatively estimated total debris flow volumes exceeded the one-event capacity of the available flexible net designs. Therefore, for design purposes, nets were assumed to fill completely. Volumetric data, field observations, topographic maps, and the Geobrugg DEBFLOW program were used to calculate the design requirements for the recommended Geobrugg Debris Flow Protection Systems.

TABLE 1. STORAGE POTENTIAL OF PHASE 1 NET LOCATIONS

Canyon	**Number of Nets**	**Approximate Retained Volume**	
		m^3	**yd^3**
Cold Spring	2	7,400	9,650
San Ysidro	2	12,170	15,900
Buena Vista	7	29,480	38,550
Romero	2	4,000	3,950
TOTAL	**13**	**53,050**	**68,050**

7. DEBRIS NET INSTALLATION

Once permits are obtained, debris nets can be installed by an experienced contractor. Access Limited Construction (Access) of Oceano, California has been identified as the Contractor for the debris net installation. Access is one of the most experienced geohazard contractors in the United States and has installed more debris nets than any other contractor.

The anchor locations are marked by the contractor and the engineer. Accurate measurements must be taken at this point so that the nets can be custom-fabricated for each location. Geobrugg manufactures its nets at its factory in Algodones, New Mexico.

While fabrication is in progress, the Contractor will begin drilling anchors using approved equipment per permit, Figure 14. All anchors will be installed in the channel sides. KANE GeoTech will be on-site to ensure conformance with its plans and to address any engineering issues immediately that may occur. Anchor installation requires the most time in the installation process. It takes a crew of three about one week to drill anchors and install a net.

As the fabricated nets are delivered, they are hung on the wire ropes, much like a shower curtain. This process generally only takes about two days per net. Once the nets are hung, the construction process is completed. The Contractor then performs site clean-up and the project is completed.

Figure 14. The Kaiser Spyder S2 Walking Excavator. It is specialized, low-environmental-impact drilling equipment from Access Limited. The machine recently was used to install anchors for debris nets Camarillo, California. Note that machine is supported on sides of channel and does not disturb the channel itself. Pictured here with an excavator bucket. The machine can be configured with a drill for anchor installation or a bucket for net clean-out.

8. Debris Net Maintenance

8.1 Net Maintenance

All steel components from Geobrugg are hot-dip galvanized with 95% zinc and 5% aluminum to provide corrosion protection. This results in an estimated lifetime of net steel components to be 75-yrs to 100-yrs.

Periodic clean-out is generally recommended. However, although not planned for this Project, a net can be left full and effectively reduce the channel gradient. The change in gradient will significantly reduce the energy from any subsequent flows.

The ring nets do not conform to the bottom of the channel, allowing the passage of water and fine sediment. They are also corrosion protected and can be powder coated for aesthetic purposes. Vegetation can easily grow around the debris nets, allowing for rapid assimilation into the surrounding environment. The debris nets should be considered temporary and removed when full area revegetation occurs.

Maintenance costs associated with the nets include the replacement of brake elements once activated beyond 50% of their capacity, and the cost cleaning-out of retained material. Clean-out frequency will depend on the frequency, intensity, and the amount of precipitation experienced in the surrounding watershed. The brake elements will generally only be activated during a high-energy debris flow event and may not activate at all with low energy sediment loading. If a debris net is filled with sediment or debris and will not be cleaned out, there is no need to replace the brake elements.

8.2 Net Clean-out

Clean-out can be accomplished in two ways. First, a backhoe or excavator can remove material and place it on the downstream side of the debris net. In this method, the debris material is returned to the natural system and free to continue downstream albeit less catastrophic conditions. If another debris event should occur, the material will be stopped and captured by the next net downstream. This approach, when used in Montecito will assure material is safely brought to the ocean to provide natural beach replenishment. Alternatively, in areas with road access, or by hauling material out of the canyons with a helicopter, the material can be loaded and placed in haul trucks for removal to a spoil site.

In either situation, the net can be disconnected from the top support ropes, laid on the ground and a small backhoe or loader used to distribute or remove the material. Only vehicles with rubber tires should be used while cleaning out the net to reduce impacts to the channel and avoid damaging the net. After the net has been cleared of retained debris, the net should be inspected for damage. For additional information on maintenance, it is recommended to follow the manufacturer's published guidelines.

Concerns regarding the nets becoming long-term "barriers" for steelhead migration can be addressed by rapid assessment, channel clearing, and re-distribution of material should the nets be partially or completely filled following an event.

Following the revegetation of the slopes and when the nets are no longer needed for debris flow protection, the nets are planned to be removed. It is common practice, to remove infrastructure within stream channels, create a passage for fish, and allow the natural stream flow re-distribute the sediment downstream by natural processes, (Matilija Coalition, 2018).

Additional detailed information about clean-out of each proposed net has been developed by Access Limited Construction (2018).

9. ENVIRONMENTAL ASPECTS OF DEBRIS NETS

The debris nets were developed in Switzerland to be environmentally sound protective measures against debris flow. They are engineered to replace environmentally destructive rigid barriers and debris basins. They can be installed without impacting channel bottoms.

The rings are large enough for small animals to pass through. Wendeler, et al. (2017) described ten years of world-wide experience with debris nets noting that when filled, the rings allow for the passage of animals. The authors noted that owners often request that the nets be left filled to allow rapid revegetation and fit into the landscape more rapidly.[3] Although this is an option, the Montecito nets will be cleaned out after filling.

Generally, the nets are designed with a gap, or freeboard, beneath them of at least 3-ft In some circumstances, such as debris chutes where a stream channel may not be present, large rings can be installed along the bottom to allow animal traffic. The Montecito project will not utilize this approach as all canyons have stream channels. Animals will be able to travel beneath the nets which will have basal openings of between 3-ft and 5-ft.

VX and Super VX nets have all their anchors on the sides eliminating the need to disturb a channel during construction. All the nets are lightweight and can easily be removed in post-fire situations once vegetation has been reestablished. For this project, VX and Super VX nets only will be used.

These systems have been in use for decades in one form or another, from rockfall protection systems to debris nets. Debris nets have been diligently researched and tested with over ten years of experience with them (Wendeler, et al., 2017). They have tremendous environmental advantages:

1. *The nets do not act as barriers to fish transport*. The nets are installed above the stream channels. During high flows the fish can easily swim through the rings. If the nets fill, they can be opened relatively quickly, the material placed downstream in a way to enhance habitat by creating pools for steelhead. The alternative is to allow debris to travel at high velocities downstream wiping out any fish and carrying toxic debris and water down to the ocean.

2. *Rock nets and debris nets do not trap animals.* They have been used in thousands of locations with great success throughout the world. There is not one recorded instance of an animal being trapped in a net. The animals simply pass under or around the nets.

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[3] The advantage to not removing vegetation is to save money, but also to allow the stream gradient to change, reducing flow velocities and consequential damage downstream.

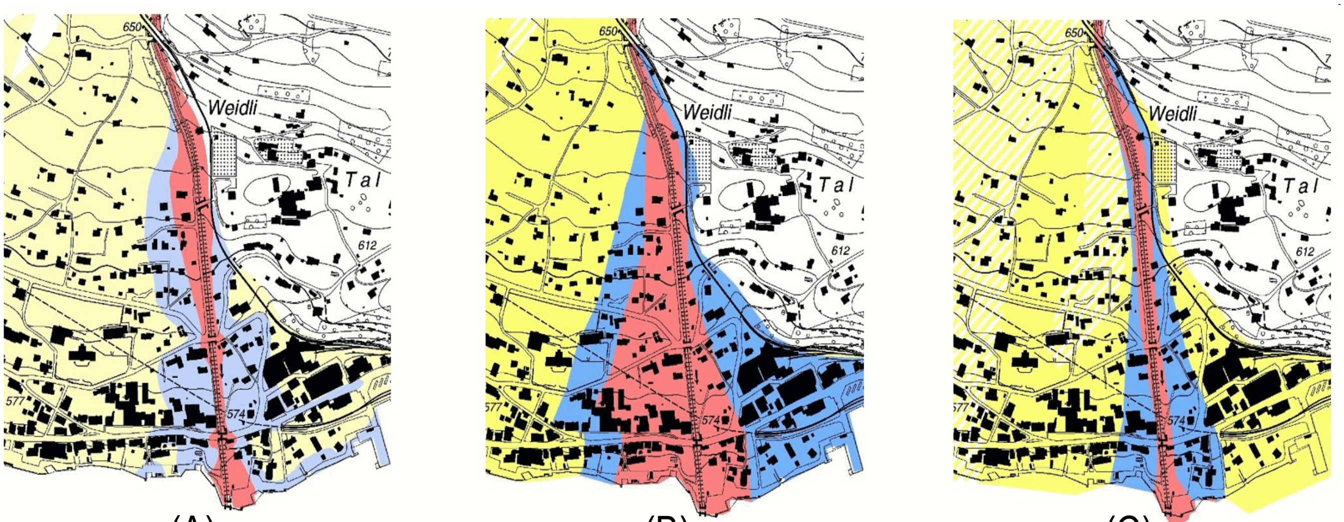
3. *The nets are a rapidly-installed, engineered solution.* The nets can be deployed relatively rapidly and provide extensive and much-needed protection to the stream channels, structures, wildlife, and people. The creeks are already "messed up" from debris that will continue if left unchecked. Further debris flows without mitigation may further destroy the channel, preventing fish transport.

4. *The nets work in harmony with the natural rock sedimentation cycle.* The debris nets remain dormant until a large debris event occurs. Once debris has been stopped, the nets are excavated and the material placed downstream and to the side to allow transport as part of the natural erosion/beach replenishment cycle. In addition, clean-out equipment can be used to enhance pools used by steelhead and other species for spawning.

5. *The nets will allow the return of the natural system vegetation much sooner than if debris flows were allowed to continue unchecked.* The debris catch-and-release-under-controlled-circumstances nature of the project facilitates the regrowth of plants to establish and remain in place, rather than be destroyed in successive uncontrolled debris flows.

10. RISK ASSESSMENT

After the flooding of August 2005 in Switzerland, the Swiss government and Geobrugg worked to reduce the debris risk to residents living in high risk zones using environmentally sound debris nets. Figure 15 shows the changes in risk in the town of Brienz, Switzerland along the Trachtbach River after two catastrophic debris flows in summer 2005. Figure 16 shows the post debris flow damage to the town. A similar design and result using the Geobrugg debris nets is the goal of this project.



(A)
Hazard maps before August 2005

(B)
Hazard maps after August 2005

(C)
Hazard map after new protection measures

Figure 15. Changes in risk in the town of Brienz, Switzerland before (A), after the catastrophic debris flows of 2005 (B), and afte the installation of a system of Geobrugg debris nets in the Alpine drainages above the town (Geobrugg, 2017).

Figure 16. Catastrophic damage to the town of Brienz, Switzerland in summer 2005 was similar to that experienced by Montecito after the January 9, 2018 debris flows.

KANE GeoTech contacted BGC Engineering (BGC)) concerning risk assessment and the need for debris flow mitigation prior to the upcoming rainy season. BGC made a preliminary assessment fo the Montecito area and the canyons above (BGC, 2018), Appendix B.

Personnel from BGC hiked Buena Vista Canyon, which has no debris basin at all, with a KANE GeoTech engineer and geologist. BGC also toured the Montecito community with Montecito Fire personnel, to make a preliminary assessment of the risk involved.

BGC concluded that a large supply of fine-grained sediment, boulders, tree-trunks, and branches remain in the canyons and is readily available for future debris flow events in the coming rainy season. They also pointed out that the existing sediments basins in Montecito are inadequate to catch and store the volume of debris likely to be mobilized during a debris flow event similar to the January 9, 2018 event.

BGC recommended that immediate mitigation action be taken and that an instrumentation and warning system be installed. They also agreed with TPRC and KANE GeoTech that flexible debris nets could be placed in the canyons to help protect against large-scale debris flow events.

11. INSTRUMENTATION

Additional weather and a debris monitoring/warning instrumentation system is being considered for implementation in subsequent construction. A detailed literature review and conceptual designs for a weather station, rain gauges, and debris flow monitoring/warning system are included as Appendix C.

12. CONSTRUCTION DRAWINGS, CALCULATIONS, AND SPECIFICATIONS

Construction drawings, calculations, and specifications for the 13 initial debris nets have been completed and submitted separately for permitting.

13. ESTIMATED COSTS

Due to the difficult access and time sensitivity of this project, TPRC has retained Access Limited Construction, LLC to construct the nets. Access has extensive experience in debris flow net construction. They have worked with private and public agencies and under rigorous timelines and constraints.

They are one of the few contractors in the United States that own and operate The Kaiser Spyder, Figure 14. This specialized excavator will allow for rapid drilling and anchor installation within difficult access channels. Access involvement in the Project prior to construction has allowed them to become familiar with the sites. This has allowed Access to work closely with KANE GeoTech and Storrer to address constructability and environmental issues in advance of construction.

14. CONSTRUCTION METHODOLOGY AND SEQUENCE

Drilling and grouting anchors is the most time consuming task of the net construction. Therefore, drilling and grouting can be performed during net fabrication. In the interest of time savings, it is our recommendation that the anchor installation by multiple crews begin as soon as possible. While anchors are being installed additional crews can follow and install support ropes and nets in each canyon after grouting is completed.

We recommend that KANE GeoTech personnel be present to document debris net anchor locations and hole depths, authorize changes, and take detailed notes while construction is taking place. This will help ensure the debris flow nets are constructed per KANE GeoTech's design, and will help maximize construction efficiency.

15. CONCLUSION

15.1 Conclusion

Due to the lack of significant revegetation in the canyons impacted by the Thomas Fire, topsoil and loose debris material does not have a substantial anchorage. Consequently, a high potential for large quantities of loose debris still remains. A substantial volume of rainfall in a relatively small time frame will likely trigger large debris flow in the already impacted areas. Given this, debris flow is still of paramount threat to the Montecito community and should be mitigated immediately before winter rains begin.

The limited storage capacity of the existing debris basins will be greatly enhanced with the installation of all 71 nets, Table 2 and KANE GeoTech (2018a - 2018d).

Additionally, the installation of the nets is an excellent way to protect Montecito residents and property without harming the environment. In fact, installation of the nets most likely will facilitate the environmental recover process.

TABLE 2. DEBRIS STORAGE CAPACITY INCREASE WITH INSTALLATION OF GEOBRUGG DEBRIS NETS

Canyon	Basin Capacity (m^3)	Total Net Capacity (m^3)	1-yr Vol. Est. (m^3)	% Retained Basin + Nets (m^3)	5-yr Vol. Est. (m^3)	% Retained Basin + Nets (m^3)
Cold Spring	15,300	78,200	90,000	104	130,000	72
San Ysidro	8,400	70,400	80,000	99	120,000	66
Romero	20,600	60,800	60,000	136	80,000	99

15.2 Addendum

For initial permitting, the installation of 13 Geobrugg debris flow protection systems will retain significant volumes of debris and greatly reduce flow energy by retaining material at higher elevations in the canyons, Figure 16. By reducing the flow energy and removing boulders from the sediment conveyance system, the likelihood that destructive debris flows will occur will be significantly reduced.

Table 3 shows the type of net for each proposed location and the amount of material that can be retained when a debris flow occurs. A total 68,053-yd^3 can be retained. This alone is more than the capacity of all the existing debris basins combined.

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TABLE 3. NET LOCATIONS AND RETENTION VOLUMES FOR PROPOSED LOCATIONS

Canyon and Net Location	Net Location Identification	Latitude	Longitude	Geobrugg Net Type	Geobrugg Net Material Retention Volume		
					Cubic Meters (m^3)	Cubic Feet (ft^3)	Cubic Yards (Yd^3)
Buena Vista Canyon	BV-2	34°27'2.88"N	119°36'39.84"W	VX140-H4	1,001	35,350	1,309
Buena Vista Canyon	BV-4	34°27'17.04"N	119°36'41.42"W	SVX180-H6	5,509	194,549	7,205
Buena Vista Canyon	BV-5	34°27'19.02"N	119°36'37.33"W	VX140-H4	1,432	50,571	1,873
Buena Vista Canyon	BV-6	34°27'30.13"N	119°36'31.63"W	VX160-H6	1,793	63,319	2,345
Buena Vista Canyon	BV-7	34°27'22.06"N	119°36'34.06"W	VX160-H6	5,296	187,027	6,927
Buena Vista Canyon	BV-10	34°27'8.78"N	119°36'40.56"W	VX160-H6	3,426	120,988	4,481
Buena Vista Canyon	BV-11	34°27'20.26"N	119°36'40.59"W	SVX180-H6	11,025	389,345	14,420
				Estimated Debris Retention Volume:	**29,482**	**1,041,148**	**38,561**
Cold Spring Canyon	CS-11	34°27'36.75"N	119°39'14.40"W	VX160-H6	2,942	103,896	3,848
Cold Spring Canyon	CS-18	34°27'36.89"N	119°39'18.01"W	SVX180-H6	4,421	156,126	5,782
				Estimated Debris Retention Volume:	**7,363**	**260,022**	**9,630**
San Ysidro Canyon	SY-7A	34°28'5.10"N	119°37'22.55"W	SVX180-H6	7,442	262,812	9,734
San Ysidro Canyon	SY-18	34°27'34.39"N	119°37'23.92"W	SVX180-H6	4,728	166,968	6,184
				Estimated Debris Retention Volume:	12,170	429,780	15,918
Romero Canyon	RC-12	34°27'54.46"N	119°35'27.46"W	SVX180-H6	2,055	72,572	2,688
Romero Canyon	RC-15	34°27'31.52"N	119°35'29.40"W	VX160-H6	960	33,902	1,256
				Estimated Debris Retention Volume:	3,015	106,474	3,943
				Total Estimated Debris Retention Volume:	**52,030**	**1,837,424**	**68,053**

Figure 17. Locations of proposed nets

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17. LIMITATIONS

Debris flows and rockfall are sporadic and unpredictable. Causes range from human construction to environmental (e.g., weather, wildfire) effects. Because of the multiplicity of factors affecting debris flow dynamics, debris flow and rockfall are not, and cannot be, exact sciences that guarantee the safety of individuals and property. However, by the application of sound engineering principles to a predictable range of geodynamics, the risk of injury and property loss can be substantially reduced by the use of properly designed nets in identified risk areas. Inspection and maintenance of nets is necessary to ensure that the desired protection level is not degraded by impact damage exceeding the design limits of a particular system or by corrosion from pollution or other man-made factors.

The analyses, conclusions and recommendations contained in this report are based on the site conditions observed by KANE GeoTech, Inc. personnel and derived from the information provided to KANE GeoTech, Inc. by others. If there is a substantial lapse of time between the submission of our report and the start of work at the site, or if conditions have changed due to natural causes or construction operations at or adjacent to the site, we urge that our report be reviewed to determine the applicability of the conclusions and recommendations considering the changed conditions and time lapse. This report is applicable only for the project and site studied. This report should not be used after three years.

Our professional services were performed, our findings obtained, and our recommendations proposed in accordance with generally accepted engineering principles and practices. This warranty is in lieu of all other warranties either expressed or implied. Findings and statements of professional opinion do not constitute a guarantee or warranty, expressed or implied.

In order to assure that the project conforms to our specifications and design plans, and for satisfactory construction and performance, we urge that KANE GeoTech, Inc. be retained to observe construction, anchor testing, and to complete a final inspection. We cannot be responsible for constructed products built without our oversight.

Yours truly,

***KANE* GeoTech, Inc.**

William F. Kane

William F. Kane, PhD, PG, PE
California Licensed Civil Engineer No. 55714

WILLIAM F. KANE
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APPENDIX A

DEBRIS NET GPS LOCATIONS

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TABLE A.1 NET LOCATIONS IN BUENA VISTA CANYON

Canyon	Debris Net Name	GPS Coordinates
Buena Vista	BV-1	N 34° 26.964' W 119° 36.670'
Buena Vista	BV-2	N 34° 27.048' W 119° 36.664'
Buena Vista	BV-3	DELETED
Buena Vista	BV-4	N 34° 27.284' W 119° 36.690'
Buena Vista	BV-5	N 34° 27.317' W 119° 36.622'
Buena Vista	BV-6	N 34° 27.502' W 119° 36.527'
Buena Vista	BV-7	N 34° 27.368' W 119° 36.568'
Buena Vista	BV-8	DELETED
Buena Vista	BV-9	DELETED
Buena Vista	BV-10	N 34° 27.2067' W 119° 36.415'
Buena Vista	BV-11	N 34° 27.205' W 119° 36.407'

TABLE A.2 NET LOCATIONS IN HOT SPRINGS CANYON

Canyon	Debris Net Name	GPS Coordinates
Hot Springs	HS-1	N 34° 27.762' W 119° 38.366'
Hot Springs	HS-2	N 34° 27.710' W 119° 38.371'
Hot Springs	HS-3	N 34° 27.625' W 119° 38.341'
Hot Springs	HS-4	N 34° 27.550' W 119° 38.347'
Hot Springs	HS-5	N 34° 27.527' W 119° 38.273'
Hot Springs	HS-6	N 34° 27.391' W 119° 38.329'
Hot Springs	HS-7	N 34° 27.302' W 119° 38.351'
Hot Springs	HS-8	N 34° 27.183' W 119° 38.515'

TABLE A.3 NET LOCATIONS IN ROMERO CANYON

Canyon	Debris Net Name	GPS Coordinates
Romero Canyon	RC-1	N 34° 27.474' W 119° 35.750'
Romero Canyon	RC-2	N 34° 27.468' W 119° 35.830'
Romero Canyon	RC-3	N 34° 27.424' W 119° 35.783'
Romero Canyon	RC-4	N 34° 27.430' W 119° 35.713'
Romero Canyon	RC-5	N 34° 27.457' W 119° 35.610'
Romero Canyon	RC-6	N 34° 27.152' W 119° 35.187'
Romero Canyon	RC-7	N 34° 27.207' W 119° 35.173'
Romero Canyon	RC-8	N 34° 27.178' W 119° 35.353'
Romero Canyon	RC-9	N 34° 27.230' W 119° 35.570'
Romero Canyon	RC-10	N 34° 27.161' W 119° 35.395'
Romero Canyon	RC-11	N 34° 27.007' W 119° 35.474'
Romero Canyon	RC-12	N 34° 27.908' W 119° 35.457'
Romero Canyon	RC-13	N 34° 27.863' W 119° 35.454'
Romero Canyon	RC-14	N 34° 27.605' W 119° 35.506'
Romero Canyon	RC-15	N 34° 27.525' W 119° 35.490'
Romero Canyon	RC-16	N 34° 27.482' W 119° 35.080'
Romero Canyon	RC-17	N 34° 27.461' W 119° 35.129"
Romero Canyon	RC-18	N 34° 27.488' W 119° 35.242'
Romero Canyon	RC-19	N 34° 27.496' W 119° 35.320'

TABLE A.4 NET LOCATIONS IN COLD SPRING CANYON

Canyon	Debris Net Name	GPS Coordinates
Cold Spring	CS-1	N 34° 28.226' W 119° 38.902'
Cold Spring	CS-2	N 34° 28.151' W 119° 38.939'
Cold Spring	CS-3	N 34° 28.059' W 119° 38.955'
Cold Spring	CS-4	N 34° 27.962' W 119° 39.000'
Cold Spring	CS-5	N 34° 27.808' W 119° 39.029'
Cold Spring	CS-6	N 34° 28.797' W 119° 38.986'
Cold Spring	CS-7	N 34° 27.789' W 119° 39.039'
Cold Spring	CS-8	N 34° 27.757' W 119° 39.094'
Cold Spring	CS-9	N 34° 27.759' W 119° 39.189'
Cold Spring	CS-10	N 34° 27.685' W 119° 39.201'
Cold Spring	CS-11	N 34° 27.613' W 119° 39.245'
Cold Spring	CS-12	N 34° 27.486' W 119° 39.264'
Cold Spring	CS-13	N 34° 28.016' W 119° 39.538'
Cold Spring	CS-14	N 34° 27.928' W 119° 39.492'
Cold Spring	CS-15	N 34° 27.882' W 119° 39.483'
Cold Spring	CS-16	N 34° 27.790' W 119° 39.379'
Cold Spring	CS-17	N 34° 27.691' W 119° 39.307'
Cold Spring	CS-18	N 34° 27.615' W 119° 39.300'

TABLE 1.5 NET LOCATIONS IN SAN YSIDRO CANYON

Canyon	Debris Net Name	GPS Coordinates
San Ysidro	SY-1	N 34° 28.216' W 119° 36.620'
San Ysidro	SY-2	N 34° 28.214' W 119° 36.827'
San Ysidro	SY-3	N 34° 28.231' W 119° 36.957'
San Ysidro	SY-4	N 34° 28.257' W 119° 36.976'
San Ysidro	SY-5	N 34° 28.210' W 119° 37.166'
San Ysidro	SY-6	N 34° 28.155' W 119° 37.298'
San Ysidro	SY-7	N 34° 28.118' W 119° 37.385'
San Ysidro	SY-8	N 34° 28.087' W 119° 37.378'
San Ysidro	SY-9	N 34° 28.002' W 119° 37.365'
San Ysidro	SY-10	N 34° 27.885' W 119° 37.409'
San Ysidro	SY-11	N 34° 27.820' W 119° 37.436'
San Ysidro	SY-12	N 34° 27.754' W 119° 37.451'
San Ysidro	SY-13	N 34° 28.279' W 119° 37.259'
San Ysidro	SY-14	N 34° 28.217' W 119° 37.256'
San Ysidro	SY-15	N 34° 28.302' W 119° 37.386'
San Ysidro	SY-16	N 34° 28.235' W 119° 37.344'
San Ysidro	SY-17	N 34° 27.657' W 119° 37.446'
San Ysidro	SY-18	N 34° 27.573' W 119° 37.399'

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APPENDIX B

BGC RISK ASSESSMENT

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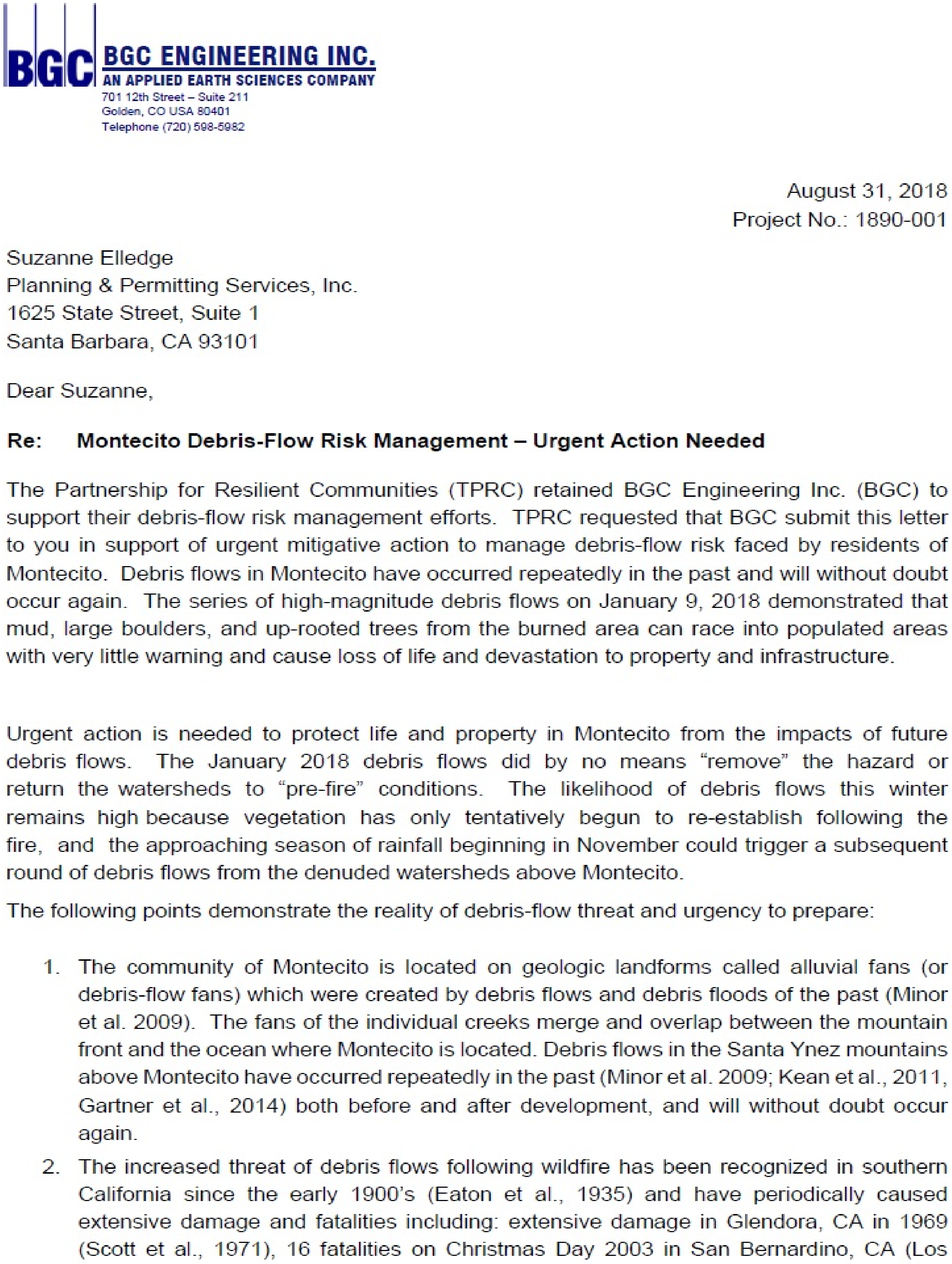

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
701 12th Street – Suite 211
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Telephone (720) 598-5982

August 31, 2018
Project No.: 1890-001

Suzanne Elledge
Planning & Permitting Services, Inc.
1625 State Street, Suite 1
Santa Barbara, CA 93101

Dear Suzanne,

Re: Montecito Debris-Flow Risk Management – Urgent Action Needed

The Partnership for Resilient Communities (TPRC) retained BGC Engineering Inc. (BGC) to support their debris-flow risk management efforts. TPRC requested that BGC submit this letter to you in support of urgent mitigative action to manage debris-flow risk faced by residents of Montecito. Debris flows in Montecito have occurred repeatedly in the past and will without doubt occur again. The series of high-magnitude debris flows on January 9, 2018 demonstrated that mud, large boulders, and up-rooted trees from the burned area can race into populated areas with very little warning and cause loss of life and devastation to property and infrastructure.

Urgent action is needed to protect life and property in Montecito from the impacts of future debris flows. The January 2018 debris flows did by no means "remove" the hazard or return the watersheds to "pre-fire" conditions. The likelihood of debris flows this winter remains high because vegetation has only tentatively begun to re-establish following the fire, and the approaching season of rainfall beginning in November could trigger a subsequent round of debris flows from the denuded watersheds above Montecito.

The following points demonstrate the reality of debris-flow threat and urgency to prepare:

1. The community of Montecito is located on geologic landforms called alluvial fans (or debris-flow fans) which were created by debris flows and debris floods of the past (Minor et al. 2009). The fans of the individual creeks merge and overlap between the mountain front and the ocean where Montecito is located. Debris flows in the Santa Ynez mountains above Montecito have occurred repeatedly in the past (Minor et al. 2009; Kean et al., 2011, Gartner et al., 2014) both before and after development, and will without doubt occur again.
2. The increased threat of debris flows following wildfire has been recognized in southern California since the early 1900's (Eaton et al., 1935) and have periodically caused extensive damage and fatalities including: extensive damage in Glendora, CA in 1969 (Scott et al., 1971), 16 fatalities on Christmas Day 2003 in San Bernardino, CA (Los

Angeles Times, 2003) and extensive damage following the 2009 Station Fire near La Canada-Flintridge, CA (USGS 2018).

3. As demonstrated on January 9, 2018, debris flows at Montecito can be highly destructive, and greatly exceeded the impacts predicted by FEMA[1]'s map of clear-water flood hazards (FEMA 2018). Debris flows travel at higher speeds, carry up-rooted trees and large boulders (car-sized or greater), and greatly exceed the capacity of Montecito's existing sediment basins and channels.
4. An abundant supply of fine-grained sediment, boulders, tree-trunks, and branches remains in the watershed to be entrained in future flows (Appendix A). The January 2018 debris flows did not exhaust the supply of sediment and large woody debris.
5. The debris flows in January 2018 do not preclude repeat events from occurring in the same watersheds, triggered by subsequent storms. Technical literature documents several examples of multiple debris flows occurring in the same watershed in the years after a fire (Booker 1998; Cleveland 1973; Kean et al. 2011; Scott 1971; Slosson et al. 1989). For example, up to 13 debris-flow events were recorded in basins burned by the nearby Station Fire which burned in the San Gabriel Mountains in 2009 (Staley et al., 2013).
6. Debris flows in California are most likely to occur within the first several winter seasons following a fire (e.g., Cannon et al. 2008). Therefore, debris-flow hazard at Montecito is currently still near its peak level, and the likelihood of a debris flow is still elevated compared to preceding winters when the watersheds were fully vegetated. Recovery of watershed vegetation will diminish debris-flow hazard with time, but will not eliminate it.
7. Occurrence and magnitude of near-future (i.e., next 1 to 5 years) debris flows will be controlled primarily by the intensity of rainfall runoff. The likelihood of a debris flow during the approaching winter is directly related to the likelihood of a heavy or intense rainstorm.
8. The rainfall measured on January 9, 2018 at Montecito was rare (NOAA 2018a), but was not unprecedented in southern California (Cannon et al. 2011). Rainfall intensity was comparable to others that have triggered post-wildfire debris flows in southern California (Cannon et al. 2011). Furthermore, debris flows from burned areas are commonly initiated from rainfall conditions with recurrence intervals of less than five years (Cannon et al. 2008). Figure 1 compares January 9, 2018 rainfall reported by NOAA (2018a) with rainfall events that triggered debris flows in southern California between 1928 and 2010. It also shows that a 1-year return period storm correlates with Magnitude II or Magnitude III debris-flows, which are capable of damaging or destroying infrastructure.

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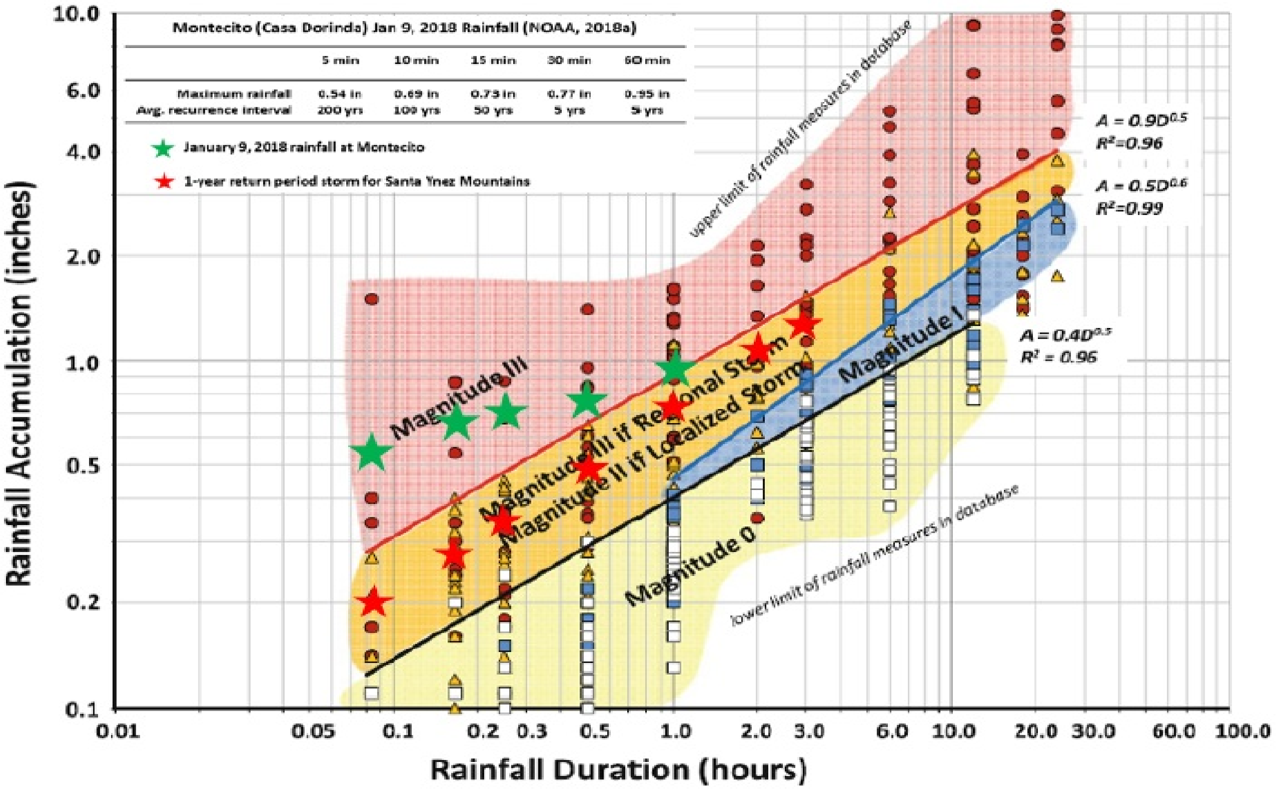
[1] U.S. government, Federal Emergency Management Agency (FEMA)



Montecito (Casa Dorinda) Jan 9, 2018 Rainfall (NOAA, 2018a)

	5 min	10 min	15 min	30 min	60 min
Maximum rainfall	0.54 in	0.69 in	0.73 in	0.77 in	0.95 in
Avg. recurrence interval	200 yrs	100 yrs	50 yrs	5 yrs	5 yrs

Figure 1. Adapted from Fig. 3 of Cannon et al. 2011. Within-storm rainfall accumulations for storms that triggered debris flows and floods. Open squares are storms with negligible response; blue squares are magnitude I events (small flows, houses damaged, but few large buildings threatened); orange triangles are magnitude II events (moderate flows, damage to houses and infrastructure); red circles are magnitude III events (large flows, buildings and infrastructure may be destroyed); green stars are rainfall reported at Montecito on January 9, 2018 by NOAA (2018a); red stars are rainfall for a 1-year return period in the Santa Ynez Mountains above Montecito (NOAA 2018b)

9. Sediment retention structures in Montecito are not large enough to retain potential post-wildfire debris-flow volumes estimated using U.S. Geological Survey methods (USGS, 2017). Table 1 compares the sediment retention basin capacities to volumes predicted by the USGS debris-flow volume models.

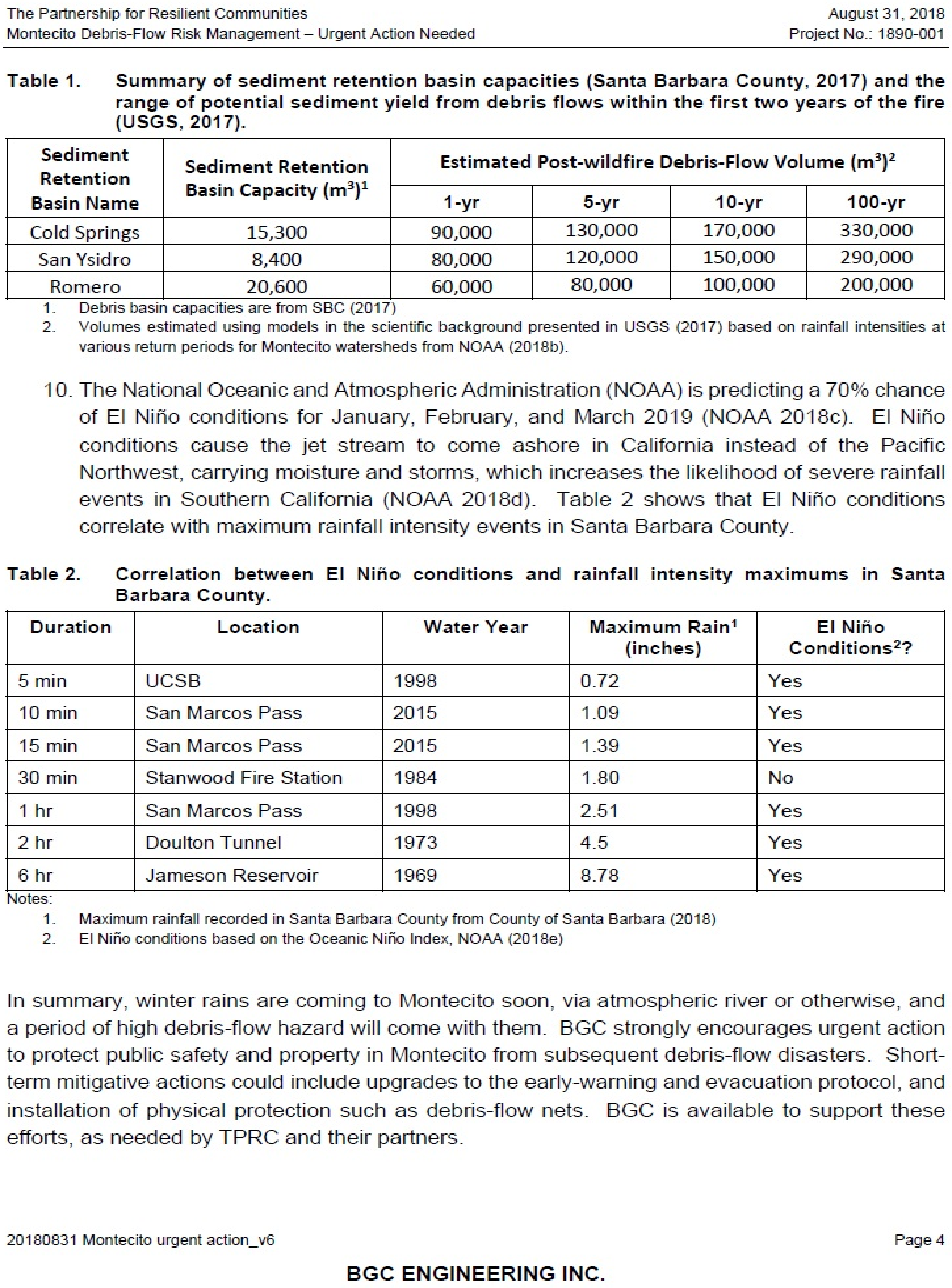


Table 1. Summary of sediment retention basin capacities (Santa Barbara County, 2017) and the range of potential sediment yield from debris flows within the first two years of the fire (USGS, 2017).

Sediment Retention Basin Name	Sediment Retention Basin Capacity (m^3)[1]	Estimated Post-wildfire Debris-Flow Volume (m^3)[2]			
		1-yr	5-yr	10-yr	100-yr
Cold Springs	15,300	90,000	130,000	170,000	330,000
San Ysidro	8,400	80,000	120,000	150,000	290,000
Romero	20,600	60,000	80,000	100,000	200,000

1. Debris basin capacities are from SBC (2017)
2. Volumes estimated using models in the scientific background presented in USGS (2017) based on rainfall intensities at various return periods for Montecito watersheds from NOAA (2018b).

10. The National Oceanic and Atmospheric Administration (NOAA) is predicting a 70% chance of El Niño conditions for January, February, and March 2019 (NOAA 2018c). El Niño conditions cause the jet stream to come ashore in California instead of the Pacific Northwest, carrying moisture and storms, which increases the likelihood of severe rainfall events in Southern California (NOAA 2018d). Table 2 shows that El Niño conditions correlate with maximum rainfall intensity events in Santa Barbara County.

Table 2. Correlation between El Niño conditions and rainfall intensity maximums in Santa Barbara County.

Duration	Location	Water Year	Maximum Rain[1] (inches)	El Niño Conditions[2]?
5 min	UCSB	1998	0.72	Yes
10 min	San Marcos Pass	2015	1.09	Yes
15 min	San Marcos Pass	2015	1.39	Yes
30 min	Stanwood Fire Station	1984	1.80	No
1 hr	San Marcos Pass	1998	2.51	Yes
2 hr	Doulton Tunnel	1973	4.5	Yes
6 hr	Jameson Reservoir	1969	8.78	Yes

Notes:
1. Maximum rainfall recorded in Santa Barbara County from County of Santa Barbara (2018)
2. El Niño conditions based on the Oceanic Niño Index, NOAA (2018e)

In summary, winter rains are coming to Montecito soon, via atmospheric river or otherwise, and a period of high debris-flow hazard will come with them. BGC strongly encourages urgent action to protect public safety and property in Montecito from subsequent debris-flow disasters. Short-term mitigative actions could include upgrades to the early-warning and evacuation protocol, and installation of physical protection such as debris-flow nets. BGC is available to support these efforts, as needed by TPRC and their partners.

CLOSURE

BGC Engineering Inc. (BGC) prepared this document for the account of The Partnership for Resilient Communities. The material in it reflects the judgment of BGC staff in light of the information available to BGC at the time of document preparation. Any use which a third party makes of this document or any reliance on decisions to be based on it is the responsibility of such third parties. BGC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this document.

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Yours sincerely,

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per:

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8/31/2018

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KANE GeoTech, Inc.

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8-31-2018
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Exp. 12-31-18

ABS/MJ/mjp

Attachment(s): Appendix A: BGC Montecito Debris-Flow Risk - Site Reconnaissance Summary

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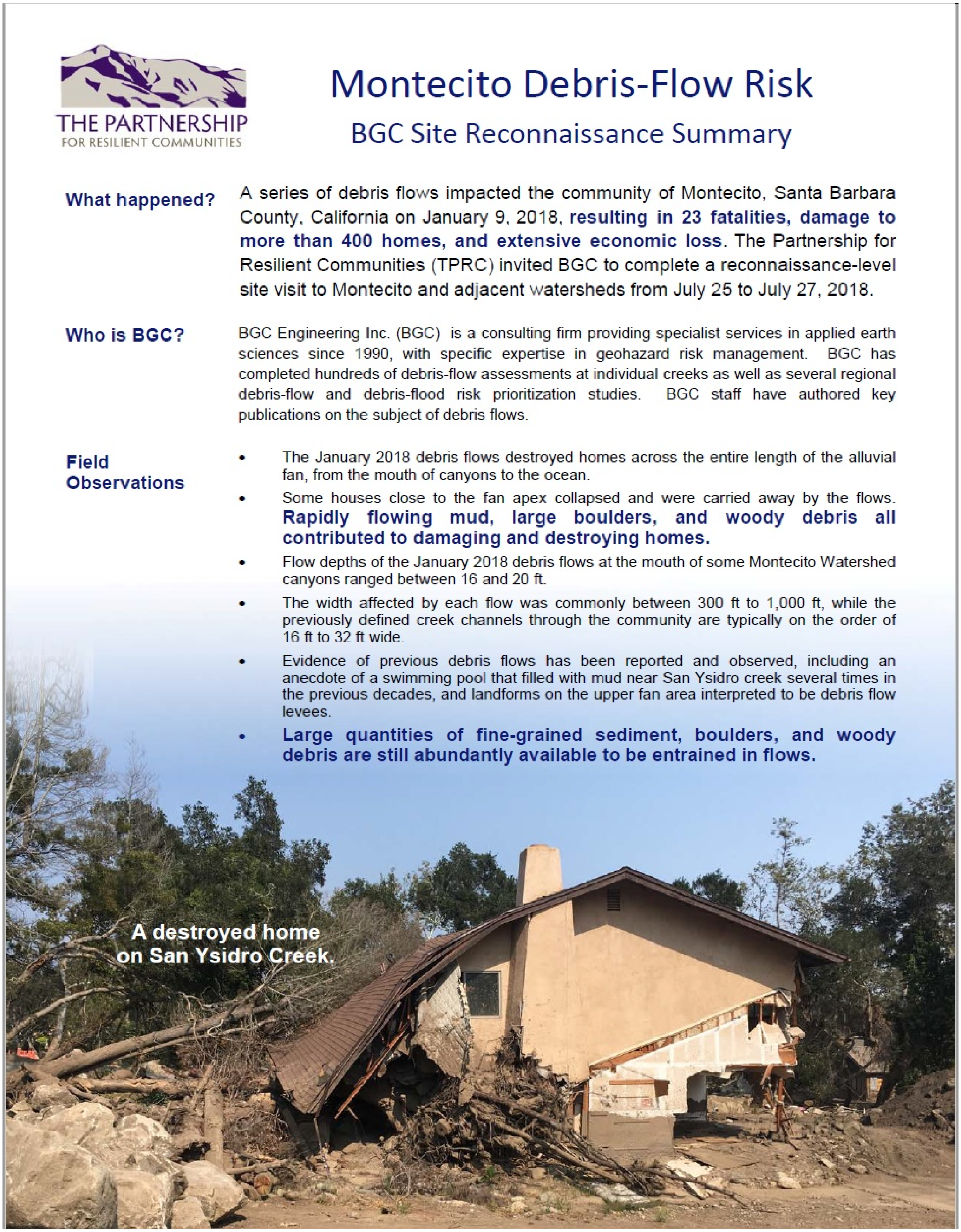
Appendix A
BGC: Montecito Debris-Flow Risk – Site Reconnaissance Summary



THE PARTNERSHIP
FOR RESILIENT COMMUNITIES

Montecito Debris-Flow Risk

BGC Site Reconnaissance Summary

What happened?

A series of debris flows impacted the community of Montecito, Santa Barbara County, California on January 9, 2018, **resulting in 23 fatalities, damage to more than 400 homes, and extensive economic loss.** The Partnership for Resilient Communities (TPRC) invited BGC to complete a reconnaissance-level site visit to Montecito and adjacent watersheds from July 25 to July 27, 2018.

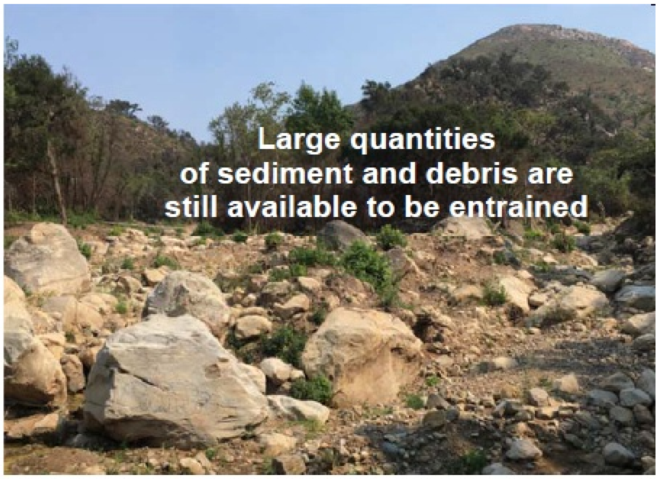
Who is BGC?

BGC Engineering Inc. (BGC) is a consulting firm providing specialist services in applied earth sciences since 1990, with specific expertise in geohazard risk management. BGC has completed hundreds of debris-flow assessments at individual creeks as well as several regional debris-flow and debris-flood risk prioritization studies. BGC staff have authored key publications on the subject of debris flows.

Field Observations

- The January 2018 debris flows destroyed homes across the entire length of the alluvial fan, from the mouth of canyons to the ocean.
- Some houses close to the fan apex collapsed and were carried away by the flows. **Rapidly flowing mud, large boulders, and woody debris all contributed to damaging and destroying homes.**
- Flow depths of the January 2018 debris flows at the mouth of some Montecito Watershed canyons ranged between 16 and 20 ft.
- The width affected by each flow was commonly between 300 ft to 1,000 ft, while the previously defined creek channels through the community are typically on the order of 16 ft to 32 ft wide.
- Evidence of previous debris flows has been reported and observed, including an anecdote of a swimming pool that filled with mud near San Ysidro creek several times in the previous decades, and landforms on the upper fan area interpreted to be debris flow levees.
- **Large quantities of fine-grained sediment, boulders, and woody debris are still abundantly available to be entrained in flows.**

A destroyed home
on San Ysidro Creek.



Interpretation

- The community of Montecito was built on geologic landforms called 'debris-flow fans' that were created by sediment deposited during repeated historical debris flows and floods. **These landforms and other field evidence indicate that debris flows have occurred in the past, and debris flows will occur in the future.**
- The existing sediment basins and channels in Montecito are designed to manage flows that are substantially less than the January 2018 debris flows.
- The January 2018 debris flows appear to have scoured more than 3 ft of material from the channels near the mouth of the canyons. However, **an abundant supply of sediment and debris remains**, including loose sediment on the watershed slopes, loose sediment concentrated in watershed channels, and erodible sediment exposed in channel banks.
- Occurrence and magnitude of near-future (i.e., next 1 to 5 years) debris flows will be controlled more by the intensity of rainfall runoff rather than the abundant availability of sediment. Intensity of runoff is controlled by rainfall intensity, and vegetation cover (which intercepts rainfall and slows runoff). Vegetation cover is currently substantially less than the pre-fire condition.
- **Recovery of vegetation** on watershed slopes will eventually reduce debris flow hazard over time, but vegetation **will not eliminate debris flow hazard.**

Risk Management

- **Implementation of risk management measures is urgent**, as the rainy season begins in November, and NOAA predicts a 70% chance of El Niño in Winter 2019, which increases likelihood of severe rainfall in California.
- The currently proposed debris flow nets should help reduce, but will not eliminate, the debris flow hazard. Additional risk management strategies need to be developed in parallel with the debris flow net design to reduce debris-flow risk to levels deemed tolerable by TPRC, local regulators, and the community of Montecito.
- Debris-flow risk management measures include development of a system for early warning and evacuation, and installation of debris flow nets in the short-term, followed by improvements to physical protection that could include upgrades to debris basins and installation of check dams and conveyance channels.

The January 2018 debris flows were exceptional in historical times in terms of their degree of destruction; however, this does not preclude similar-sized or larger debris flows from occurring in the future. In the absence of adequate risk management, **the consequence of future debris flows could meet or exceed the exceptional consequences of the January 2018 debris flows.**

THIS DOCUMENT IS AN EXCERPT FROM BGC'S LETTER TITLED "MONTECITO DEBRIS-FLOW RISK—SITE RECONNAISSANCE SUMMARY" DATED AUGUST 29, 2018. OBSERVATIONS THAT SUPPORT THE INTERPRETATIONS PRESENTED HERE ARE PROVIDED IN THAT LETTER.

Issue Date: August 29, 2018, version 4

Project No.: 1890-001

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August 29, 2018
Project No.: 1890-001

Les Firestein
The Partnership for Resilient Communities
1482 East Valley Road, Suite T
Santa Barbara, CA 93101

Dear Les,

Re: Montecito Debris-Flow Risk – Site Reconnaissance Summary

1.0 INTRODUCTION

A series of debris flows impacted the community of Montecito, Santa Barbara County, California on January 9, 2018, resulting in 23 fatalities, damage to more than 400 homes, and extensive economic loss. The debris flows were caused by high intensity rainfall on Santa Ynez mountain watersheds that had experienced a wildfire (Thomas Fire) during the preceding weeks. After the debris flows, Montecito community members formed a nonprofit organization called The Partnership for Resilient Communities (TPRC) to support disaster recovery and longer-term debris-flow risk reduction.

TPRC invited BGC Engineering Inc. (BGC) to complete a reconnaissance-level site visit to Montecito and adjacent watersheds from July 25 to July 27, 2018. The purpose of the site visit was to observe the state (e.g. burn areas, surficial geology) of the watersheds that generated the January 2018 debris flows and the developed areas of Montecito that were impacted. These observations will inform development of a proposed scope of work that BGC is preparing for TPRC that includes debris-flow hazard assessment, debris-flow risk assessment, and debris-flow risk management.

This letter summarizes BGC's site reconnaissance observations, preliminary interpretations, and recommended short-term actions for debris-flow risk management. It also describes the qualifications and experience of BGC's debris-flow risk management team. This letter is intended to be used by TPRC to inform development of risk management plans for the winter 2018/2019 rainy season. This letter was requested in an email from Les Firestein dated July 30, 2018, and prepared under terms of contract between BGC and TPRC dated August 1, 2018.

2.0 SCOPE OF WORK

BGC's work to date has involved the following components:

1. Approximately 4 hours of review of reports and background information related to the January debris flows that is available on the internet.

2. Reconnaissance-level site visit (July 25-27, 2018) by one BGC representative, Alex Strouth, including:
    a. Meetings with Les Firestein of TPRC.
    b. Meetings with KANE GeoTech Inc. (KANE), who have been retained by TPRC to design debris flow nets to be installed in the canyons upstream of Montecito development.
    c. Meeting with Kerry Kellogg, wildfire specialist at the Montecito Fire Department.
    d. Observation of developed areas of Montecito that were impacted by the January 9, 2018 debris flows.
    e. Observation of the lower portion of Cold Spring, San Ysidro, Buena Vista, and Romero canyons from the start of development to approximately 500 m (1/3 mile) upstream
    f. Observation of the burned watersheds above Montecito from the Camino Cielo Road, located near the ridge line at the top of the watersheds.

3.0 OBSERVATIONS

The following points summarize BGC's observations. Figures that support these observations are attached to this letter.

1. Debris flows that impacted Montecito occurred in the following creeks[1] (from west to east; Figure 1):
    a. Cold Spring Creek and Hot Spring Creek (which join to form Montecito Creek)
    b. Oak Creek (which is a smaller watershed, causing less damage than other creeks)
    c. San Ysidro Creek
    d. Buena Vista Creek
    e. Romero Creek
2. Chaparral shrubland plants densely cover watersheds adjacent to these creeks that were not burned by the Thomas Fire; the slope surface is generally not visible through the Chaparral from a distance except where vegetation has been removed for development or fire break lines (Figure 2). Google Earth imagery suggests that the watersheds that produced the January 9 debris flows had a similar Chaparral cover prior to the Thomas Fire.
3. The Thomas Fire burned most vegetation in the Montecito Watersheds (Figure 3), although the burn severity appears to be somewhat less in Romero watershed compared to the other Montecito Watersheds (Figure 4, Figure 5). The Montecito fire department (K. Kellogg, pers. comm.) reports that the watersheds burned between December 13 and 16, 2017.

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[1] Collectively, the watersheds that feed these creeks are referred to as the 'Montecito Watersheds' in this report.

4. Large quantities of fine-grained sediment, boulders, and woody debris are still available to be entrained in flows. This material is located on the watershed slopes, within creek channels in the canyons, and in the scoured banks of the January 2018 debris flow channel (Figure 6, Figure 7).

5. Flow depths of the January 2018 debris flows at the mouth of the Montecito Watershed canyons (as indicated by mud lines on trees and channel banks) typically ranged between 5 m and 6 m (16 ft and 20 ft)[2]. The width of the flow areas typically ranged between 20 m and 50 m (70 ft to 160 ft) within the canyons, near the canyon mouth. A superelevation[3] angle of 8° was measured at a channel bend (50 m radius of curvature, 40 m flow width) in Cold Spring Canyon, approximately 300 m (1000 ft) upstream from the development interface (Figure 8).

6. The January 2018 debris flows destroyed homes across the entire length of the alluvial fan, from the mouth of canyons to the ocean (a distance of 3 km to 4 km (1.9 to 2.5 miles), with a 5% average gradient). Some houses within approximately 1 km to 2 km (0.6 to 1.2 miles) from the fan apex collapsed entirely and were carried away by the flows. The width affected by each flow was commonly between 100 m and 300 m (300 ft to 1000 ft), while the defined creek channels through the community are typically on the order of 5 m to 10 m (16 ft to 32 ft) wide. Rapidly flowing mud, large boulders, and woody debris all contributed to damaging and destroying homes (Figure 9, Figure 10, Figure 11).

7. Evidence of previous debris flows has been reported and observed, including an anecdote of a swimming pool that filled with mud near San Ysidro creek several times in the previous decades, and landforms on the upper fan area interpreted to be debris flow levees (Figure 12).

4.0 INTERPRETATIONS

The following interpretations are based on BGC's observations:

1. The community of Montecito is located on geologic landforms called 'debris flow fans' that were created by sediment deposited during debris flows and floods. The fans of the individual creeks coalesce and overlap on the piedmont between the mountain side and the ocean. These landforms and evidence of boulder levees on the fan indicate that debris flows have occurred episodically in the past (both before and after development of Montecito), and debris flows will occur in the future.

2. The existing sediment basins and channels in Montecito are designed to manage flows that are substantially less than the January 2018 debris flows. For example, superelevation of the Cold Spring creek debris flow (Figure 8) suggests it travelled at

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[2] BGC recorded observations in metric units. Approximately equivalent imperial dimensions are provided for the benefit of readers not familiar with metric units.

[3] Superelevation means that a high velocity flow at a channel bend has a higher flow surface on the outside of the channel bend than on the inside. This can be used to estimate flow velocity.

approximately 6 m/s to 8 m/s (13 to 18 miles per hour) at the canyon mouth, through an approximately 200 m^2 (2100 ft^2) channel area, yielding a peak discharge that may have approached 1600 m^3/s (57,000 ft^3/s). The San Ysidro creek debris flow appears to be of a similar scale, with relatively smaller debris flows in the other creeks.

3. The January 2018 debris flows appear to have scoured more than 1 m (3 ft) depth in channels near the mouth of the canyons and fan apex areas. However, an abundant supply of sediment remains, including loose sediment on the watershed slopes, loose sediment concentrated in watershed channels, and erodible sediment exposed in channel banks.
4. Occurrence and magnitude of near-future (i.e., next 1 to 5 years) debris flows will be controlled more by the intensity of rainfall runoff rather than the availability of sediment. Intensity of runoff is controlled by rainfall intensity, and vegetation cover (which intercepts rainfall and slows runoff). Vegetation cover is currently substantially less than the pre-fire condition (compare Figure 2 and Figure 3), but is expected to re-grow and contribute to stabilizing the watersheds with time.
5. Recovery of vegetation on watershed slopes will reduce debris flow hazard but will not eliminate debris flow hazard. Vegetation can be pictured as a ‘sponge’ sitting atop erodible sediment. The ‘sponge’ is absent in the first years following a fire, so relatively low rainfall intensities can directly impact erodible sediment, leading to a debris flow. The ‘sponge’ is thick after vegetation has recovered and can absorb substantial rainfall and soil moisture; however, debris flows can still occur when rainfall continues after the ‘sponge’ becomes saturated. This example illustrates that relatively low-intensity rainfall that is unlikely to trigger a debris flow in a vegetated watershed can trigger debris flows in a recent burn area, and relatively high-intensity rainfall can trigger debris flows in both burned and vegetated watersheds.
6. Debris flow nets proposed by TPRC and KANE are meant to reduce the volume and intensity of debris flows that reach the community of Montecito. The degree of hazard reduction depends on the number, location, and design of the nets, as well as the magnitude of future events, and has not yet been assessed by BGC or others because net design is in-progress.
7. The currently proposed debris flow nets will not eliminate the debris flow hazard. Other risk management strategies need to be developed in parallel with the debris flow net design to reduce debris-flow risk to levels deemed tolerable by TPRC, local regulators, and the community of Montecito.
8. The January 2018 debris flows were exceptional in historical times in terms of their degree of destruction; however, this does not preclude similar-sized or larger debris flows from occurring in the future. In the absence of adequate risk management, the consequence of future debris flows could meet or exceed the exceptional consequences of the January 2018 debris flows.

5.0 RECOMMENDED SHORT-TERM ACTIONS

The peak debris flow hazard period at Montecito is during the rainy season (typically November to March), particularly during the next few winters before watershed vegetation has fully recovered. Implementation of risk management measures is urgent, as the rainy season begins in 3 months. Furthermore, the National Oceanic and Atmospheric Administration (NOAA) is predicting a 70% chance of El Niño conditions for January, February, and March 2019, which suggests a relatively higher likelihood of severe rainfall events in California (NOAA, 2018). The following recommended short-term actions are intended to guide TPRC as they prepare for the upcoming rainy season.

5.1. Early Warning System and Evacuation

1. Develop an early warning and monitoring system and response protocol that includes evacuation. The short time before the rainy season limits the number and scale of physical mitigation measures (e.g. debris flow nets) that can be constructed. The best method to reduce life-loss risk in the absence of physical protection is timely evacuation of people from hazard zones[4].
2. Educate community members about debris flow hazards, monitoring, and evacuation plans, including for example: debris flow causes and triggers; how the monitoring system works; potential for false alarms; where to go during an evacuation; what to do following a debris flow event.
3. Monitoring and evacuation plans should be informed by the following information:
   a. Establish thresholds for rainfall intensity that could trigger debris flows of varying magnitude.
   b. Debris flow hazard maps identifying zones of relatively high and low debris flow hazard.
   c. Evacuation route maps identifying roads with relatively high and low debris flow hazard.
   d. Assessment of the time needed to alert and evacuate residents.
4. Consider the following monitoring phases:
   a. Monitor forecasted rainfall to identify storms capable of triggering debris flows.
   b. Monitor rainfall intensity observed in Doppler radar and at weather stations along the storm's path.
   c. Install instruments in the debris flow channels, for example cameras and load cells on debris flow nets that identify when a debris flow has initiated. Note that this system will provide only a few minutes of warning prior to the debris flow impacting

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[4] Evacuation does not prevent economic loss

6.0 BGC EXPERIENCE AND QUALIFICATIONS

BGC is a consulting firm providing specialist services in applied earth sciences since 1990, with specific expertise in geohazard risk management. BGC has completed hundreds of debris-flow assessments at individual creeks as well as several regional debris-flow and debris-flood risk prioritization studies. BGC staff have also authored one of the key publications on the subject of debris flows (Jakob and Hungr, 2005: Debris Flows and Related Phenomena). BGC senior staff have also acted as expert witnesses for debris-flow related litigations and are thus well aware of the intricacies of projects with high litigative potential.

The following recent projects are most relevant to Montecito's debris flow setting and TPRC's objectives:

- Town of Canmore, Alberta: Debris-flood hazard assessment, quantitative risk assessment, mitigation design, and assistance with public policy development related to steep creek hazards. This work followed debris floods in 2013 that caused widespread damage to the town. Many of BGC's reports (including quantitative risk assessments) are available on the town's website: https://canmore.ca/projects/mountain-creek-hazard-mitigation/creek-resources
- Seton Portage, British Columbia: Detailed debris flow hazard and risk assessment for four steep creeks that have impacted homes in the past and led to their abandonment. The work is arguably one of the most sophisticated debris flow and debris flood risk assessments conducted in Canada to date.
- District of North Vancouver, British Columbia: BGC completed quantitative flood, debris flood and debris flow risk assessment and conceptual risk reduction designs for 35 steep creeks within the District of North Vancouver (DNV). The lower portion of these creeks flow through areas containing over 20,000 buildings and a network of roads, utilities, and stormwater management infrastructure. BGC developed an interactive web application to manage complex datasets of development characteristics, hazard scenarios, risk assessment results, and mitigation options in a clear, simple format that can be used for community and risk reduction planning.
- British Columbia Ministry of Forests: BGC completed post-wildfire geohazard risk assessments at four recently burned areas of southern British Columbia. The work focused on assessing debris flow risk to homes and infrastructure, and on prioritizing debris flow mitigation locations and strategies.
- Rio Tinto, Holden Mine near Chelan, Washington: BGC provided a quantitative post-fire risk assessment to guide shutdown criteria at various work sites and along a 10-mile long access road, and to evaluate the safety of the lodging facilities. A warning system was developed to guide when to shut down work activities on the mine in response to intense rainfall. BGC installed a telemetered rain gage at the site to assist Rio Tinto staff to implement the warning system.

BGC's team of debris-flow risk management specialists includes approximately 20 members with diverse backgrounds in geomorphology, hydrology, engineering geology, geotechnical engineering, construction, and geomatics. The team is highly experienced with all project phases, development, if the debris flow magnitude is significantly greater than the net capacity. This is not enough time to evacuate, but may allow individuals who have not evacuated to react to the approaching hazard, and the system may be a tool for first responders.

5. Develop a communication plan for informing and alerting residents and first responders along with response and evacuation plans.
6. Consider the following response phases:
    a. Warn residents that a storm capable of triggering debris flows is approaching.
    b. Evacuate residents.
    c. Audible and visual alarms (e.g., sirens, flashing lights) when a debris flow is occurring.

5.2. Physical Debris Flow Mitigation Measures

1. Install debris flow nets proposed by KANE. The nets provide physical protection by capturing debris and potentially slowing the initiation and volumetric growth of debris flows, and can be an important component of the monitoring system.
2. Identify other physical protection that can be installed or improved in the short term. This may include things like removing sediment and debris from existing basins and channels and improving the conveyance capacity of channels.

5.3. Long-term Risk Management Plans

1. Begin developing long-term risk management plans. Elements of the plan may include measures to accelerate revegetation of the watershed, and physical protection such as debris flow basins, check dams, and conveyance channels designed for debris flow magnitudes estimated from a detailed assessment of the watershed.

including hazard recognition, detailed hazard assessment, numerical modeling, quantitative safety and economic risk assessment, and design and implementation of risk reduction strategies. Our team has extensive geomatics capabilities, including digital terrain analysis based on high-resolution LiDAR imagery, change detection and quantification, and development of web-based interfaces that allow spatial data to be comprehended, queried, communicated, and modified by our clients.

Key members of BGC's proposed Montecito debris flow risk management team include:

- Dr. Matthias Jakob, PGeo, LG (BGC) – Dr. Jakob is a leading expert in debris-flow hazard and risk assessment, and has completed several hundred such assessments around the world. Dr. Jakob is co-author and editor of the book "Debris-flow Hazards and Related Phenomena", which is the standard reference text book for this topic. Dr. Jakob has also co-authored relevant guidelines for British Columbia and Alberta and continues to research various aspects of applied debris flow science.
- Dr. Joseph Gartner, PE (BGC) – Dr. Gartner is an expert in post-fire debris flow assessment. Before joining BGC in 2014, Dr. Gartner spent 12 years at the U.S. Geological Survey, where he developed models for post-fire debris-flow probability and volume, and rainfall intensity-duration thresholds for post-fire debris flow initiation. His work is used by government agencies to guide design of post-fire erosion mitigation, evacuation route planning, and post-fire debris-flow watches and warnings issued by the National Weather Service. Dr. Gartner is a co-author of the "Wildfire-related debris flow from a hazards perspective" chapter in the book "Debris-flow Hazards and Related Phenomena."
- Alex Strouth, MASc, PE, PEng (BGC) - Mr. Strouth is a specialist in debris-flow risk assessment and risk reduction engineering at scales ranging from site-specific to broad regions. He has worked in a wide variety of settings around the world for linear infrastructure, municipal, and major industry developments. His experience includes all project phases from initial hazard assessment to mitigation design and construction.
- Dr. Paul Santi (CSM) – Dr. Santi is a professor in the Department of Geology and Geological Engineering at Colorado School of Mines (CSM). He will act as a technical reviewer of BGC's work. Dr. Santi's research emphasis is on debris flow analysis and mitigation, with a focus on post-wildfire debris flows in Southern California. He has authored more than 20 peer-reviewed articles related to post-wildfire debris flows during the past decade.

7.0 CLOSURE

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Yours sincerely,

BGC ENGINEERING INC.
per:

ALEXANDER B. STROUTH
44998

29 AUG 2018

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ABS/MJ/mjp
Attachment(s): Figures

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Santa Barbara Independent (SBI). 2018. Montecito Mudslides Disaster Assessment Map. Available from https://www.google.com/maps/d/viewer?mid=1tSzYm6DZpootH4aS3STEfYIHYPgak2jO&ll=34.444042466028556%2C-119.65280212535856&z=14 [accessed July 31, 2018].

FIGURES

Figure 2. Typical chaparral shrubland in a watershed that has not recently burned. This watershed is located immediately north of San Ysidro Creek watershed, adjacent to the Thomas Fire burn area. BGC photo, July 2018, looking north from Camino Cielo Road.

Figure 3. Typical watershed slope following the Thomas Fire. Note lack of vegetation and lack of organic duff layer, and loose soil directly exposed to rainfall. Pioneer vegetation has developed since the Thomas Fire. BGC photo, July 2018, looking northwest from lower Buena Vista Creek watershed.

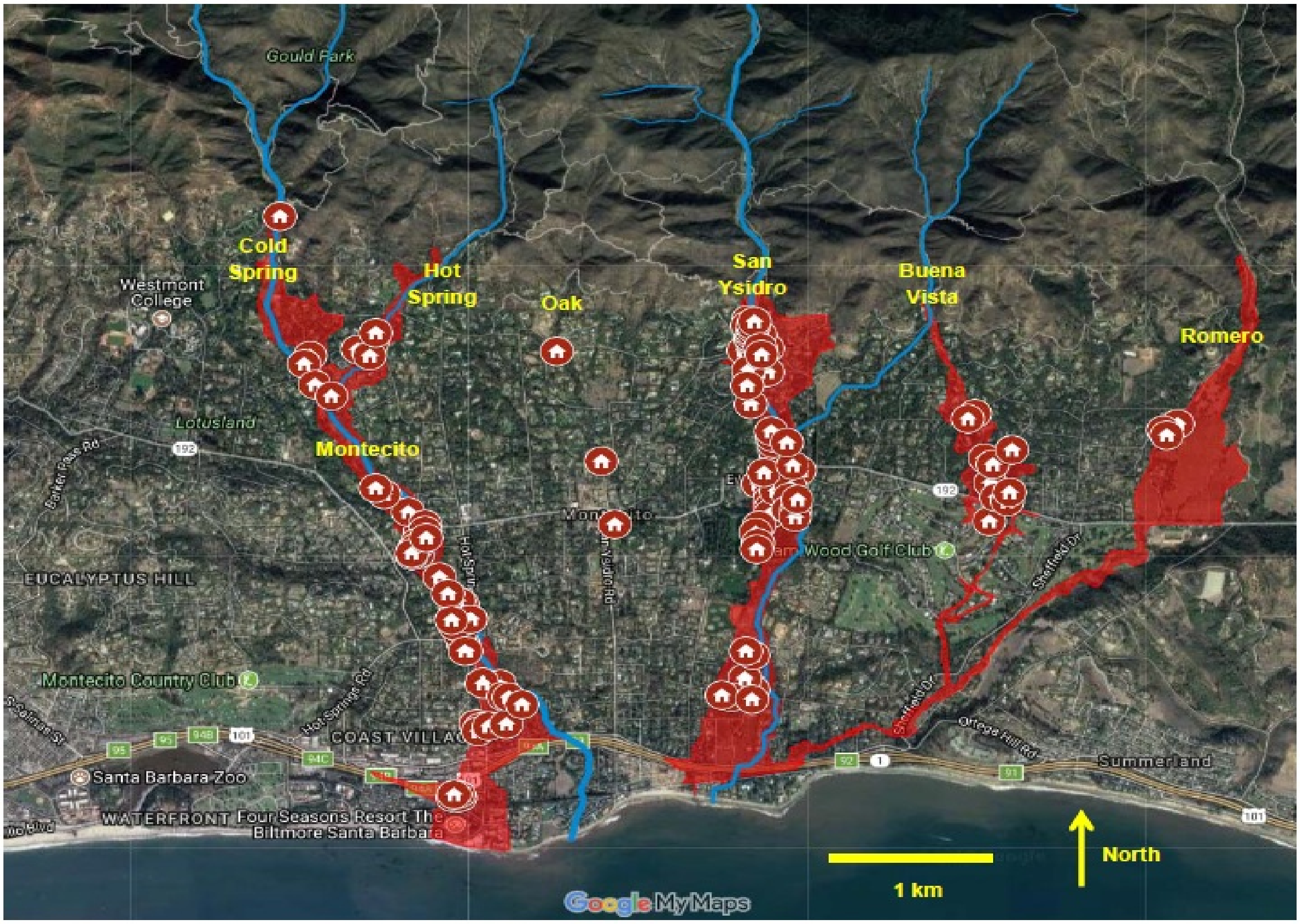

Figure 1. Map of January 9, 2018 debris flows created by the Santa Barbara Independent newspaper (SBI, 2018). Red polygons indicate the debris flow extents, and red symbols indicate homes that 'appear destroyed or majorly damaged'. Yellow labels indicate creek names (by BGC).

Figure 6. Sediment and boulders in Cold Spring Canyon approximately 400 m upstream from the development interface. Boulders up to 1.5 m diameter in foreground. BGC photo, July 2018, looking north.

Figure 7. Woody debris and erodible channel banks in San Ysidro Canyon approximately 200 m upstream from the development interface. BGC photo, July 2018, looking west.

Figure 4. San Ysidro Creek watershed following the Thomas fire. BGC photo, July 2018, looking south from Camino Cielo Road.

Figure 5. Romero Creek watershed showing a mixture of un-burned and burned areas from the Thomas fire. BGC photo, July 2018, looking south from Camino Cielo Road.

Figure 8. Superelevation of January 2018 flow indicated by mud lines in Cold Spring Canyon approximately 300 m upstream from the development interface. BGC photo, July 2018, looking north.

Figure 9. Destroyed home on San Ysidro Creek, located approximately 1 km from the fan apex. BGC photo, July 2018, looking east.

Figure 10. **Woody debris immediately upstream of a destroyed home on Montecito Creek located approximately 2 km from the fan apex. BGC photo, July 2018, looking west.**

Figure 11. **Boulders, up to 4 m diameter, transported by San Ysidro Creek debris flow more than 1 km from the fan apex. BGC photo, July 2018, looking east.**

Figure 12. A landform interpreted to be a debris flow levee from an event that pre-dates construction of the home in the background, located 500 m from the Hot Spring Creek fan apex. Boulders up to 1 m diameter in foreground. BGC photo, July 2018, looking south.

APPENDIX C

MONTECITO INSTRUMENTATION

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C. INSTRUMENTATION

C.1 Debris Net Instrumentation

C.1.1 Debris Net Instrumentation Review

In Preonzo, Switzerland, a torrent, or channel, produced debris flows in the spring of 2008. These flows were monitored using geophones mounted on large boulders in contact with the flow (Graf & McArdell, 2009). The geophones measured the debris flow front velocity. They emitted an analog signal that was digitized within the geophone to filter and reduce the amount of necessary data.

During the 2008 event, the geophone signal recorded a number of pulses per second that surpassed a pre-determined threshold. This signal was sustained for several seconds indicating a significant flow event was occurring.

A radar sensor was used in combination with the geophones to measure the depth of the debris flow. Researchers programmed a smoothing algorithm providing a stable signal as the depth of debris rapidly changed. Although the signal from radar sensors were delayed slightly, and the changes in the surface of the flow are not as accurate as laser sensors, they are capable of measuring a larger surface area. This resulted in a signal that was more stable. The location of the radar sensor was suspended by two wires over the channel where the initial depth was not greatly affected by a flow event.

The data was stored on a data logger and collected via public GSM (Global System for Mobile communications) network. Rainfall was also measured at the top of the watershed area. Two video cameras were also installed to record the event.

After two deflection dams were constructed, the observation station was moved to a more active debris flow channel system. A geophone was then mounted below the upper deflection dam at the lower end of the intermediate deposition zone. The purpose of the geophone was to trigger the main instrument station that a flow event was approaching. The main monitoring station was located at the lower deflection dam with geophones placed at the upper and lower end of the dam to calculate front velocity.

Penna (2014) described two types of debris flow warning systems: advance warning and event warning. An advance warning system compares current precipitation to the threshold value of precipitation that could potentially cause a debris flow. An advance warning could allow for a longer period of time for evacuation, but are often inaccurate due to variability in causing factors such as weather paths and system evolution.

An event warning is stimulated by the data collected from measurable sources such as wire sensors, ground vibration sensors, or stage meters placed upstream. Event warnings are highly accurate but only permit a short interval between the notification and the event.

Penna described how these debris warning systems were used at a debris flow location in the Italian Alps in the Spring of 2011. The system consisted of five rain gauges placed at various elevations, radar sensors, geophones, video cameras, piezometers, and soil moisture probes. The rain gauges, stored and transmitted data to a server via radio. The depth of debris flow was monitored by three stage radar sensors mounted on cable suspended sledges, dataloggers recorded the data. The stage radar data was used to calculate the mean velocity of debris flow. Five vertical geophones were placed at the same sites as the radar sensors.

Debris flows peak frequencies ranged between 30 and 80 Hz which is well within the operating range of the geophones (which were found to be highly reliable). Three video cameras with spotlights were installed. Twenty-eight soil moisture probes were installed as well as 14 different pressure transducers. Monitoring of slope hydrology with pore pressure transducers did not prove to be useful nor did the piezometers. The instruments were powered by the standard electric line extended to the main station from nearby farms. The radar sensors and geophones were connected directly to the server by the Ethernet cable. At another similar location, all the instruments were powered by batteries and solar panels.

The Illgraben test location for the Geobrugg debris net test was instrumented by Badoux, et al. (2008). At the Illgraben, tested under the direction of Alexander Badoux, a range of detection sensors were used in order to create an early detection warning system. Geophones measured ground vibrations, ultrasonic and radar sensors were used to measure flow height, and microwave sensors measured water table variation. The time between the warning and the flow event was slightly under an hour but there was no other reliable way of warning that could occur any earlier. Locations in China and Canada have used multiple rain gauges as a way of predicting debris flow events, but this method has been ineffective since the spacial variability of rainfall is too high for isolated rain gauges to accurately represent the rainfall within a wide range. Early warning is highly imprecise and built on more speculation and comparison than event warnings.

The instrumentation installed along the final kilometer of the channel were geophones that determined velocity and triggered the system, radar, laser, and ultrasonic devices were used to determine flow depth, video cameras were installed, as well as a force plate. It was determined that the radar devices for measuring were better suited for a warning mechanism than the laser devices which produced faster and more accurate data but did not provide a signal that could be used in the case of flooding and flowing.

The geophones were bolted to concrete check dams because the signal of a geophone is highly influenced by whatever material is surrounding it, and concrete has proven to be an effective surface. The sensor system sends the first alarm then activates the light and auditory alerts. Two radar sensors were suspended over the check dam at a place where bed depth stays consistent. When the threshold number of pulses per second has been surpassed, detection installations in the geophones activate the lights, sirens, texts, emails, or faxes to notify the community. A rainfall density threshold is dependent upon the region where the debris flow was to take place. Geophones and radar sensors have proven to be highly reliable in the Illgraben as well as in various other locations where they have been implemented.

Designed to provide a fast and reliable alert, the alarm system included a number of sensors and sent a daily email that could be used to determine if any aspect of the system was malfunctioning. The alert system was hosted by the GSM which was proved to be reliable and is what is used by many local emergency response personnel.

Abancó, et al. (2014) described the how debris flow ground vibrations were measured using a series of seismic and sonic devices at the Rebaixader monitoring site in the Central Pyrenees, Spain. Geophones were used to monitor debris flows because they are sturdy and do not consume much power. In order for a ground velocity signal to not be continuously recording data, a trigger must turn it on so that it primarily records events. A level trigger occurs when a fixed value for ground velocity is reached- which is typically established by combining past knowledge and expert advice, the threshold value must be defined at each geophone with site-specific factors that must be taken into consideration. The extenuating factors that affect the geophones include the distance between the geophone and the debris-flow path, the substance upon which the geophone is placed, the material surrounding the geophones, and the assembly of the geophone itself. The distance between the geophone and the actual flow is crucial- therefore, geophones are typically located on the channel banks. The substance upon which the geophones are mounted when they cannot be buried has a great impact upon frequency amplification.

The signal transformation consists of a two-part process where the voltage from the geophone is filtered such that low frequencies are not taken into consideration, then the voltage that surpasses a threshold number is transformed into an impulse signal by electrical resistors in the conditioning circuit acting as a threshold voltage.

To determine how the geophones reacted in different substances, they were placed in different locations then compared against each other, the highest recorded amplitudes were from the geophone located in a thin layer of colluvium, the geophone that was burred 2m below the surface emitted the weakest signal, the geophone fixed to the bedrock produced a signal that was similar to the geophone in the alluvium. One geophone was mounted on a metal sheet box which amplified the signal greatly. The main issue to be figured out with geophones is filtering out irrelevant ground velocity and finding the correct detection threshold so that false alarms do not occur. Geophones have been proven to be highly efficient in the monitoring of torrents around the world and by several researchers.

A surveillance system had been installed for monitoring debris flows in the Italian Alps for a period of ten years (Marchi, et al., 2001). The instrumentation applied consisted of rain gauges, ultrasonic sensors, seismic sensors, and a video camera. The rainfall was recorded and separated into two categories: storms that caused a debris flow, and storms that did not cause a debris flow, however, this data was not consistent with itself proving that there are other factors responsible for triggering a flow event. The ultrasonic sensors measured the torrent stage for the recording of debris-flow hydrographs, they were also used in finding the estimates of mean velocity, volume, and peak discharge. The sensors were also utilized for calculating the front velocity. The seismic detection devices implemented were seismometers and geophones which used ground oscillation velocity to measure the flows' velocity. There was a video camera installed for estimating surface velocity and was triggered by an ultrasonic sensor placed upstream.

Hürlimann, et al. (2011) implemented a debris flow monitoring station in the Eastern Pyrenees with following instruments: geophones, ultrasonic measuring devices, dataloggers, a video camera, a meteorological station, a flexible ring net, and load cells. The geophones were used to calculate front velocity, determine when the flow started, and to trigger other measurement devices further down the channel. The ultrasonic devices measure flow depth and can be used in conjunction with the data from the geophones to estimate a mean flow velocity. A spotlight was installed next to a standard GANZ security camera. The meteorological station consisted of tipping-bucket rain gauges and a thermometer to ascertain whether the substance collected was rain or snow. A flexible GEOBRUGG VX160 net was installed, fitted with tension load cells on the horizontal cables. The net was installed in order such that its effectiveness could be quantified. Two different dataloggers with GSM modems were installed, one was placed at the meteorological station and the other was placed at the flow site with the remaining instruments. Power is supplied to the dataloggers by batteries that are recharged by a solar panel. The dataloggers must be programmed to differentiate between “event” and “no-event” mode, which was accomplished by scanning the four geophones to see if the threshold number was surpassed. The conclusion from testing was that monitoring was possible with only geophones and ultrasonic devices, but cannot provide enough data alone, which was why the video cameras were a necessity.

Arrattano and Marchi (2008) described the difficulties in setting debris warning sensor threshholds. The purpose of an event warning system is to provide an alarm when a debris flow is in progress. The principal sensors in those systems are geophones to measure ground vibrations. They are easy and safe to install. However, setting warning thresholds can be complicated; video cameras offer a recognition of debris flows and are safe to install which will allow for visual confirmation of a flow event. The maximum depth of debris flow can be measured after the event by the use of a GPS or theodolite since the flow will leave behind distinct tracks. A set of wires stretched across the channel can determine flow height based upon the lowest wire left unbroken. Photocells along with photobeam sensors are also used in detecting depth since the path of the beam is cut short by the waves of debris. Ultrasonic gauges are most commonly used as they provide for the measurement of channel erosion. Ultrasonic sensors suspended over the channel bed measure the distance between the device itself and the height of the flow, that value can be subtracted from the known value of the distance between the bed of the channel and the sensor to provide the height of the flow. Since the initial ground measurement is crucial, the sensor must be placed above part of the channel bed that will not decrease as the flow rushes over it- which is often why concrete is poured at the designated area. Because debris flows emit strong ground vibrations, the need for underground sensors is apparent, these sensors do not have to be installed within the channel bed and will still transmit the detected vibrations. The output signal is a voltage that is equal to the oscillation velocity of the ground.

When a pair of ultrasonic sensors are placed at a known distance somewhere along the torrent, the average velocity of the flow is able to be calculated as the ratio between the distance between the sensors and the time elapsed between the front signal between the two. This same technique would work with several different devices such as, wire detectors, geophones, photocells, and microphones. Doppler speedometers are capable of measuring surface velocity. Doppler speedometers measure the frequency of radio waves reflected by moving objects. Load cells along the channel bottom can be used to measure the load of the debris flow. Vertical and horizontal load cells make the measurement of shear stress and normal stress possible.

The impact force of debris flows in contingent upon the dynamic pressure of fluid, (which is the kinetic energy per unit volume of a particle of fluid) and the collision force of single boulders.

Abanco, et al. (2012) also discussed the difficulties with establishing warning levels for geophones. Geophones are a type of ground vibration sensor that record the velocity of small ground movements because of the passage of debris flows. The geophone signal date acquisition process and its analysis show the relevant complexities of debris flow monitoring. On one hand, the characteristics of the measured signal requires high frequency ground vibration sampling rates.

On the other hand, it is crucial to define an appropriate level of vibration to distinguish between the seismic noise of the site which can be originated by many other factors and the vibrations generated by a debris flow. Definition level of threshold is a key task. Geophones are the most common ground vibration sensors in debris flow monitoring systems. Moving-coil geophones consist of a magnetic moving mass oscillating inside a wire coil, a mechanism that generates an output voltage proportional to the velocity of the ground vibration in the direction of the coil. They are installed outside the wetted area. Three main issues affect the vibration measured by geophones: distance between sensor and flow path, characteristics of the underground material at sensor location and between sensor and channel, and type of sensor assembly. Geophones should be installed, at the most, a few tens of meters from the channel. The output of the geophone is a continuous voltage proportional to ground velocity. Analog signal recording consists of continuous lagging of the voltage measured at the sensor. Digital signal recording consists of non-continuous voltage sounds from the output signal. Transforming a ground vibration velocity into impulses removes ground vibration noise and external distinguishing factors. On the case study, data are stored in a Campbell Scientific CR10X datalogger every second.

Jun et al. (2017) attempted to use an analytical hierarchical process to determine the best installation location of sensors for debris flow events. Two stages of warning systems, advance systems and event warning were used. The event warning was issued using sensors installed in the debris flow channel when a flow occurred. A ratio was calculated to find the relationship between applied number of targeted devices and surveyed total devices. Based on this ratio, the most frequent indicator of impending debris flow was rainfall intensity. Rainfall was selected as a trigger and the monitoring system automatically operated to warn of impending debris flow when precipitation exceeded the threshold values. The geophones were shown to be excellent devices for measuring the velocity of debris flows. Geophones were installed on an embankment that was safe with regard to debris flow. A camera was used as a complementary technique to the debris flow event and was installed safely above the channel on a supporting beam.

Debris flows in Sakurajima Island were monitored by a system that used steel plated load cells to determine flow characteristics (Itoh and Mizuyama, 2014). Included in the system are four pin-type load cells, a 2mX4m steel plate, two pressure sensors, ultrasonic sensors, and CCTV cameras. The pressure sensors on the steel plate measured interstitial water pressure in the channel bed and the ultrasonic sensors measured the depth and velocity of the flow. The camera's purpose was to monitor the conditions within and surrounding the flow, such as flow width and surface velocity. Data from both fine and course material flows was collected. The load cells measured normal stress as well as temporal changes in the flow itself. Rainfall was measured by a rain gauge and the data was averaged by X-band MP radar which provides for estimates regarding the special distribution of rain. However, at peak rainfall discharge a flow event may not necessarily occur.

Various methods of detecting debris flows were tested on a small flow channel in Switzerland as a method of testing their accuracy and reliability (Arattano and Marchi, 2005). Ultrasonic sensors prove to be difficult to install on steep channels as they need to be suspended by wires which are often broken by accidents not pertaining to a flow event. Doppler speedometers, spatial-filter speedometers, and video cameras are expensive and require clear visibility of the channel and a safe base to be constructed upon. Ground vibration sensors do not require visibility of the flow nor are supplemental structures necessary for their installation. However, if the ground vibration sensor is placed in a location where there are often vibrations (railroad tracks, freeway, etc.) interpretation of the data becomes difficult.

The use of a cross-correlation function between two signal devices placed at a known distance from each other provide for the calculation of debris flow front velocity, and the time difference between the two devices allows for the estimation of an average velocity. However, all measurements and estimates require the presences of a clearly defined debris-flow front.

A monitoring system installed in the eastern Dolomites by the USGS (Berti et al., 1999) consisted of a rain gauge positioned at the upper initiation area as well an anemometer for the measurement of wind speed because the flow of debris greatly relies upon the speed at which rain comes upon it. Pore fluid pressures were also installed at the upper initiation area, five pressure transducers were installed at various depths, four of them are located shallowly and are destroyed and must be replaced after each flow event. To measure front velocity, seven geophones were installed, grouped at three different stations the average velocity is derived from the time lag between geophone signals. The depth of debris flow was measured by an ultrasonic sensor that was suspended over the channel. A hydraulic pressure cell and a pressure transducer measured the total normal stress and the fluid pressure. The average debris flow density was able to be estimated from the ration between debris flow depth and total normal stress. The monitoring system included three cameras which were positioned at different angles and at different locations. The videos would only activate once the geophones or rainfall threshold values were exceeded. The surface velocity of the debris flow was ascertained from the time interval between photographs taken. Remote control of the entire monitoring system was possible through connection to a phone modem.

C.2 Weather Station

C.2.1 Weather Station Instruments And Their Function

Weather stations rely on several basic instruments in order to gather data for interpretation by forecasters. Below is a list of commonly used weather sensors and their descriptions:

- **Wind Vane -** measures which direction the wind is blowing, and the anemometer measures the velocity of the wind- together they provide for the calculation of a wind vector (a measurement consisting of speed and inverse direction). Wind speed greatly impacts the kinetic energy of rain, and the greater the velocity of rain, the faster a debris flow.

- **Tipping-bucket Rain Gauge -** The amount of rainfall at the higher elevations of mountains is a major factor in the initiation of a debris flow. The tipping-bucket rain gauge collects water through the lid funnel which then drips down to a balance. The bucket will tip and emit an electrical signal when a pre-determined amount of water fills it. This will continue during the period of rainfall to communicate the amount of rain as well as its intensity rate.

- **Air Temperature and Humidity Probe -** Measures air temperature and humidity at the location by using vents that read radiation and humidity from air that flows through them rather than heat generated from the sun shining on it. A radiation shield is necessary and will give more accurate data and increases the longevity of the probe.

- **Barometer -** A barometer measures atmospheric (or barometric) pressure which is used in forecasting weather. A low atmospheric pressure indicates cold, rainy weather. Whereas a higher atmospheric pressure suggests clear and sunny weather. Barometers are an essential aspect of any functioning weather station and have been used since the 1600s.

- **Soil Moisture Probe -** This instrument is used to determine the saturation of soil. It operates by measuring electrical resistance, and which results in the determination of volumetric water content of the soil. Soil moisture is thought to be an indicator of a potential debris flow event depending upon the amount of water the soil is able to retain.

C.2.2 Existing Santa Barbara Weather Stations

There are three weather stations located in Santa Barbara County, Table C.1. The weather station utilized by the NWS is a Fixed Remote Automated Weather Station (RAWS), made by Forest Technology Systems (FTS). The other two weather stations are not part of the NWS and are attached to two different fire stations in Santa Barbara- information regarding the equipment and instruments used by these two fire stations is not readily available to the public aside from the fact they employ the use of the WeatherLink Network software designed by Davis Instruments which may imply that Davis instruments are used.

The RAWS manufactured by FTS contains every instrument for weather detection and is known to meet the qualifications of the NWS, Instruments are mounted upon a tripod frame that does not require concrete bases. The Axiom F6 datalogger is used and is simple to install and connect to the instruments.

TABLE C.1 EXISTING SANTA BARBARA COUNTY WEATHER STATIONS

Location	Factor Measured	Instrument Used	Instrument Manufacturer
Fire Station 1 121 West Carrillo Street Santa Barbara, Ca	• Temperature • Humidity • Dew point • Air pressure • wind speed • Wind direction • Rain	• Max/Min Temp. • Hygrometer • Psychrometer • Barometer • Anemometer • Anemometer • Rain gauge	Davis Instruments (?) WeatherLink Network
Fire Station 7 2411 Starwood Drive Santa Barbara, Ca	• Temperature • Humidity • Dew point • Air pressure • wind speed • Wind direction • Rain	• Max/Min Temp. • Hygrometer • Psychrometer • Barometer • Anemometer • Anemometer • Rain gauge	Davis Instruments (?) WeatherLink Network
Montecito #2 **(MOIC1) NWS** lat: 34.445° long: 119.625°	• Humidity • Wind Speed • Air pressure • Dew Point • Visibility • Rain	• Hygrometer • Anemometer • Barometer • Psychrometer • Transmissometer • Rain Gauge	FTS inc.

C.2.3 COOP with the National Weather Service (NWS)

The NWS runs the Cooperative Observer Program (COOP), which is a weather network that is run by trained volunteers who check provided weather instruments and upload the data to NWS servers, there are three different classes of COOP stations: “a”, “b”, and “c”. Class “a” network stations are the most basic, the class “b” network support in forecast and warning programs, and the “c” network stations are the more complex stations that include those made for research, experiments, or special purpose.

The Montecito Debris flow monitoring could likely be classified as a “Special Purpose” placing it under the “c” network.

C.3 Proposed Instrumentation and Monitoring/Alert System

C.3.1 Description and Philosophy

KANE GeoTech recommends the implementation of several forms of instrumentation in conjunction to the construction of debris flow nets. These systems will monitor the debris flow nets and possibly provide emergency warnings in the event that major debris flows occur. The utilization of this proposed instrumentation plan does not replace the necessity of existing emergency warning and management systems.

The instrumented systems will consist of two forms of monitoring: systems put in place to monitor the meteorological conditions leading up to debris flow and systems designed to monitor the debris flow event as it progresses. Within the system monitoring meteorological conditions, a fully equipped weather station can be programmed and installed at the northern ridge of San Ysidro canyon. This station will be connected to a network of eight rain gauges, one per canyon and three additional, which will constantly monitor precipitation rates. The network will also include wind direction and speed sensors, probes for temperature and relative humidity, a radiation sensor, a soil moisture sensor, and a barometer. Data from the rain gauges and weather station will be accessible through a public web page. In addition, it can be interfaced with existing weather stations to enhance the array of weather data available to forecasters and researchers.

Within the systems monitoring the debris flow event as it progresses, each canyon can be instrumented with a set of sensors attached to the debris flow nets as well as sensors within the canyon walls. Geophones, Figure C.1, will be installed upstream of each net to measure and record vibrations in the ground. Geophones are commonly associated with seismic activity; however, they can be installed in the canyons to record tremors caused by debris flows. Tension load cells, Figure C.2, installed on the top and bottom support ropes of the nets will actively measure added loads on the nets resulting from debris retention.


Figure C.1. Geophone installed in subsurface.

Each canyon will be equipped with a central station that includes a datalogger. This datalogger will receive the information from the geophones, tension load cells, and the cameras installed at each net. When geophones and rain gauges exceed a threshold, the video cameras, Figure C.3, will be triggered to power on and record the debris flow as it impacts the nets.

The monitoring system is also capable of sending out text message and/or email alerts as debris flows progress. Alerts can be customized according to a user's preference. All data can be uploaded to a public web page from the automated data acquisition system (ADAS). In addition the video feed and data will be sent to a central emergency facility for real time monitoring of debris activity in the canyons. Figure C.4 shows a typical ADAS similar to the systems to be installed for the debris nets.

Figure C.2. Tension load cell.

C.3.2 Proposed Instrumentation

The instrumentation proposed for the weather station system is listed in Table C.2. Table C.3 lists the ancillary instrumentation required for the Central Canyon Monitoring Stations. Table C.4 contains the list of instrumentation required each net.

C.3.3 Installation

The ADAS's will be placed on poles on the slopes above the top net anchors and within the disturbed zone footprints of the nets, Figure C.5. The nets will be instrumented during construction or easily after they are constructed.

Figure C.3. Infrared video camera.

Approximate locations and schematic concepts for the instrumentation are shown in Figures C.6 and C.7. The weather station instrumentation and repeaters for the net stations have not been checked for environmental impacts and will have to be assessed before installation.

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Figure C.4. Automated Data Acquisition System (ADAS) similar to the systems to be installed in Montecito.

TABLE C.2 INSTRUMENTATION FOR WEATHER MONITORING SYSTEM

ITEM	**QUANTITY**
Mounting tower for weather base station	1
Stainless steel enclosure	1
Fiberglass enclosures for rain gauges)	8
Datalogger, radio, and Verizon LTE Modem	1
Additional dataloggers rain gauges	8
Additional radios for rain gauges	8
Rain gauges - one or two per canyon depending on canyon size	9
Barometer	1
Anemometer	1
Wind vane	1
Temperature and relative humidity sensor	1
Radiation sensor	1
Soil moisture sensors	3
Solar panels	9
Storage batteries	9

TABLE C.3 INSTRUMENTATION FOR NET CENTRAL DATA STATIONS

ITEM	QUANTITY
Fiberglass enclosures - one per canyon	5
Mounting Poles	5
Dataloggers	5
Radios	5
Verizon LTE Modems	5
Solar Panels	5
Storage Batteries	2

TABLE C.4 INSTRUMENTATION FOR NET MONITORING SYSTEMS

ITEM	**QUANTITY**
Fiberglass enclosures	1
Mounting Pole	1
Dataloggers	1
Radios	1
Geophones	1
Video Cameras	1
Net tension load cells	2
Solar panels	1
Storage batteries	1

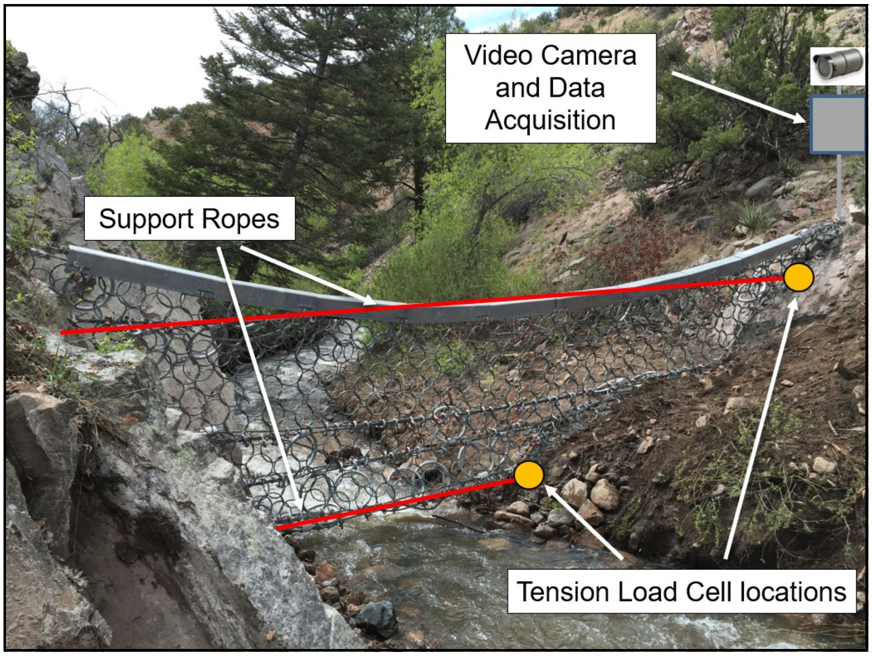

Figure C.5. Conceptual schematic of proposed instrumentation system.

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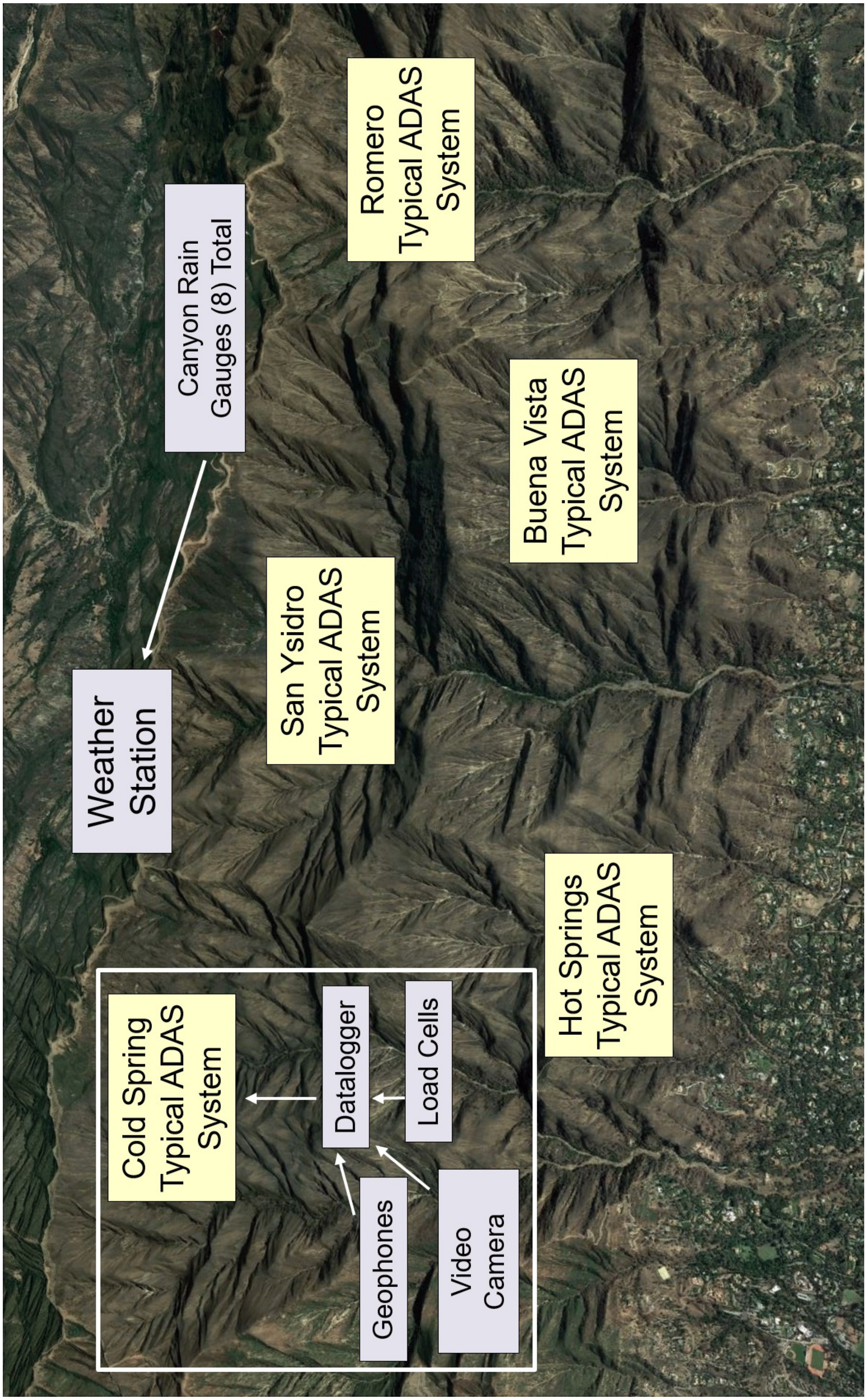

Figure C.6. Schematic layout of Montecito debris weather and monitoring systems.

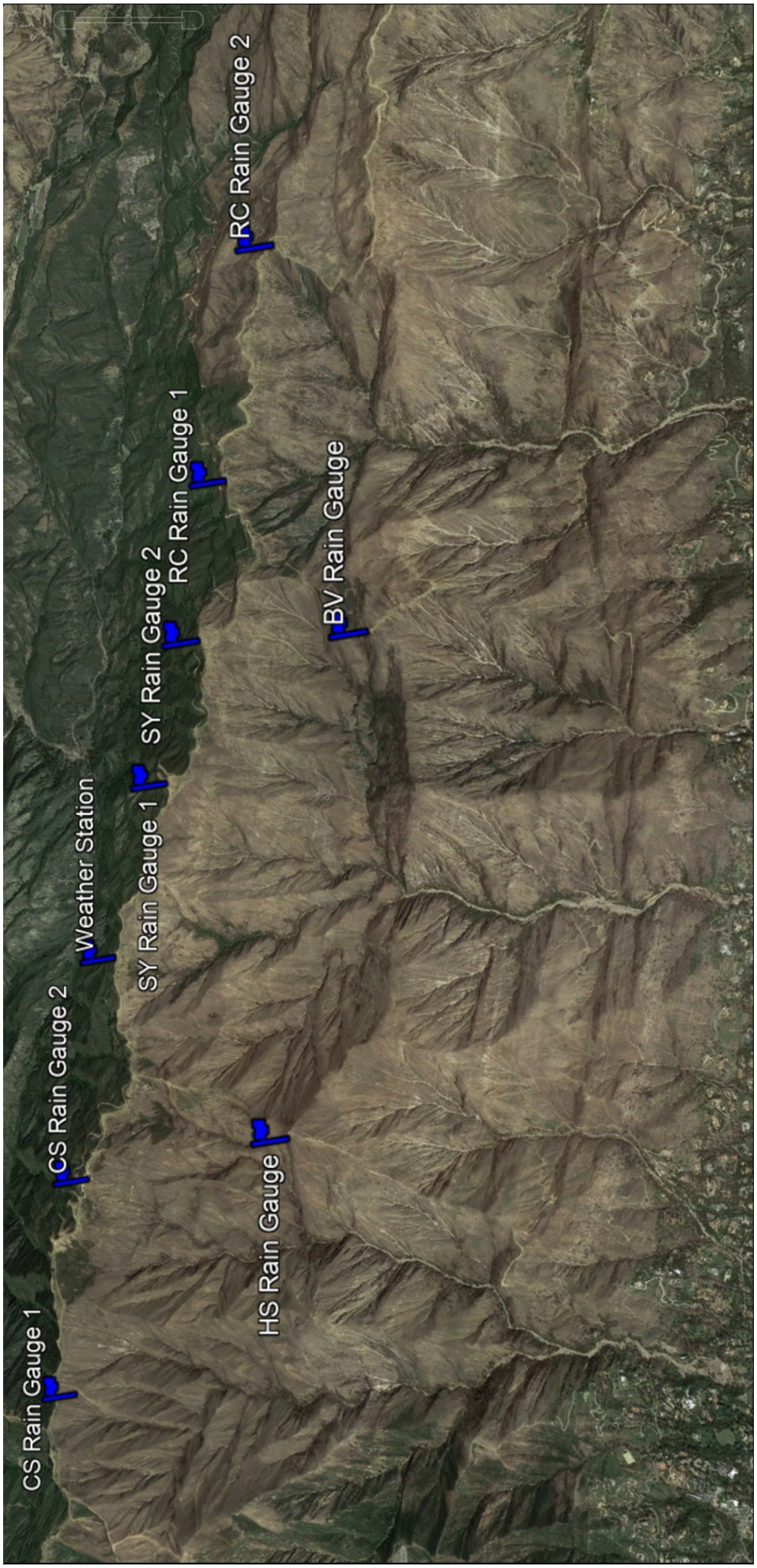

Figure C.7. Schematic of Montecito weather station system.

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DEBRIS DISTRIBUTION &
NET MANAGEMENT PLAN
MONTECITO DEBRIS FLOW MITIGATION PROJECT
SANTA BARBARA COUNTY, CALIFORNIA

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1.0 INTRODUCTION

This Revised Debris Distribution and Net Management Plan (Plan) was prepared for The Partnership for Resilient Communities (TPRC) by Storrer Environmental Services, LLC (SES) and South Coast Habitat Restoration (SCHR), with technical support from Sandshed Consulting (Sandshed) and Waterways Consulting, Inc. (Waterways). The Plan outlines monitoring and maintenance requirements and provides guidelines for management and distribution of accumulated debris for six (6) debris flow nets in three creek corridors in Montecito, Santa Barbara County, California (Project). This Plan is also intended to support applications for regulatory agency permits to monitor and maintain the nets for the life of the Project (i.e., 5 years from the time of installation; April 2019 through October 2023).

1.1 PROJECT DESCRIPTION & BACKGROUND

The Project is located in three creek corridors north of the community of Montecito in Santa Barbara County, California: Cold Spring Creek, San Ysidro Creek, and Buena Vista Creek (Subject Creeks) (Figure 1 – Net Locations and Drainages). The Project includes the installation, five-years of maintenance, and removal of six flexible debris flow nets. The basic debris flow protection system consists of a steel ring net engineered to resist the velocities and dynamic and static pressures unique to debris flows. Support cables are installed into channel banks and transfer debris impact and pressure loads from ring nets to the ground. Excessive energy is absorbed by net braking elements in the wire support ropes (KANE 2018). The goal of the Project is to reduce the debris flow hazard to the community of Montecito until canyon slopes are sufficiently revegetated and soils have stabilized.

A Biological Resources Assessment was completed by SES for all proposed net locations in fall 2018 (SES 2019). Prior to conducting the field surveys, a background review was performed to identify any special-status plant and wildlife species and sensitive natural communities that have the potential to occur in the Project vicinity. Biological field investigations were conducted in September and December 2018 and included mapping of net locations and impact areas, botanical surveys, wildlife surveys, and a jurisdictional delineation at each net location.

An Emergency Permit (18EMP-00000-00007) for installation of 11 debris flow nets was issued by Santa Barbara County (County) on December 21, 2018, and the 60-day construction period for installation of the first four nets was activated on April 4, 2019. Therefore, April 5, 2019 is considered the Project start date (see Table 1). The California Department of Fish and Wildlife (CDFW) allowed the Project to proceed under a 1610 Emergency Notification. The Project was also authorized by the Regional Water Quality Control Board (RWQCB) via a Notice of Applicability (NOA) under Order No. 2004-0004-DWQ (Project No. 34218WQ39). The existing emergency permits and agency authorizations allow installation and one-year of maintenance of the debris flow nets. The U.S. Army Corps of Engineers (USACE) deemed that net installation was not regulated under Section 404 of the Clean Water Act (File No. SPL-2018-00727).

Four (4) debris flow nets (CS-11, CS-18, SY-18, and BV-4) were installed by Access Limited Construction (ALC) between April 5 and June 7, 2019 (Appendix A – Site Photographs). Two additional nets (BV-10 and SY-7a) were installed between September 23 and November 13, 2019. Engineering oversight was provided by DRS Engineering and Geo Solutions. Full-time biological monitoring was performed by SES. Per the County Emergency Permit (County 2018), the debris flow nets were installed at a minimum elevation ranging from 36 to 60 inches above the water surface of the low-flow channel to allow for the passage of water, fine sediment, and aquatic and terrestrial wildlife. Table 1 below provides a description of net type, retention capacity, and location of the six nets.

Table 1 – Net Descriptions and Locations

Net Location	Geobrugg Net Type[1]	Net Freeboard[2] (inches)	Approximate Retention Volume[3] (cubic yards)	Latitude	Longitude	Project Start Date
Cold Spring Creek						
CS-11	VX160-H6	18-40	1,300	34.460252	-119.654054	04/05/2019
CS-18	SVX180-H6	36-57	2,300	34.460208	-119.655108	04/05/2019
San Ysidro Creek						
SY-7a	SVX180-H6	5-58	960	34.468166	-119.622936	09/23/2019
SY-18	SVX180-H6	20-50	2,700	34.459536	-119.623201	04/05/2019
Buena Vista Creek						
BV-4	SVX180-H6	2-46	2,100	34.454738	-119.611534	04/05/2019
BV-10	VX160-H6	4-56	1,000	34.452348	-119.611480	09/23/2019

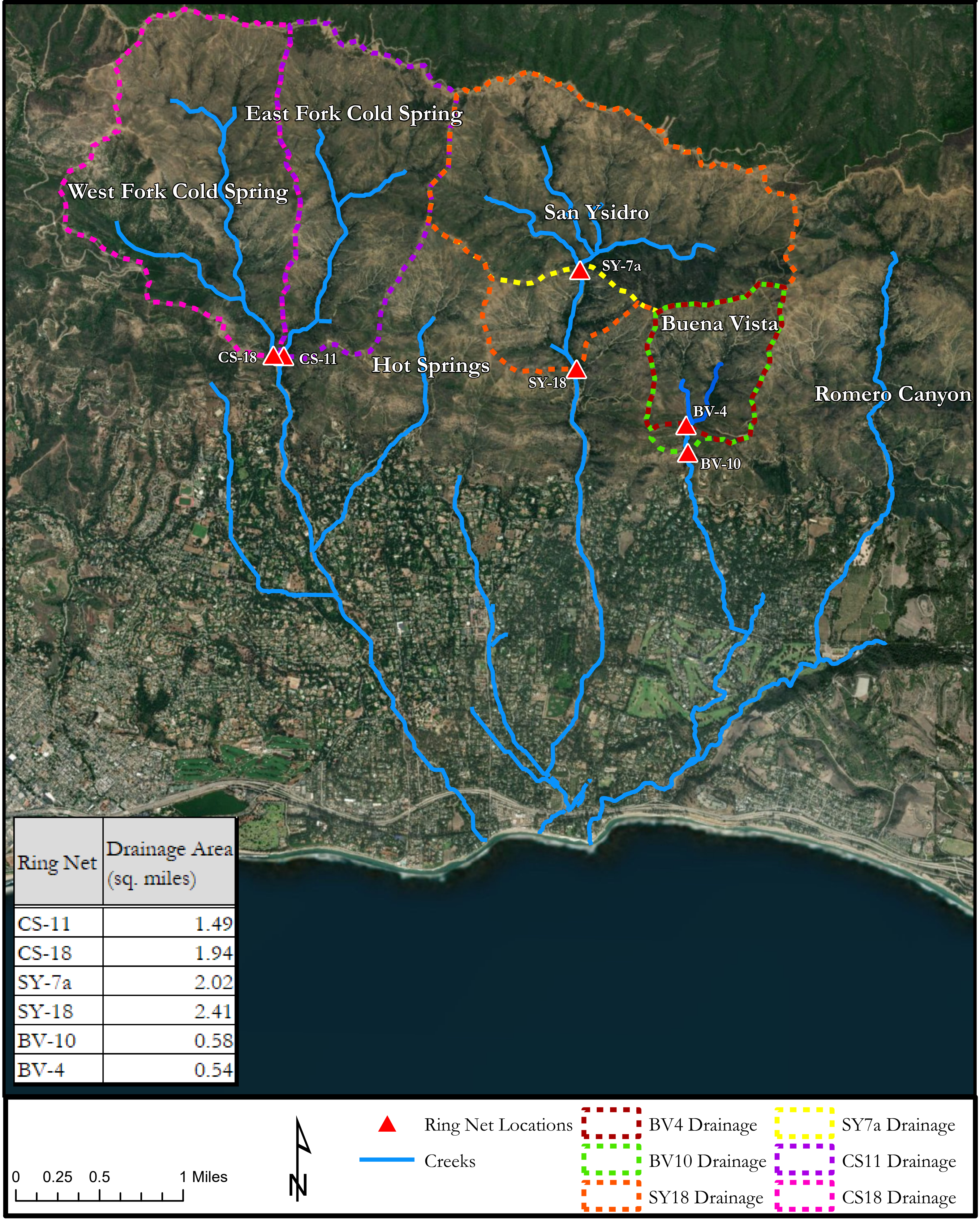
[1] Net types provided by the *General Report of Findings* (KANE 2018).
[2] Net freeboard is measured from bank to bank.
[3] Net retention volumes recalculated in September 2019 by Waterways Consulting, Inc. (Appendix B – Waterways Memorandum).

1.1 PURPOSE OF PLAN

The County Emergency Permit (2018) and the existing CDFW, RWQCB, and USACE authorizations allow the installation of the debris nets as well as the monitoring and maintenance of the nets for one year only. This Plan will support permit applications for ongoing net monitoring, maintenance, and debris distribution for the remainder of the life of the Project (years 2 through 5), as well as removal of the nets after 5 years.

The objectives of this Plan are to: 1) outline net monitoring frequency and requirements; 2) summarize routine net maintenance requirements; 3) provide guidelines for management of accumulated debris during normal rain events; 4) provide prescriptions for timing and methods of distribution of large quantities of material following a debris flow or debris laden flood; and, 5) outline the requirements and methods for net removal.

Net Locations and Drainages



Ring Net	Drainage Area (sq. miles)
CS-11	1.49
CS-18	1.94
SY-7a	2.02
SY-18	2.41
BV-10	0.58
BV-4	0.54

1.2 PLAN DEVELOPMENT

The development of this Plan was a collaborative effort involving wildlife biologists, fisheries biologists, botanists, restoration ecologists, geomorphologists, and GIS specialists (Project Team). Although the Subject Creeks and net locations share many similar physical characteristics, each site has its own unique attributes that will dictate specific debris management practices. Guidelines for debris distribution and net maintenance/monitoring were developed using the following techniques.

1.2.1 Aerial Photogrammetric Surveys & Digital Terrain Models

Sandshed conducted baseline aerial, photogrammetric surveys of Cold Spring, San Ysidro, and Buena Vista Creeks September 4-6, 2019 using an unmanned aerial vehicle (UAV). The resulting baseline digital terrain models (DTMs) provide three dimensional data at a 0.5-foot pixel resolution. The data show the stream's cross-sectional and longitudinal profiles that were used to determine the area of debris distribution and analyze the change (degradation or aggradation of material) in stream morphology over time.

1.2.2 LiDAR Analysis & Hydraulic Modeling

Approximate net retention volumes were recalculated by Waterways in August and September 2019 using the LiDAR data collected following the debris flow on January 9, 2018 (see Table 1) (Appendix B – Waterways Memorandum). Retention volumes were previously estimated using the net manufacturer's online modeling software (i.e., GeoBrugg DEBFLOW software).

Waterways used the DTMs provided by Sandshed to create a two-dimensional hydraulic model of each net location using the Hydrologic Engineering Center's River Analysis System (HEC-RAS) (USACE 2019). HEC-RAS utilized data from each net location to simulate the timing and magnitude of flow characteristics through the Project site locations. The hydrology of each site was generated using the USGS StreamStats online software (USGS 2019) to estimate both the 2-year and the 100-year flow events. The Waterways *Montecito Ring Net Storage Potential Modeling Memorandum* is provided as Appendix B.

The 2-year flow event threshold was chosen based on previous recommendations to Santa Barbara County Flood Control Protection District (SBCFCPD) from the National Marine Fisheries Service (NMFS) and the RWQCB. NMFS and the RWQCB recommend that the SBFCPD re-distribute accumulated debris at their facilities (e.g., debris basins) to areas downstream that are within the 100-year flood inundation area and outside the 2-year flood inundation zone.

The preliminary modeling results were field verified by SCHR on October 16, 2019 to confirm and refine debris distribution areas above the 2-year flow event delineation. SCHR divided each of the creek channels (i.e., Cold Spring, San Ysidro, and Buena Vista) into reaches and photographed and examined each reach for the following: 1) receiver site likeliness; 2) side-cast site likeliness; 3) equipment access; and, 4) any other noteworthy considerations. The *SCHR Distribution Zone Notes* are provided as Appendix C.

1.2.3 Channel Cross-sections & Baseline Freeboard Measurements

Baseline freeboard measurements were taken in September 2019 by SCHR to evaluate the cross-sectional freeboard discharge area for each net. This information will serve as a reference for the duration of the Project and will be used to inform the Contractor how much cross-sectional freeboard area will need to be re-established as a part of the debris distribution process. Baseline freeboard cross-sectional profiles are described in Section 4.0 and depicted in Figures 3, 4, 7, and 10.

1.2.3.1 Freeboard Measurement Methodology

Starting on the downstream side, a meter transect tape was exteneded from the ‘river right’ stream bank to the ‘river left’ streambank along the bottommost net cable, intiating from the bottommost anchor point. Once the transect was set, depth measurements were taken at 0.5-meter intervals from the bottommost cable or ring. Where each depth measurement occurred horizontially along the transect, a black piece of electrical tape was wrapped to assist in consistency when future measurements are recorded. It is important to note that each depth measurement was taken from the bottommost freeboard impediment (i.e., ring or cable) and not from the electrical tape marker; tape was placed solely to offer a horizontal marker along the transect. Depth was recorded at the start and end at the anchor points. Maximum depth, total length, and wetted area were also measured along the transect.

1.2.3.2 Evaluating Cross-sectional Area

To estimate the cross-sectional area, a simple graphing exercise was employed. After plotting the initial cross-sectional profile, the profile was split in to 0.5-meter vertical intervals (see Figures 3, 4, 7, and 10). These vertical intervals are not located at the horizontal depth measurements taken in the field, but are an average of the two closest depth measurements. For example, in calcualting cross-sectional area, the average depth is calculated between two sequentially measured depths in order to not overestimate the area between two points. These areas are labeled A1, A2, A3 and so on. Aggeregating each Ax prism totals the cross-sectional area. Measurements were recorded in meters in the field and were later converted to feet for plan consistency.

2.0 NET MONITORING & ROUTINE MAINTENANCE

Net monitoring, routine maintenance, and management of accumulated debris will be required for the life of the Project (i.e., 5 years following net installation, April 2019 through October 2023). The following sections describe storm event and rainfall thresholds, monitoring frequency (as required by existing permits and authorizations), and routine net maintenance.

2.1 STORM EVENT & RAINFALL RATE THRESHOLDS

The USGS and National Weather Service (NWS) have developed a Debris Flow Warning System (NWS 2018) for post-burn areas. The USGS computes rainfall rate thresholds based on statistical occurrences of debris flows and associated rainfall rates for burn areas less than 2 years old. The NWS uses these thresholds as guidance for warnings of possible flash flooding and debris flows.

Per the County Emergency Permit, a "storm event" is an event consistent with the triggering thresholds used by the NWS (NWS 2018). A storm event is considered to be over when no further precipitation is forecasted and entry is permitted by public safety officials.

Table 2 summarizes the rainfall rate thresholds used to determine the likelihood of debris flows in and near recent burn areas. High intensity, short duration rainfall rates are found to be the primary cause of debris flows.

Table 2. NWS Rainfall Rate Thresholds

Duration		Precipitation Amount
High Intensity, Short Duration Rainfall Rates[1]	15 minutes	0.2-inch
	30 minutes	0.3-inch
	1 hour	0.5-inch
Normal Intensity Rainfall Rates[1]	3 hours	1.0 inch
	6 hours	1.4 inches
	12 hours	1.9 inches

[1] Rates produced by ordinary thunderstorms (NWS 2018).

2.2 NET MONITORING METHODS & FREQUENCY

2.2.1 Physical Net Monitoring

After a storm event ends, each net will be inspected within 48 hours for repairs and/or debris removal by the applicant's contractor, geotechnical engineer, and/or biologist. If the inspection indicates that a repair is required or that there is debris in a net, repair or removal of debris shall commence as soon as possible following the net inspection and entry is permitted by public safety officials.

The nets will also be inspected routinely for damage year-round (monthly during the dry-season) by the applicant's contractors and/or staff.

2.2.2 Motion-Activated Cameras

In addition to routine net inspections, battery-operated motion-activated cameras (*Bushnell Trophy Cam HD 24 MP Trail Cameras*) were installed in December 2019 at each of the nets to monitor wildlife passage in the creek channels. Cameras and footage will be examined regularly (every two weeks) by the Project biologists. Additionally, the Project team will take note of any wildlife tracks in the vicinity of net locations during routine inspections and will inspect camera footage for suspected wildlife crossings.

2.2.3 Annual Freeboard Measurements & Monitoring

Freeboard measurements will be made during the dry season each year, before and after any redistribtion of debris. As mentioned above, baseline freeboard measurements at each net were taken by SCHR in September 2019. Prior to debris distribution, freeboard measurments will be taken to understand the difference in cross-sectional freeboard area from the baseline condition at at each net.

If excavation is necessary, Project biologists and/or geohydrologists will be onsite to measure the cross-sectional area to provide the contractor guidance in restoring baseline channel conditions. Following excavation of the channel under each net, the Project biologists will employ the freeboard measurement methodology outlined in Section 1.3.3.1 to record data. This data will be used as the following years' baseline dataset from which excavation will be directed.

In the case a smaller accumulation event occurs, Project Biologists will evaluate and report the suspected cause of the accumulation event and whether the nets promoted ancillary aggradation (i.e., nets hanging to low or isolated trapping incidents) rather than what was intended for their primary purpose (i.e. mitigating a catastrophic event). In addition, an evaluation of the impact to water quality and the natural stream process from freeboard reestablishment will be conducted.

2.3 ROUTINE NET MAINTENANCE

Maintenance of the debris nets is required if any of the nets are damaged or otherwise in need of repair. Minor maintenance may be done using tools and materials transported by hand. Major damage may require equipment and materials to be delivered in the same manner as installation (via helicopter). Debris removal associated with large amounts of material is discussed below in Section 3.3.

2.4 ANNUAL REPORTING

Annual data collection will include aerial drone surveys, new DTM data, and hydraulic modeling to reflect flood inundation areas and new channel morphology. The new DTM/flood inundation maps will be used as baseline data for the following year. New DTM data will also be collected post debris re-distribution, in the event a debris flow occurs.

Annual Monitoring Reports will summarize all monitoring, maintenance, and debris management (if any) at each net location throughout the year. General net management guidelines are described in detail below. Annual reports will be submitted to regulatory agencies by the end of the calendar year for the duration of the Project (i.e., through December 31, 2023).

3.0 GENERAL NET MANAGEMENT GUIDELINES

Intense and localized rainfall events have potential to mobilize soil and debris. The timing for removal of debris will depend on frequency, intensity, and the amount of precipitation experienced in the watershed. Nets will be managed in accordance with the magnitude of debris accumulated using a two-phased, seasonal approach: wet season and dry season.

Wet season (November 1 to May 31) management will consist of monitoring the nets on a per storm basis and creation of a low-flow channel to re-establish a path for temporary fish/wildlife passage, until large machinery is able to mobilize in the creek channel for more extended periods of time. Dry season (June 1 to October 31) management will consist of distribution of material that was side-cast to create the low-flow channel during the wet season. Dry season debris distribution will involve a dewatering and stream diversion system and placement of material in a prescriptive fashion between the 2-year flow line and 100-year flow line, as directed by the Project geomorphologists and biologists. Debris distribution at each net location will vary, depending on the onsite geomorphic conditions.

Along with differences in seasonal activities that are permitted to take place, work will be dictated by the type/magnitude of flow events generated by any particular storm. As such, minor debris accumulation and major accumulation events are described below to distinguish activities that will be employed under these alternate scenarios.

3.1 WILDLIFE CONSIDERATIONS

Prior to major debris management, a downstream fish presence/absence assessment will be performed by SES and/or SCHR biologists using CDFW California Salmonid Stream Habitat Manual protocols. Either a snorkel survey or stream bank observation techniques will be employed depending on the nature of the stream conditions. Surveys will be completed from the uppermost debris basin on each Subject Creek to the furthest upstream (northernmost) net. Sites that do not possess debris basins (i.e., Buena Vista Creek) will be surveyed from the closest downstream fish passage barrier upstream to the northernmost net.

If debris distribution is implemented during the bird nesting season (February 1 to August 31), an agency-approved biologist shall conduct a pre-construction survey of the net locations and adjacent habitats within 7 days of commencement (i.e., mobilization, staging, vegetation clearing, or excavation) to avoid impacts to nesting raptors and other birds.

Section 6.0 below summarizes avoidance and minimization measures to be implemented during debris management to reduce the potential for impacts to wildlife.

3.2 MANAGEMENT OF MINOR DEBRIS ACCUMULATION

Per the County Emergency Permit, a freeboard of 36-60 inches above the water surface of the low-flow channel must be maintained at each net location. Depending on the amount and type of debris accumulated following a normal storm event, the net can be temporarily adjusted upward or dismantled in sections to allow for removal of material.

3.2.1 Establishment of Low-Flow Channel & Net Freeboard

To allow immediate rectification of the low-flow channel and net freeboard after a minor debris accumulation, hand removal of material will be performed with picks, shovels, and small hydraulic splitters (if necessary). Construction personnel will access net locations via adjacent public trails and transport tools by foot.

Small branches, vegetation, and small amounts of cobble, and fines accumulated behind the net will be removed with hand tools and placed outside of the active channel flow line. Branches and vegetation may also be placed in adjacent upland habitat, if present.

Removal of large pieces of woody debris, rocks, and boulders will require the same methods and protocols used for the management of a major debris flow and accumulation of large amounts of material (i.e., mobilization of heavy equipment). These methods are described in detail in Section 3.3.

3.2.2 Minor Debris Accumulation Scenario Workflow Example

Presented below is a conditional scenario that describes how the workflow would be employed given the described minor debris accumulation.

Scenario Conditions:

- Baseline terrain and flood inundation data collected during the previous season;
- Multiple winter storms during wet season;
- No storm event that accumulates significant amounts of debris; and,
- Blockage of freeboard remained at 50% of passable area (i.e., less than half the baseline freeboard was obstructed).

Wet Season (November 1 – May 31):

- Project team checks nets post storm events, documents conditions.
- Project team mobilizes contractor to maintain low-flow channel after storm event when deemed safe.
- Contractor creates low-flow channel with hand tools to reflect pre-debris accumulation channel slope and establishes a minimum freeboard depth of 36 inches over the water surface.
- Contractor moves accumulated material downstream out of the direct flow path as directed by Project biologists and/or geomorphologists.
- De-mobilize personnel and equipment prior to next storm event.

Dry Season (June 1 – October 31):

- Project team evaluates if any further debris management is necessary to meet baseline channel conditions. If required, the following tasks will be performed:
  - Project biologists conduct pre-construction fish presence/absence surveys and nesting bird surveys.
  - Re-establishment of minimum freeboard beneath net using hand tools. Heavy equipment is not expected to be required to manage minor debris accumulation (i.e., 50% of the net freeboard is passable).
  - Document impacts, if any, to vegetation, wildlife, or creek resources
- Annual Data Collection
  - Collect new DTM data via aerial drone surveys post debris re-distribution.
  - Perform hydraulic modeling to reflect flood inundation areas to new channel morphology.
  - Use new DTM/flood inundation maps as baseline for following year.

3.3 MANAGEMENT OF MAJOR DEBRIS ACCUMULATION

3.3.1 Mobilization

Should the nets accumulate enough material to block the channel, heavy equipment will be mobilized to the net location via heavy-lift helicopter, once stream flow has subsided sufficiently to allow safe access. The contractor will use a Spyder excavator and/or a 10-ton class excavator depending on the specific characteristics of the debris flow. All equipment and materials will be mobilized to and from the existing turn-around and parking area used by Southern California Edison (SCE) and the Montecito Fire Department located at the top of the Edison Catway access road at the end of West Park Lane in San Ysidro Canyon.

Construction staging areas will be utilized as much as possible for staging of equipment and supplies (e.g., chainsaws, shovels, straw wattles, filter fabric, etc.) during debris removal. All equipment and supplies will be staged outside of the active creek channel and flowing water. Best management practices (BMPs) necessary to minimize downstream turbidity originating from the debris management activities will be installed (e.g., straw wattles, silt fencing, filter fabric, etc.).

3.3.2 Establishment of Low-Flow Channel & Net Freeboard

If a storm event results in accumulation of a significant volume of debris, the first priority will be to re-establish a low-flow channel and net freeboard of 36-60 inches over the water surface to allow for fish and wildlife passage. Under the direction/supervision of biologists and/or geomorphologists, the contractor will re-establish the low flow channel upstream of the net using an excavator(s) once stream flows have subsided sufficiently to allow safe access and working conditions. Depending on the characteristics of the debris flow, the net may be pulled upward or disconnected from the support cables to allow the excavator(s) to restore the wetted channel.

3.3.2.1 During the Wet Season

To re-establish the low-flow channel during the wet season, the helicopter will place the excavator(s) on top of the accumulated debris behind the net. The excavator will then clear a low-flow channel by excavating through the middle of the debris pile in the channel and side-casting material against the upstream banks. Restoring the low-flow channel to baseline elevation conditions will begin from the back of the debris flow working towards the net. During the excavation of the low-flow channel, a minimum of 36 inches of freeboard will be re-established to maintain terrestrial wildlife passage under the net through the duration of the wet season.

The use of heavy equipment in the wetted portion of the creek between November 1 and May 31 will be limited to clearance and maintenance of a low-flow channel. Distribution of the remaining material accumulated behind the net will take place after the rainy season ends and stream flows recede enough to allow for installation of a dewatering and stream diversion system.

3.3.2.2 During Dry Season

After May 31, the extent of the net freeboard established at each location during the wet season should be returned to the baseline elevations and continued upstream at an appropriate grade, based on Waterways elevation calculations (Appendix B – Waterways Memorandum). Excavated material will be placed at a bank slope inclination sufficient to allow the stream discharge to pass base flow conditions. The excavators used will be as small as practical to perform the work. Subsequent to debris flow events, channel morphology is generally dynamic and unstable. In the event the low-flow channel avulses from its original flow path measured at the baseline condition (see Figures 3, 4, 7, and 10), an alternate low-flow channel may be established with the following conditions: 1) The maximum freeboard measurement must be reestablished at any given location along the net, 2) the total area of freeboard must equal or exceed that measured from the baseline conditions.

3.3.3 Dewatering and Stream Diversion System

If a significant volume of material is in need of distribution, dewatering of a portion of the stream may be necessary to ensure that aquatic biota are not harmed or perish during the process. Dewatering entails the contractor setting up an upstream diversion with plastic sheeting, sand bags, cofferdam, and diversion pipes to bypass the net location and debris distribution (i.e. work) areas. If necessary, Baker tanks and pumps may be used during dewatering of the work areas to allow for sediment to settle prior to discharge downstream. Water detained behind the upstream cofferdam will be pumped and piped past the work areas and discharged below the downstream cofferdam. Upstream/downstream exclusion nets will be set in place to ensure no aquatic biota enter the diversion pipes.

Details regarding the timing and plan specifications of each dewatering and stream diversion system will be developed by the Contractor based on the extent and type of material accumulated and streamflow volume. Dewatering and stream diversion plan sheets will be submitted to the agencies for approval prior to mobilization and major debris distribution. Approximate areas for debris distribution and therefore, the extent of the dewatering system at each net location, are depicted in the hydraulic models (see Figures 2, 5, 6, 8, and 9) and described below in Section 4.0 – Net Specific Debris Distribution Guidelines.

3.3.4 Debris Types & Placement

It is likely that debris accumulated behind the nets will vary substantially in composition. The following sections describe how to place various types of debris. In general, it is recommended that all debris flow materials remain in the creek channels at approximate inundation elevations. It is the intent if this Plan to mimic natural debris transport/deposition as much as possible.

3.3.4.1 Woody Debris

If large pieces of organic (woody) debris are present and pose an issue to re-establishing the low-flow channel, the pieces will be cut with chainsaws into 3-foot sections and placed downstream of the net above the 2-year flow line or in an upland location.

3.3.4.2 Sediment Debris

Selective distribution of sediment will be dependent on the size of material and sorting capabilities of the Contractor and equipment. For the purposes of this Plan, sediment sizes have been broken up into three categories based on physical and biological process considerations. They are: 1) fine material, 2) bedload material (e.g., gravel to large boulders), and 3) immobile material.

Size classes of material were determined by Waterways via a literature review exercise. Sediment size classifications were based on contractor constraints and promoting aquatic biological resource processes—the primary intent being to keep spawning gravels within the creek channel to promote steelhead habitat and recovery. Waterways used peer reviewed literature that indicates that steelhead spawning functions are impaired when sediment sizes become less than 6 millimeters (mm) (Appendix B – Waterways Memorandum). As such, Fine Material is classified as sediment less than 6 millimeters in diameter. Bedload Material is classified as sediment from 6 mm up to any size that would not be mobilized under the 2-year flow event threshold. Immobile Material is classified as any material in which the contractor’s equipment would not be able to mobilize.

3.3.4.2.1 Fine Material

Fine material is to be placed outside the 2-year flow delineation and below the 100-year flow delineation. The 2-year flow elevations were based on nuisance turbidity concerns with the thought that there would already be background turbidity above the 2-year flow line. Placing fine material outside the 2-year flow allows for the material to be remobilized during a higher flow event and carried downstream, ultimately to the beach. Sorting the Fine Material will require various sifts during debris re-distribution. While sifting for material below 6 mm will be intensive in the initial phases of debris distribution, retaining material larger than 6 mm in the creek channel at the net location will limit construction impacts because the contractor will be working more intensely in proximity to the net locations and less at distant receiver sites. In addition, keeping a larger proportion of the 6 mm plus material within the channel (rather than above the 2-year flow delineation at receiver sites) will allow for the creek to begin to aggrade more naturally.

3.3.4.2.2 Bedload Material

Bedload material shall be placed anywhere below the 100-year flow event delineation, with preference given to areas inside the 2-year flow path delineation. Placement of some large rock below the 2-year flow line will promote aggradation, which will benefit the channel morphology in areas that have experienced major incision. Placement of suitable material below the 2-year flow event delineation will keep habitat forming features (e.g., cobble, small boulders) in the channel. If larger material is placed outside the 2-year delineation, it would take longer to mobilize and has the potential to promote further incision in the creek channel before being remobilized at a lower probability high flow event (i.e., 10-yr to 100-yr events).

Large rocks should be placed at the toe-slopes of the creek banks to promote bank stabilization, encourage riparian cover, and create roughness elements that restore habitat and reduce flood potential. Placement of large rock shall be done under the supervision of a biologist or geomorphologist.

3.3.4.2.3 Immobile Material

Large boulders that cannot be lifted by the excavator will be broken in place using a hydraulic excavator-mounted hammer or by using hydraulic splitters to enable management with the excavator. The broken down "Immobile Material" will be placed according to size, or as directed by the biological monitor and/or geomorphologists.

Receiver sites for debris distribution at each net location are described below in Section 4.0.

3.3.5 Transport of Accumulated Material to Receiver Sites

Material that accumulates behind the nets must be transported upstream or downstream to receiver sites. Depending on the type, size, and quantity of debris that is present, there are several ways that this may be accomplished. Side-casting of material above the 2-year delineation in upstream locations and in proximity to the net, will likely utilize a Spyder or 10-ton excavator and/or a conveyor belt system. If necessary, a helicopter may be used to transport debris to receiver sites downstream that are too far for conveyor belts systems or heavy equipment to travel in the stream channel. Use of adjacent upland locations (if feasible) and avoidance and minimization measures (Section 6.0) will be implemented during transport of material to reduce impacts to the creek channels as much as possible.

3.3.6 Major Debris Accumulation Scenario Workflow Example

As described above, debris management will be implemented using a two-phased approach that will occur over the period of two distinct seasons, the wet season and the dry season. Each season's scope of work will vary based on magnitude of debris accumulation, climatic variability, impacts to resources, feasibility, worker safety, and workflow synchrony.

Wet season work includes monitoring of debris accumulation, storm events, and wildlife passage. Management actions may consist of creation of a low-flow channel following storm events that accumulate debris, side-casting debris upstream of nets to re-establish a low-flow channel, and general project oversight.

Dry season work will include pre-construction biological surveys (i.e., fish presence/absence surveys, nesting bird surveys), installation of a dewatering and stream diversion system, debris re-distribution, and terrain data collection via aerial drone surveys to inform future hydraulic models and mitigation requirements.

Presented below is a conditional scenario that describes how the workflow would be employed in the event of a major debris accumulation.

<u>Scenario Conditions:</u>

- Baseline terrain and flood inundation data already collected prior season;
- Multiple winter storms during wet season; and,
- One or more storm events that resulted in major debris accumulation requiring dispersal with heavy equipment.

<u>Wet Season (November 1 to May 31):</u>

- Project team checks nets post storm events, documents conditions.
- Project team mobilizes Contractor to create low-flow channel after storm event when deemed safe.
- Contractor creates low-flow channel to reflect pre-debris accumulation channel slope and establishes a minimum freeboard depth of 36 inches.
- Contractor side-casts material (material excavated for low flow channel creation) upstream of net until dry season when more extensive work can be completed.
- De-mobilize personnel and equipment before next storm event.

<u>Dry Season (June 1 to October 31):</u>

- Project biologists conduct pre-construction fisheries presence/absence surveys and nesting bird surveys.
- Dewatering and stream diversion system installation, if necessary.
- Contractor mobilizes 10-ton excavator and/or Sypder Excavator to upstream side of net.

- Contractor excavates material from upstream portion of accumulated debris and strategically places debris in accordance with appropriate placement areas as depicted in Figures 2, 5, 6, 8, and 9.
    - Material distributed as directed by the biological monitor and/or geomorphologists.
    - Re-establishment of baseline channel conditions and freeboard measurements.
- De-mobilize personnel and equipment prior to October 15.
- Document impacts, if any, to vegetation, wildlife, or creek resources
- Annual Data Collection
    - Collect new DTM data via aerial drone surveys post debris re-distribution.
    - Perform hydraulic modeling to reflect flood inundation areas to new channel morphology.
    - Use new DTM/flood inundation maps as baseline for following year.

4.0 NET SPECIFIC DEBRIS DISTRIBUTION GUIDELINES

The following sections describe the field verified debris distribution areas in each creek channel (i.e., Cold Spring, San Ysidro, and Buena Vista) based on the *SCHR Distribution Zone Notes* (Appendix C). All calculations of acreages/linear feet of distribution areas assumes that a debris flow event results in the maximum fill capacity at each net (see Table 1).

In addition to descriptions of the debris distribution zones, the baseline cross-sectional freeboard profile is provided for each net location (i.e., CS-11, CS-18, SY-18, BV-4, SY-7a, and BV-10). These baseline measurements will be utilized to guide the re-establishment of the low flow channel following a debris flow.

4.1 COLD SPRING CREEK

4.1.1 CS-11 & CS-18 Debris Distribution Zones

The two nets in Cold Spring Creek are located in the west fork (CS-18) and east fork (CS-11) of the creek. Based on the field verification of the hydraulic model, there is 0.17-acre (215 linear feet) of storage upstream and 0.49-acre of storage (565 linear feet) downstream of CS-18 and 0.11-acre (230 linear feet) of storage upstream and 0.11-acre of storage (105 linear feet) downstream of CS-11 (Appendix B – Waterways Memorandum).

Depth of material in distribution zones in Cold Spring West ranges from 1.6 feet to 4.7 feet. Depth of material in distribution zones in Cold Spring East is 12.5 to 13 feet (Appendix B – Waterways Memorandum). There is also another 0.55-acre of storage available downstream of the confluence of Cold Spring West and Cold Spring East (see Figure 2). Depth of redistributed material would decrease if areas downstream of the confluence are utilized.

There are likely receiver sites and side-cast opportunities directly upstream and downstream of CS-18 and CS-11 (Reaches 2 through 7). The northernmost extent of Cold Spring East (Reach 1) is considered an unlikely receiver site due to equipment access issues. There are also several plausible receiver sites downstream of the confluence (Reaches 8 through 10); however, equipment access to these locations from the nets would rely on equipment having to traverse a vertical drop near the confluence (Appendix C – SCHR Distribution Zone Notes).

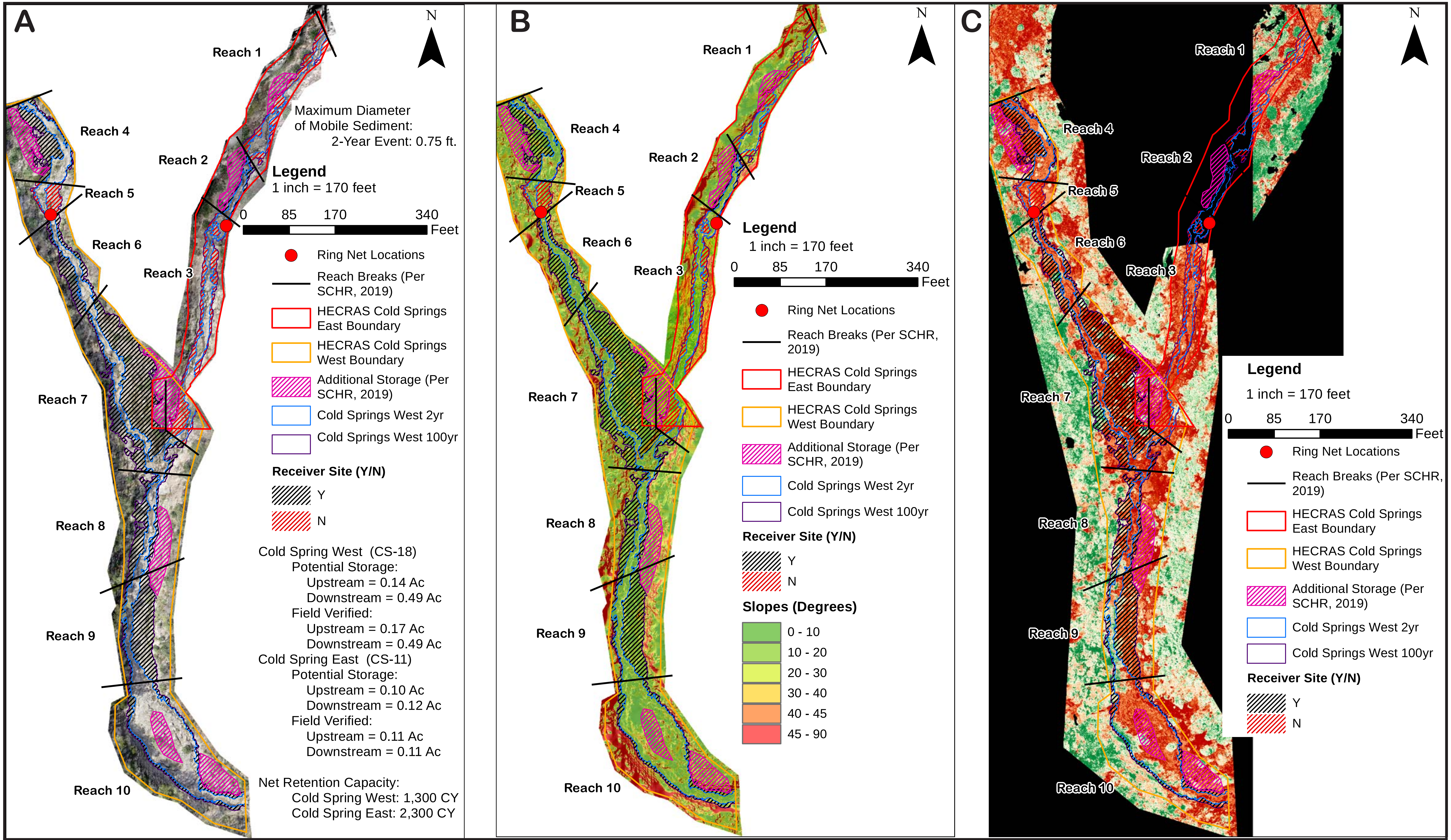
4.1.2 Baseline Cross-sectional Net Profiles

4.1.2.1 Cold Spring East (CS-11)

The Cold Spring East net (CS-11) extends 34.4 feet from the anchor point to anchor point along the bottom net cable. The net's freeboard discharge area is 97.69 square feet. The maximum depth of the freeboard was 3.7 feet located over the low flow channel water surface (see Figure 3).

4.1.2.2 Cold Spring West (CS-18)

Cold Spring West net (CS-18) extends 45.2 feet from anchor point to anchor point along the bottom net cable. The net's freeboard discharge area is 115.24 square feet. The maximum depth of the freeboard was 5.3 feet located over the low flow channel water surface (see Figure 4).



Maximum Diameter
of Mobile Sediment:
2-Year Event: 0.75 ft.

Cold Spring West (CS-18)
Potential Storage:
Upstream = 0.14 Ac
Downstream = 0.49 Ac
Field Verified:
Upstream = 0.17 Ac
Downstream = 0.49 Ac
Cold Spring East (CS-11)
Potential Storage:
Upstream = 0.10 Ac
Downstream = 0.12 Ac
Field Verified:
Upstream = 0.11 Ac
Downstream = 0.11 Ac

Net Retention Capacity:
Cold Spring West: 1,300 CY
Cold Spring East: 2,300 CY

CS-18 (Cold Spring West) and CS-11 (Cold Spring East)

A: Aerial; B: Slope Raster; Normalized Difference Vegetation Index (NDVI)

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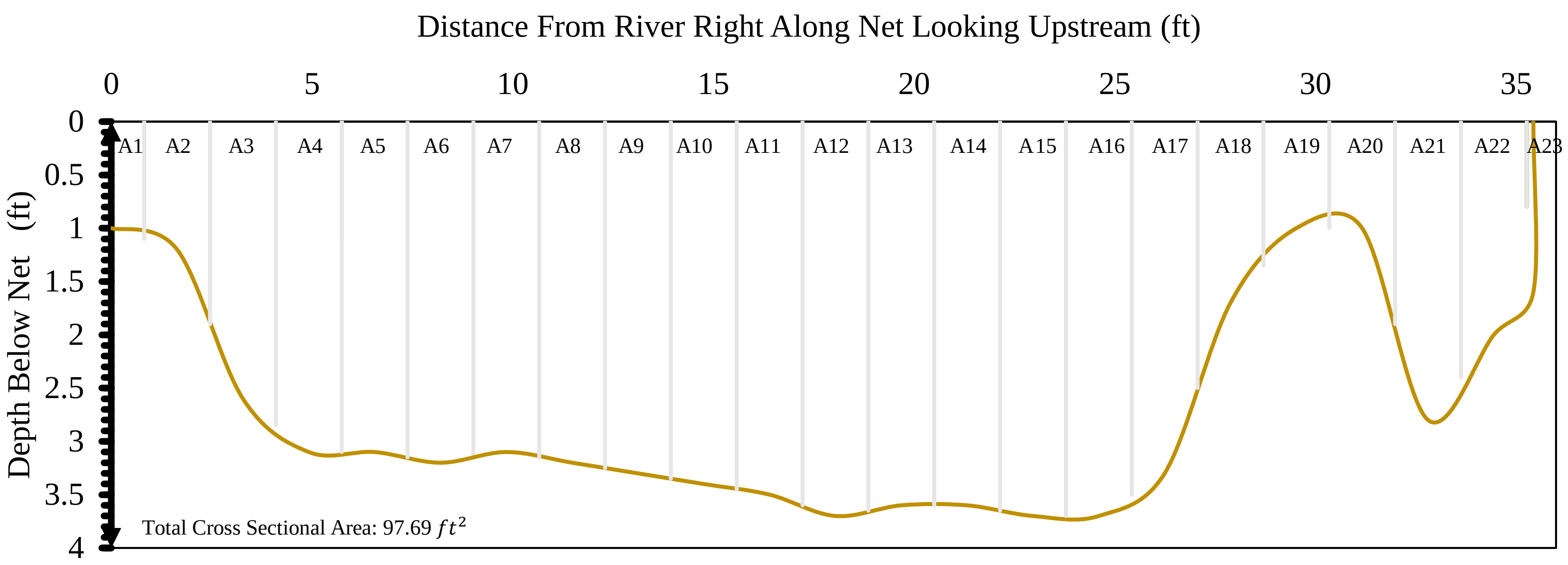
FIGURE
2

HECRAS Model Surface Resolution: 0.5 feet

Figure 3 - Cold Springs East (CS-11); Cross Sectional Freeboard Profile



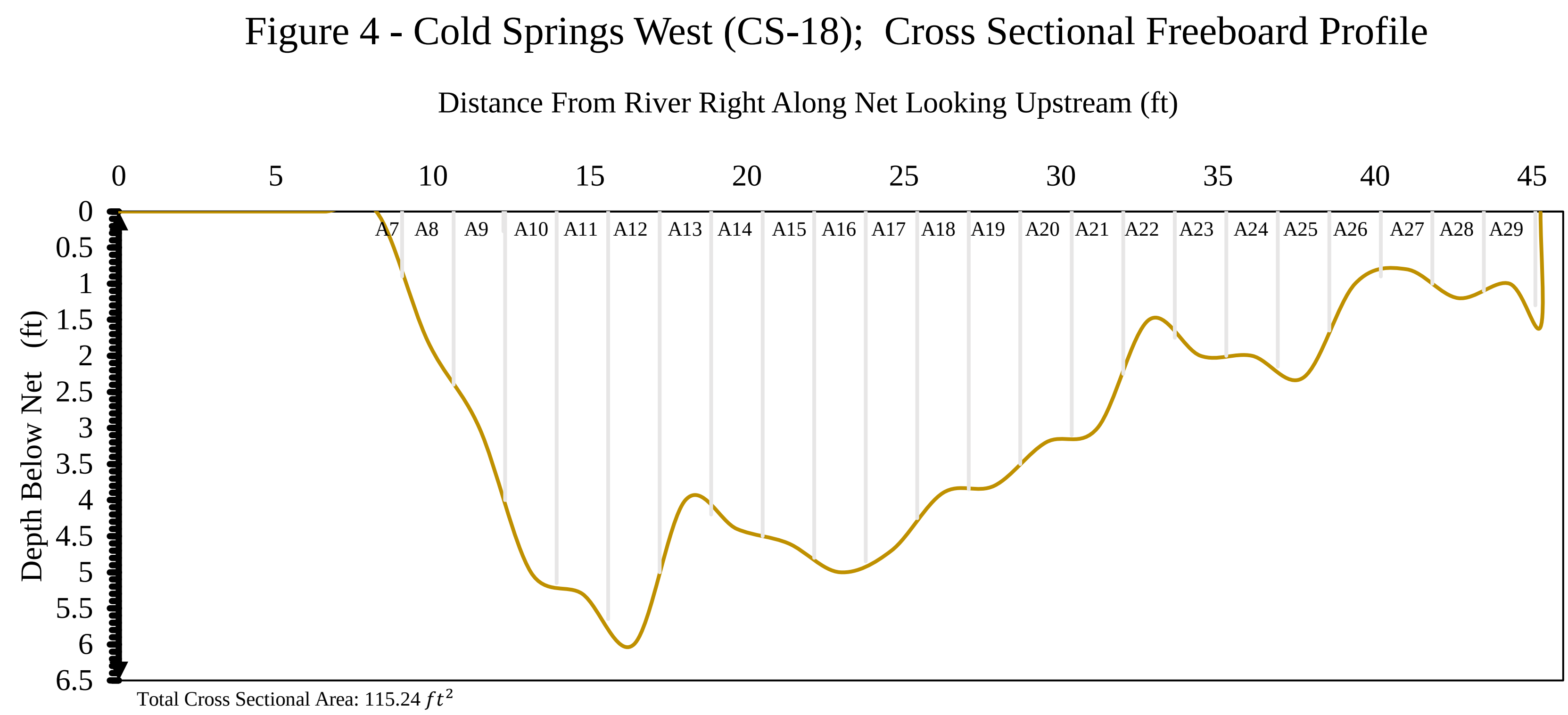


Figure 4 - Cold Springs West (CS-18); Cross Sectional Freeboard Profile
Distance From River Right Along Net Looking Upstream (ft)
0
5
10
15
20
25
30
35
40
45
Depth Below Net (ft)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
A7
A8
A9
A10
A11
A12
A13
A14
A15
A16
A17
A18
A19
A20
A21
A22
A23
A24
A25
A26
A27
A28
A29
Total Cross Sectional Area: 115.24 ft²

4.2 SAN YSIDRO CREEK

4.2.1 SY-7a Debris Distribution Zones

Eight (8) stream reaches in the upper portion of San Ysidro Creek (approximately 800 feet upstream and 1,000 feet downstream) of the SY-7a net location were examined for likeliness as debris receiver and side-cast sites (see Figure 5). Although some locations for debris distribution were preliminarily identified by the hydraulic model, the field verification exercise revealed that there is no debris storage potential within approximately 1,800 feet of the net.

Reaches 1, 2, 3, and 4 upstream of the net are unlikely receiver sites because of equipment access limitations, the presence of the public hiking trail, and a waterfall in Reach 3. The channel gradient below the net (Reaches 5 through 8) is steep and there are multiple large vertical drops (as many as three, 30-foot plus drops in Reach 5), with no opportunities for equipment mobility (Appendix C – SCHR Distribution Zone Notes).

The net at SY-7a has the least net retention capacity (960 cubic yards) (see Table 1; Appendix B). However, because of the constraints present at this location, any debris that accumulates behind the net will either need to be redistributed in the channel directly downstream (below the 2-year flow event delineation) or removed from the site via helicopter.

4.2.2 SY-18 Debris Distribution Zones

Seven (7) stream reaches (i.e., Reaches 9 through 15) in the lower portion of San Ysidro Creek near the SY-18 net location were field verified for likeliness as debris receiver and side-cast sites (see Figure 6). There is 0.12-acre (400 linear feet) of storage upstream and 0.73-acre of storage (1,140 linear feet) downstream of SY-18 (Appendix B – Waterways Memorandum). Depth of material in distribution zones around SY-18 ranges from 2.3 feet to 14.3 feet.

All of the distribution zones upstream of the net (Reaches 9 through 12) are accessible to equipment, although Reaches 11 and 12 are closer to the net and therefore, provide more plausible opportunities for receiver sites (Appendix C – SCHR Distribution Zone Notes). Distribution zones downstream of the net (Reaches 13 through 15) also provide plausible receiver sites and can be accessed readily from the staging area on the SCE access road.

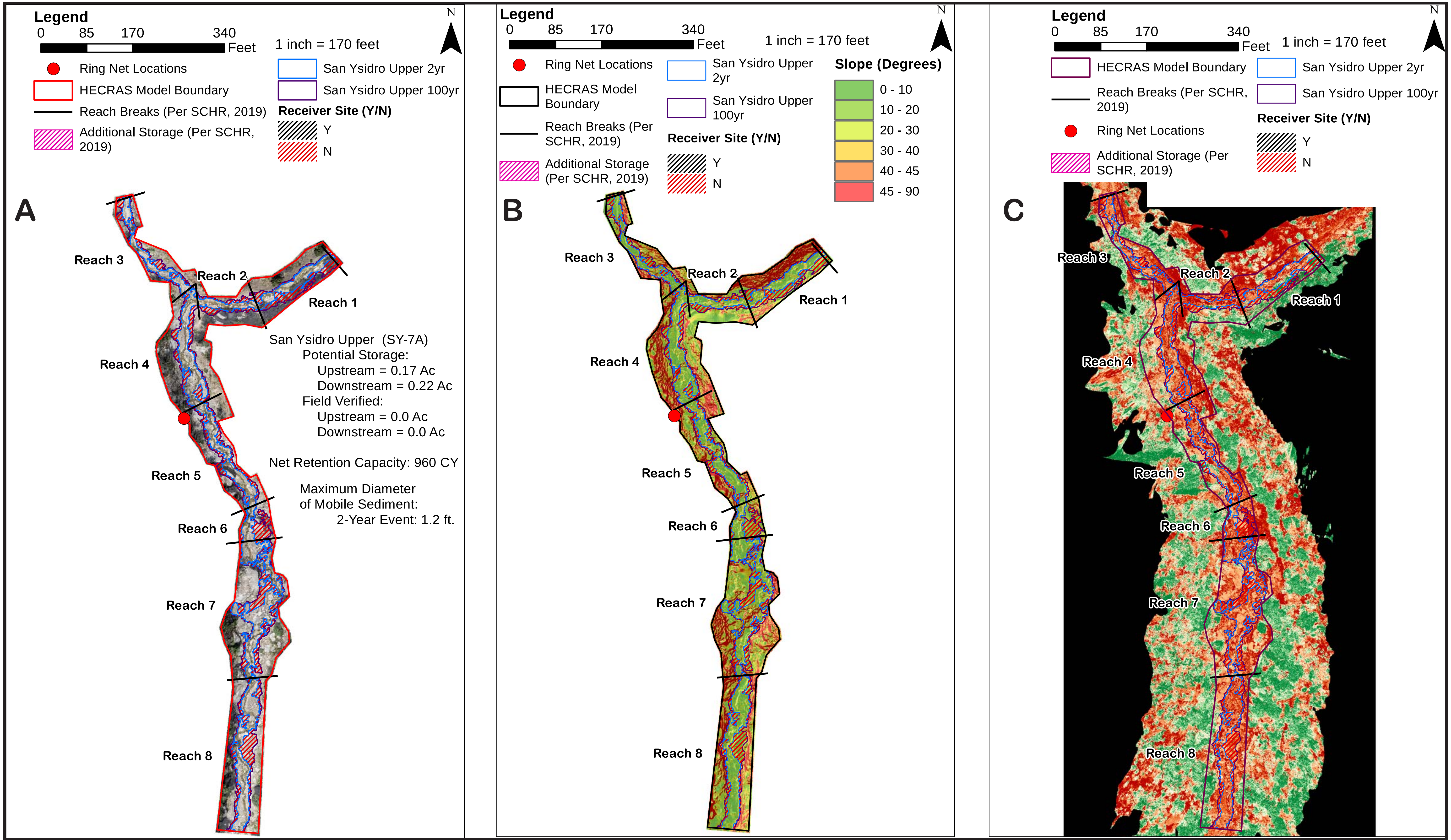
4.2.3 Baseline Cross-sectional Net Profiles

4.2.3.1 Upper San Ysidro (SY-7a)

The upper San Ysidro net (SY-7a) extends 25.4 feet from anchor point to anchor point along the bottom net cable. The net's freeboard discharge area is 65.08 square feet. The maximum depth of the freeboard was 4.9 feet located over the low flow channel water surface (see Figure 7).

4.2.3.2 Lower San Ysidro (SY-18)

The lower San Ysidro net (SY-18) extends 41.0 feet from anchor point to anchor point along the bottom net cable. The net's freeboard discharge area is 101.17 square feet. The maximum depth of the freeboard was 5.5 feet located over the low flow channel water surface (see Figure 8).



San Ysidro Upper (SY-7A)
Potential Storage:
Upstream = 0.17 Ac
Downstream = 0.22 Ac
Field Verified:
Upstream = 0.0 Ac
Downstream = 0.0 Ac

Net Retention Capacity: 960 CY

Maximum Diameter
of Mobile Sediment:
2-Year Event: 1.2 ft.

SY-7a (San Ysidro Upper)
A: Aerial; B: Slope Raster; C: Normalized Difference Vegetation Index (NDVI)

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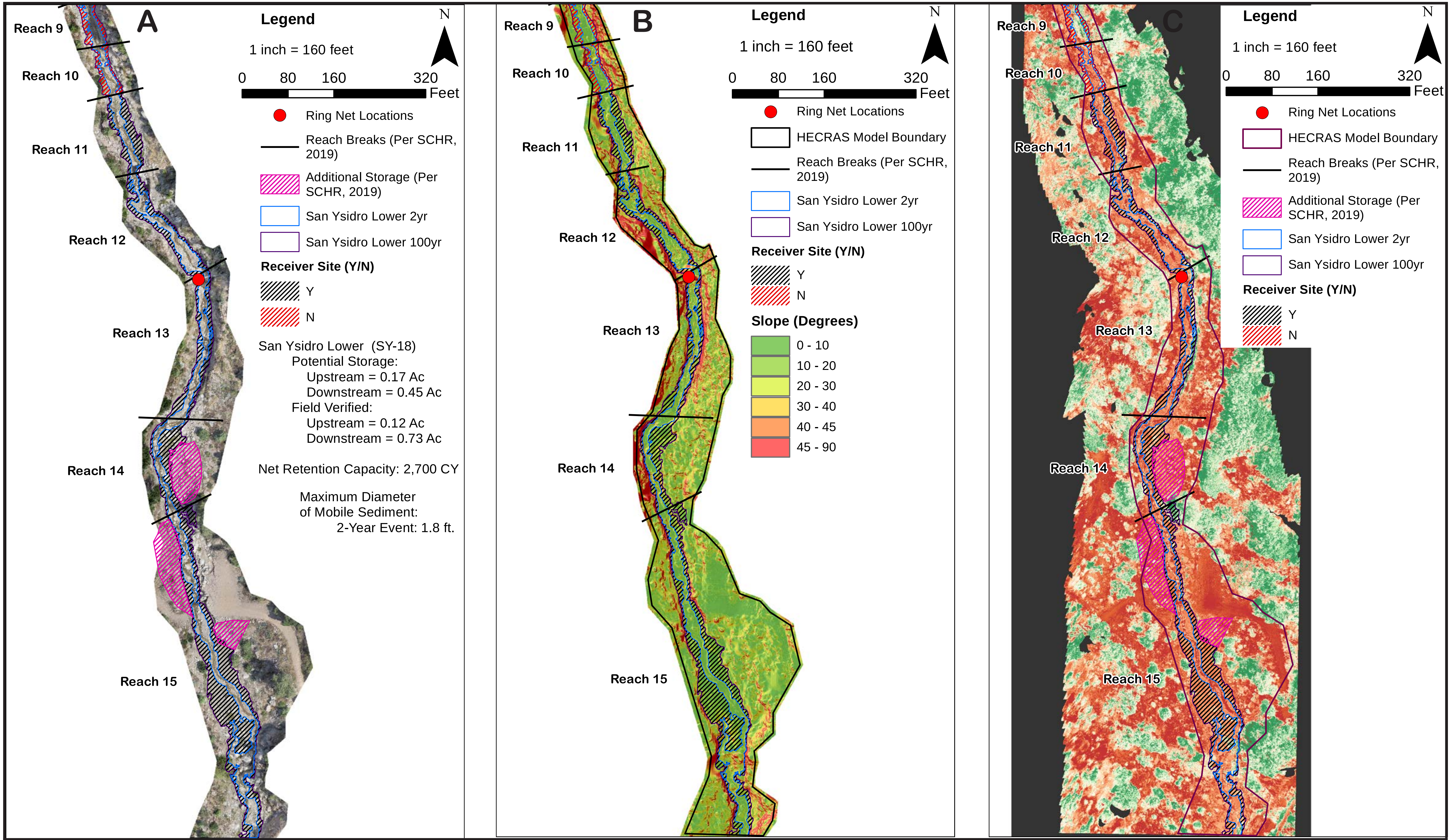
FIGURE
5

HECRAS Model Surface Resolution: 0.5 feet



San Ysidro Lower (SY-18)
Potential Storage:
Upstream = 0.17 Ac
Downstream = 0.45 Ac
Field Verified:
Upstream = 0.12 Ac
Downstream = 0.73 Ac

Net Retention Capacity: 2,700 CY

Maximum Diameter
of Mobile Sediment:
2-Year Event: 1.8 ft.

SY-18 (San Ysidro Lower)
A: Aerial; B: Slope Raster; C: Normalized Difference Vegetation Index (NDVI)

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FIGURE
6

HECRAS Model Surface Resolution: 0.5 feet

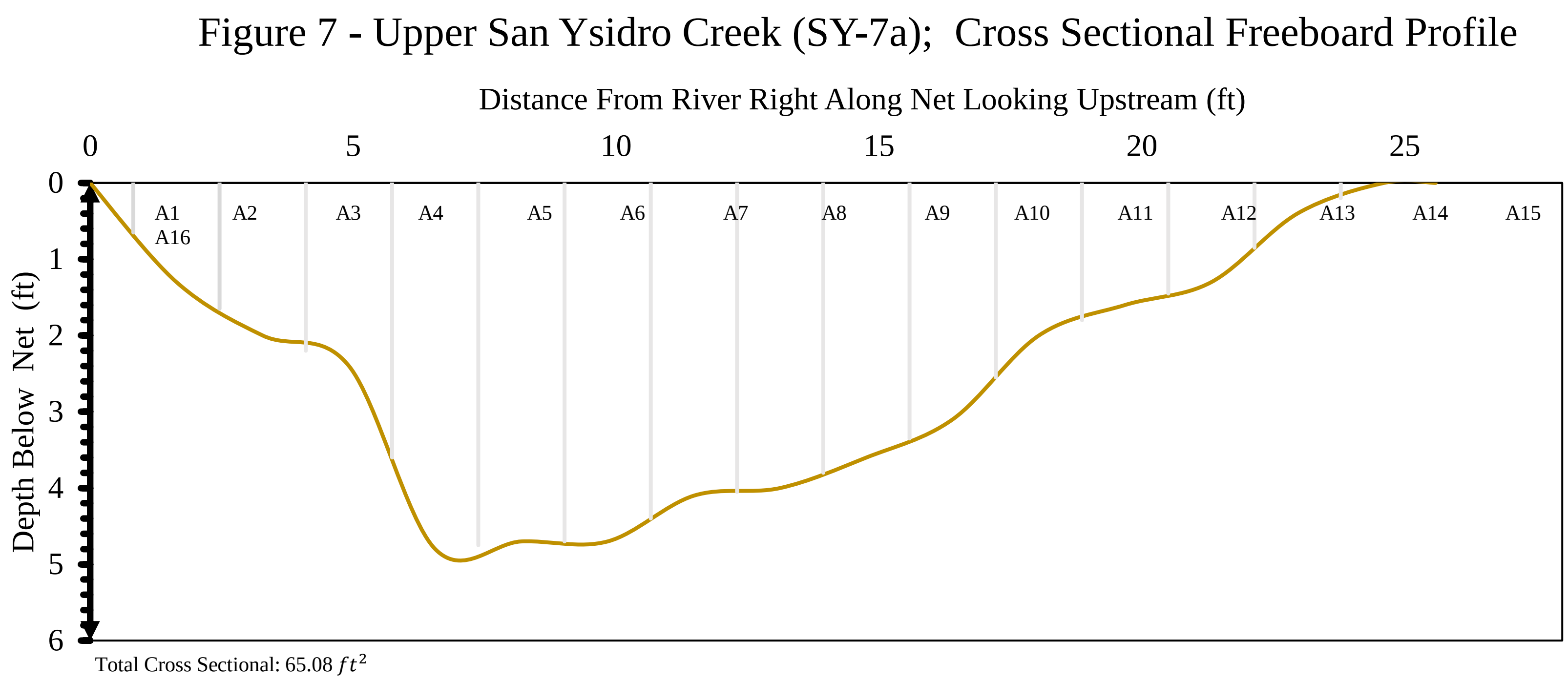
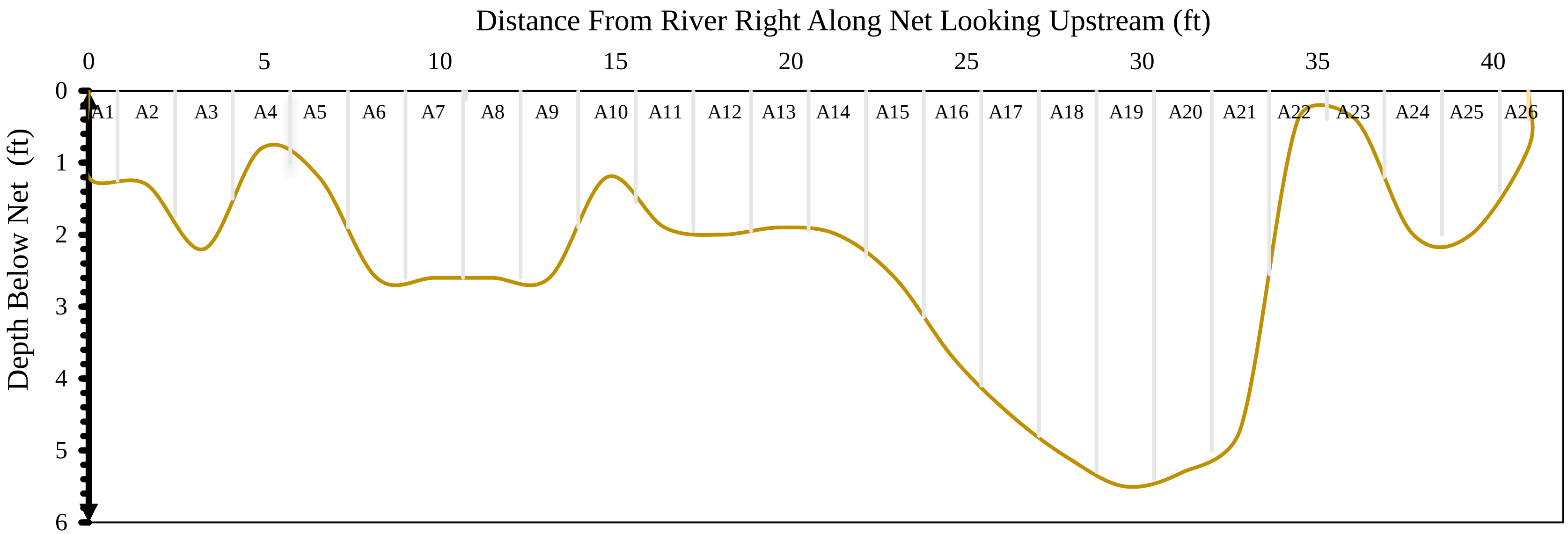


Figure 7 - Upper San Ysidro Creek (SY-7a); Cross Sectional Freeboard Profile
Distance From River Right Along Net Looking Upstream (ft)
0
5
10
15
20
25
Depth Below Net (ft)
0
1
2
3
4
5
6
A1
A16
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
A15
Total Cross Sectional: 65.08 ft^2

Figure 8 - Lower San Ysidro (SY-18); Cross Sectional Freeboard Profile



Total Cross Sectional Area: 101.17 ft^2

4.3 BUENA VISTA CREEK

4.3.1 BV-4 Debris Distribution Zones

Six (6) stream reaches (i.e., Reaches 1 through 6) in the upper portion of Buena Vista Creek near the BV-4 net location were field verified for likeliness as debris receiver and side-cast sites (see Figure 8). There is 0.06-acre (135 linear feet) of storage upstream and 0.27-acre of storage (545 linear feet) downstream of BV-4 (Appendix B – Waterways Memorandum). Depth of material in distribution zones around BV-4 ranges from 4.9 feet to 21.3 feet.

Reach 1 is inaccessible to equipment due to a vertical drop between Reach 1 and Reach 2. Reach 2 is directly upstream of the net at BV-4 and provides opportunities to side-cast material out of the channel (see Figure 9). Reach 3 is inaccessible to equipment due to a 20 foot vertical drop downstream of the net and Reach 4 is considered an unlikely receiver area due to the narrow width of the channel.

Material storage is available in Reaches 5 and 6, downstream of the net. However, equipment access between the net and the downstream receiver sites would require use of the abandoned roadcut (now a public hiking trail) that crosses the creek at the northern portion of Reach 5 (Appendix C – SCHR Distribution Zone Notes).

4.3.2 BV-10 Debris Distribution Zones

Material receiver sites in the lower portion of Buena Vista Creek (Reaches 7-13) are limited to the areas directly upstream of the net at BV-10 (see Figure 10). There is 0.04-acre (250 linear feet) of storage available in Reaches 8 and 9. Depth of material in distribution zones in Reaches 8 and 9 is 17.2 feet (Appendix B – Waterways Memorandum).

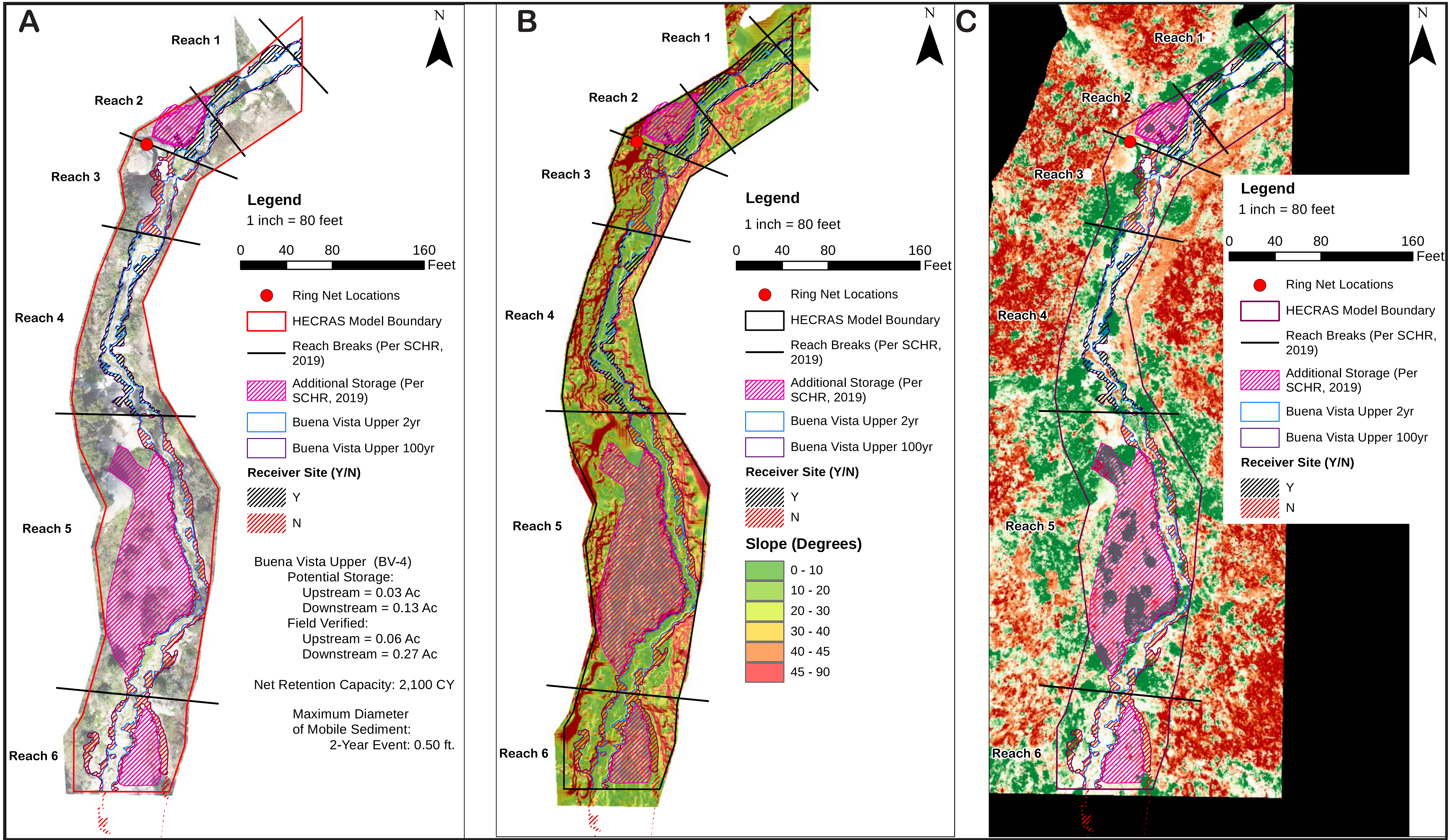
4.3.3 Baseline Cross-sectional Net Profiles

4.3.3.1 Upper Buena Vista (BV-4)

The upper Buena Vista net extends 45.2 feet from anchor point to anchor point along the bottom net cable. The net's freeboard discharge area is 70.70 square feet. The maximum depth of the freeboard was 4.3 feet located over the low flow channel water surface (see Figure 11).

4.3.3.2 Lower Buena Vista (BV-10)

The lower Buena Vista net (BV-10) extends 23.9 feet from anchor point to anchor point along the bottom net cable. The net's freeboard discharge area is 58.77 square feet. The maximum depth of the freeboard was 5.0 feet located over the low flow channel water surface (see Figure 12).



Buena Vista Upper (BV-4)
Potential Storage:
Upstream = 0.03 Ac
Downstream = 0.13 Ac
Field Verified:
Upstream = 0.06 Ac
Downstream = 0.27 Ac

Net Retention Capacity: 2,100 CY

Maximum Diameter
of Mobile Sediment:
2-Year Event: 0.50 ft.

BV-4 (Buena Vista Upper)
A: Aerial; B: Slope Raster; C: Normalized Difference Vegetation Index (NDVI)

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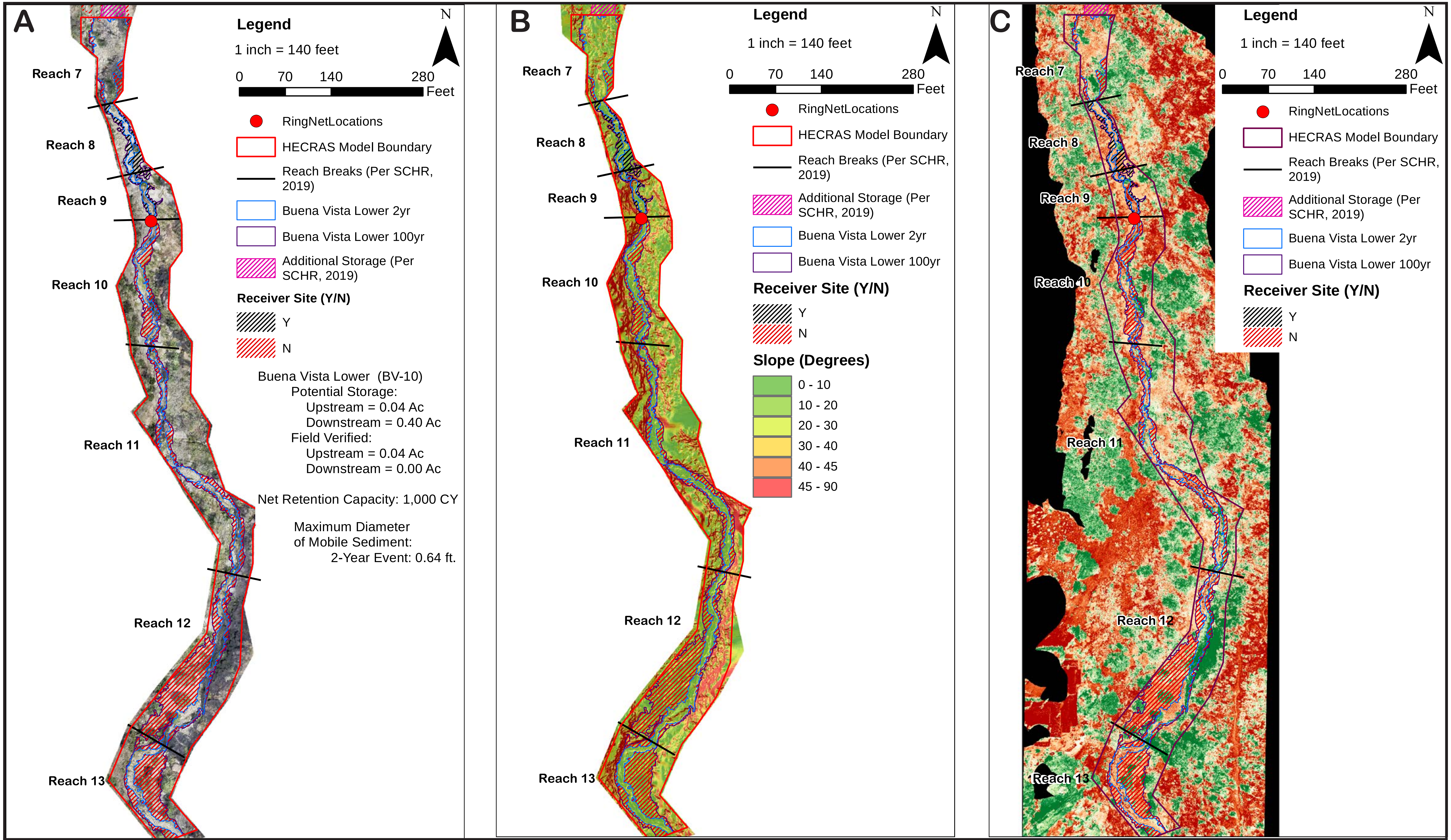
FIGURE
9

HECRAS Model Surface Resolution: 0.5 feet



Buena Vista Lower (BV-10)
Potential Storage:
Upstream = 0.04 Ac
Downstream = 0.40 Ac
Field Verified:
Upstream = 0.04 Ac
Downstream = 0.00 Ac

Net Retention Capacity: 1,000 CY

Maximum Diameter
of Mobile Sediment:
2-Year Event: 0.64 ft.

BV-10 (Buena Vista Lower)
A: Aerial; B: Slope Raster; C: Normalized Difference Vegetation Index (NDVI)

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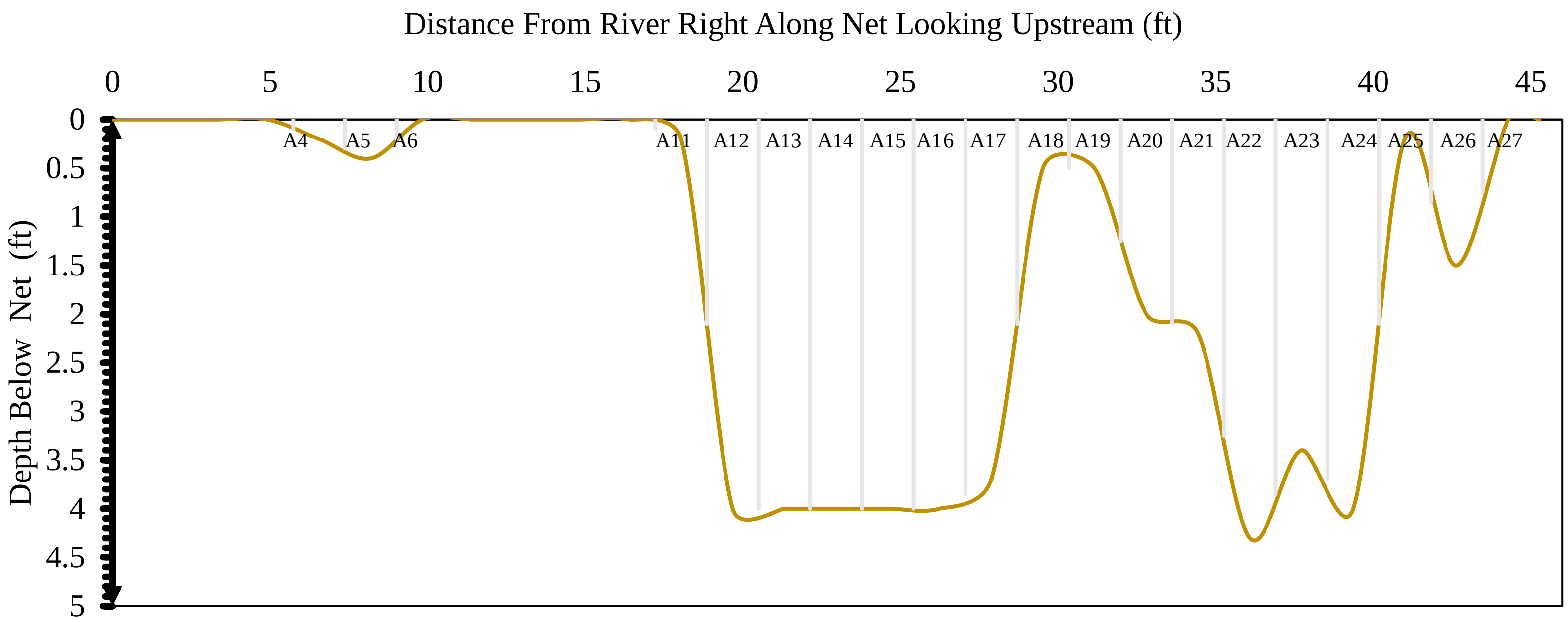
FIGURE
10

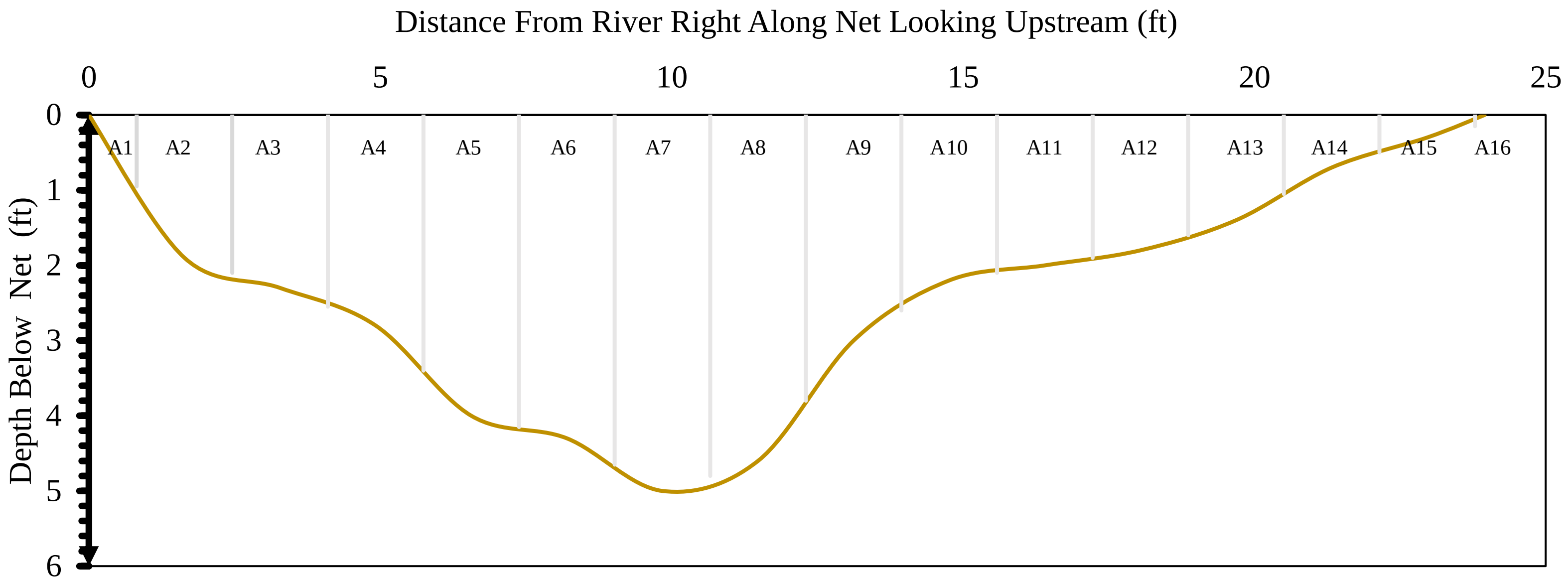
HECRAS Model Surface Resolution: 0.5 feet

Figure 11 - Upper Buena Vista (BV-4); Cross Sectional Freeboard Profile



Total Cross Sectional Area: 70.70 ft^2

Figure 12- Lower Buena Vista (BV-10); Cross Sectional Freeboard Profile



Total Cross Sectional: 58.77 ft^2

5.0 NET REMOVAL

Each net will be removed at the end of 5 years after installation (see Table 1 for Project Start Dates). Net removal will follow the same general work plan and methodology as installation at each of the net locations.

All equipment and materials will be mobilized to and from the existing turn-around and parking area at the top of the Edison Catway access road in San Ysidro Canyon. Equipment and materials will be removed from net locations by helicopter to the San Ysidro Canyon Staging Area. All equipment and materials will then be transported down the access road and loaded into trucks and trailers for final demobilization.

6.0 RECOMMENDED AVOIDANCE AND MINIMIZATION MEASURES

Methods of debris distribution and net management are designed to reduce impacts to biological resources. Work during the rainy season and in the wetted portion of the creek channels will be limited to re-establishment of the low-flow channel and net freeboard. Management of large amounts of accumulated debris will not occur until the dry season (after June 1), when a dewatering and stream diversion system can be designed and installed. This two-phased strategy for debris distribution is meant to reduce impacts to the creek channels as much as possible.

The following avoidance and minimization measures are recommended to further reduce impacts to biological resources that might result from debris distribution and net management. Recommended species-specific and sensitive habitat protection measures are listed first, followed by general construction measures and BMPs.

6.1 SPECIES-SPECIFIC AND SENSITIVE HABITAT AVOIDANCE AND MINIMIZATION MEASURES

- All special-status plant populations (e.g., Plummer’s baccharis, ocellated Humboldt lily, late-flowered mariposa lily) present near works areas shall be flagged for avoidance prior to commencement of work to prevent impacts and/or disturbance. If special-status plant species cannot be avoided during debris distribution, the number of plants impacted shall be documented and appropriate mitigation shall be developed.

- Prior to any debris management, a downstream fish presence/absence assessment will be performed using CDFW California Salmonid Stream Habitat Manual observational protocols. Either a snorkel survey or stream bank observations techniques will be employed depending on the nature of the stream conditions. Surveys will be completed from the uppermost debris basin on each creek to the northernmost (upstream) net. Creeks that do not possess debris basins (i.e., Buena Vista Creek) will be surveyed from the closest downstream fish passage barrier upstream to the northernmost net. If fish are found in any location in the stream channels, regulatory agencies (e.g., CDFW, NMFS) will be notified and consulted regarding when, how, and where to relocate the individuals.

- A qualified biologist shall conduct a pre-construction survey of the net locations and access points for special-status wildlife that have the potential to occur (e.g., coast range newt, two-striped gartersnake). Wildlife observed within work areas will be captured and relocated to suitable habitat outside the construction zone. Incidental take permits are not being requested, so no handling (i.e., capture and relocation) of state- and/or federally-listed species is proposed. If listed species are observed within or near the work area, work will be suspended and the CDFW and USFWS notified.

6.2 GENERAL CONSTRUCTION AVOIDANCE AND MINIMIZATION MEASURES

- An agency-approved biologist will be onsite to conduct wildlife surveys, monitor for permit compliance, and provide oversight of all debris distribution activities.
- If the Project is implemented during the bird nesting season (February 1 to August 31), an agency-approved biologist shall conduct a pre-construction survey of the proposed development envelope and adjacent habitats within 7 days of construction commencement (i.e., mobilization, staging, vegetation clearing, or excavation) to avoid impacts to nesting raptors and other birds. Surveys shall be conducted in all areas within 500 feet of proposed disturbance areas, or a lesser distance if dense vegetation renders a 500-foot survey radius infeasible. If breeding birds with active nests are found prior to (or during) Project construction, an agency-approved biologist shall oversee the establishment of a buffer (prescriptively 300 feet for passerines and 500 feet for raptors) around the nest; no activities will be allowed within the buffer(s) until the young have fledged from the nest or the nest fails.
- Prior to the start of work, an agency-approved biologist shall provide worker orientation for all construction contractors (including site supervisors, equipment operators, and laborers) which emphasizes the presence of special-status species within the creek channels and/or adjacent to the net locations, identification of those species, their habitat requirements, applicable regulatory policies and provisions regarding their protection, measures being implemented to avoid and/or minimize impacts, and penalties for noncompliance will be conducted. No staging of equipment or construction supplies shall occur prior to the tailgate meeting.
- As necessary, dewatering and stream diversion plan sheets will be prepared by a qualified Contractor based on the conditions/material at each net after a debris flow. Dewatering and stream diversion plans will be submitted for review and approval by the agencies prior to mobilization of heavy equipment into the creek channels.
- All construction equipment shall be limited to designated work and staging areas. Minor adjustments may be made in the field in consideration of topography and current flow conditions, with the approval of the biological monitor.
- No equipment, diesel fuel, or grout will be staged or stored within the stream channel. Fueling of equipment will not be done within 100 feet of the active channel.
- BMPs (e.g., silt fencing, straw wattles, filter fabric, etc.) shall be installed in the stream channel or around adjacent habitat as directed by the biological monitor or geohydrologist.

- Stationary equipment and fluid storage vessels will be equipped with secondary containment. A spill containment and cleanup kit will be onsite at each location while work is in progress.
- No construction shall occur within 24 hours of a National Weather Service forecasted 0.25-inch rain event.
- All motorized equipment used shall be maintained in proper working condition and shall be free of drips and leaks of coolant, hydraulic, and petroleum products. No equipment shall be used for the Project unless such equipment is free of leaks and drips. Equipment will be power-washed before mobilization to the work site.
- Trash and food items will be kept in closed containers and removed daily.
- Sediment controls will be installed downstream from the work area when accumulated material from behind the net is redistributed. Once the low-flow channel has been re-established, soil and rock will be cast to the side of the active channel. If feasible, a temporary retention basin may be used to control turbidity.
- Rocks, boulders, and coarse materials will be redistributed in a manner that mimics natural stream deposition and is favorable to wildlife. Re-distribution of accumulated material will be done under the supervision of a qualified biologist and/or geohydrologist.

7.0 LITERATURE CITED

County of Santa Barbara Planning and Development Department (County). 2018. Emergency Permit (18EMP-00000-00007), Montecito Debris Flow Protection Plan. December 21.

KANE Geotech, Inc. (KANE). 2018. Revised Montecito Debris Flow Mitigation, General Report of Findings. Montecito, California. Prepared for the Partnership for Resilient Communities. December 12, 2018.

National Weather Service (NWS). 2018. National Weather Service Debris Flow Warning System. Los Angeles/Oxnard Office. Accessed online: http://www.scag.ca.gov/programs/Documents/Earthquake/RAFwebinar_NWSdebrisFlowWarningSystem.pdf

Storrer Environmental Services, LLC. (SES). 2019. Biological Resources Assessment for the Montecito Debris Flow Mitigation Project, Santa Barbara County, California. Revised January 2019.

U.S. Army Corp of Engineers (USACE). 2019. Hydrologic Engineering Center River Analysis System (HEC-RAS). Accessed online: https://www.hec.usace.army.mil/software/hec-ras/. September 2019.

U.S. Geological Survey (USGS). 2019. StreamStats Online Software. Accessed online: https://streamstats.usgs.gov/ss/. September 2019.

APPENDIX A

SITE PHOTOGRAPHS

Net Location:	**Date of Photo:**
CS-11	06/11/2019

Description:

View looking upstream at CS-11net following construction.

Net Location:	**Date of Photo:**
CS-11	06/11/2019

Description:

View looking downstream at CS-11 net following construction.

Net Location: CS-18

Date of Photo: 06/06/2019

Description:

View looking upstream at CS-18 net following construction.

Net Location: CS-18

Date of Photo: 06/06/2019

Description:

View looking downstream at CS-18 following construction.

Height of the net at CS-18 ranges from 36 to 57 inches above the creek channel.

Net Location:	**Date of Photo:**
SY-18	06/04/2019

Description:

View looking upstream at SY-18 following net construction.

Net Location:	**Date of Photo:**
SY-18	5/30/2019

Description:

View looking downstream at freeboard under SY-18 after net construction.

Height of the net at SY-18 ranges from 20 to 50 inches above the creek channel.

Net Location:	**Date of Photo:**	
BV-4	06/11/2019	
Description: View looking downstream at BV-4 following construction.		

Net Location:	**Date of Photo:**	
BV-4	06/11/2019	
Description: View looking upstream at BV-4 following construction.		

Net Location:	**Date of Photo:**
BV-10	09/20/2019

Description:

Downstream view of BV-10 location during pre-construction survey.

Net Location:	**Date of Photo:**
SY-7a	12/07/2018

Description:

Upstream view of SY-7a net location during biological survey.

APPENDIX B

WATERWAYS MEMORANDUM

WATERWAYS
CONSULTING, INC.

Ecological Restoration Design ~ Civil Engineering ~ Natural Resource Management

November 25, 2019

The Partnership for Resilient Communities
Pat McElroy
O.O. Box 5476
Montecito, CA 93150

RE: Montecito Ring Net Storage Potential Modeling Memorandum - Revised

Mr. McElroy,

Waterways Consulting Inc.'s (Waterways) role in the permitting phase of the Montecito Ring Net project is to assist in identifying preliminary locations to deposit sediment removed from the net locations following a high flow event that mobilizes sediment and accumulates behind the Ring Nets. The approach to identifying preliminary long-term sediment storage areas consisted of developing a two-dimensional model for each Ring Net site and delineating the areas that fall between the 2-year water surface and the 100-year water surface. This area represents locations where there is the potential to store the deposited sediment long-term based on the idea that higher flows will mobilize the stored material over time without resulting in chronic levels of turbidity during more frequent events. This memorandum was prepared to describe the approach used to generate the potential storage polygons and summarize the results.

The process of identifying potential sediment storage sites consisted of the following steps:

1. Running a 2-dimensional hydraulic model to determine the spatial extent of the 2-year and 100-year flood events through each Ring Net project area,
2. Develop a potential sediment storage polygon for each Ring Net site that represents the area that falls between the 2-year and 100-year event,
3. Estimate the debris flow volume stored upstream of each Ring Net following a debris flow or debris laden flood event using the criteria provided by the geotechnical engineer,
4. Estimate an average depth for the material in the potential storage areas based on the maximum volume deposited upstream of the Ring Net following a debris flow or debris laden flood event,

5. Identify a sediment size threshold based on biological criteria to separate the deposited material into volumes of material that would or would not cause impairment if that were relocated below the 2-year flood and were available for immediate mobilization,
6. Estimate the percentage of the deposited material that is greater or less than the sediment size threshold (from Step 5) that would need to be moved and redeposited downstream of the Ring Net based on debris flow sediment characteristics measured by Kean and others (Kean et al, 2019) following the January 2018 debris flows, and
7. Based on the areas delineated in Step 2, calculate the average depth of storage assuming all potential storage areas are utilized for both the total volume of debris flow sediments and the adjusted volume of sediments per Step 6.

Following the determination of potential sediment storage areas by Waterways, South Coast Habitat Restoration (SCHR) conducted a field verification to determine likely storage areas versus potential storage areas based on access constraints and other local site characteristics such as presence of vegetation and terrain. In addition, the field-based verification identified additional potential storage areas that occur outside of the 100-year flood event that may be more practical to utilize. That assessment is described in a separate document (SCHR 2019).

For the hydraulic modeling effort (Step 1), high resolution topographic data, provided by Santa Barbara County and Sandshed Consulting, was utilized along with 2-year and 100-year estimated discharges calculated using StreamStats, an online tool created by the U.S. Geological Survey (USGS). Estimated 2-year and 100-year discharges are shown below in Table 1. Manning's roughness coefficients were determined based on field visits and published literature values and were assigned as 0.035 for the channel and 0.07 for the floodplain. The polygons representing the areas between the 2-year and 100-year events were delineated based on the modeled spatial extent of the two events (Step 2; see attached Figures).

Maximum debris flow storage volumes (Step 3) were calculated for each Ring Net site using either the LiDAR data or the aerial topographic data along with design criteria provided by the geotechnical engineer. The design criteria used for this analysis included the location of the Ring Net, the height of the Ring Net, and the slope of the depositional surface. These data were used to generate estimated debris flow storage volumes upstream of the Ring Nets by calculating the volume between the existing ground and a sloped plane representing the slope of the depositional surface. The results of this analysis are summarized in Table 2. The volume of debris flow sediments was then divided by the square feet of the potential sediment storage sites to estimate an average depth of sediment for areas upstream, downstream and total in relation to the Ring Net site (Step 4; Table 2).

Table 1: Estimate peak event discharges for each Ring Net site.

Recurrence Event	**Cold Spring West (CS-18)**	**Cold Spring East (CS-11)**	**San Ysidro Upper (SY-7A)**	**San Ysidro Lower (SY-18)**	**Buena Vista Upper (BV-4)**	**Buena Vista Lower (BV-10)**
2	74.8	63.1	95.7	91.3	31.5	31.5
100	1380	1120	1597	1830	418	418
*Developed using USGS StreamStats program; All Flows in cubic feet per second (cfs)						

In recognition of the potential for the Ring Nets to starve downstream reaches of valuable sediment that is vital to maintain physical habitat and biological process an approach was developed to allow the coarser grained portion of the material deposited upstream of the Ring Nets to be placed within the channel below the 2-year flood threshold (Step 5). The biological sediment size criteria was set based on research conducted by Kondolf (2000) and others that showed that impairment starts to occur in spawning beds when grain sizes less than 6 millimeters (0.23 inches) in diameter increase. Based on Kondolf's research a threshold of 6mm has been adopted as an impairing sediment size in Total Maximum Daily Load (TMDL) regulatory documents for steelhead listed watersheds, such as the San Lorenzo River in Santa Cruz County, by the Regional Water Quality Control Board.

Utilizing percent finer curves generated for recent debris flows deposits from the January 2018 event and the biological grain size criteria the portion of the debris flow deposit that would need to be removed from upstream of the Ring Nets and deposited downstream of the Ring Nets was calculated (Step 6). Kean and others (Kean et al, 2019) found that the debris flow deposits from the January 2018 event were bimodal and consisted of smaller material less than 4 inches in diameter, and boulders greater than 18 inches. Kean provided characterized grain size distribution of the finer fraction of the debris flow deposit at five location. Averaging these sites found that 80% of the finer fraction was less than the 6-millimeter threshold.

Unfortunately, the data published by Kean characterized the finer and coarser fraction of the debris flow deposits separately, meaning that the percentage of material less than 6-mm as a fraction of the entire debris flow deposit is not known. Given that the data does not provide an estimate of the percentage of the debris flow deposit below the threshold we decided to report a range of volumes that will need to be placed above the 2-year event by assuming the boulder fraction could be anywhere between 50% and 10% of the total delivered load during a debris flow event (Table 2). The numbers reported in Table 2 provide storage depths based on estimates of the volume of material that would be less than the sediment size threshold of 6-mm given a range of boulder volumes (Step 7; Table 2).

References

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Kondolf, G. Mathias, 2000, “Assessing Salmonid Spawning Gravel Quality”, Transactions of the American Fisheries Society, 129:pgs. 262-281, 2000.

Table 2: Estimates of potential storage capacity based on modeling results.

Site Number	Site Name	Net Retention Capacity (cubic yards)	Total Potential Storage (Acreage)			Total Potential Storage (Length in feet)			Depth of Storage at Max Capacity (feet)			Size of Biological Sediment Criteria (mm)	Average Depth of Storage for Sediments Finer than Biological Criteria (in feet)				
			Upstream	Downstream	Total	Upstream	Downstream	Total	Upstream	Downstream	Total		Boulders = 50%	Boulders = 40%	Boulders = 30%	Boulders = 20%	Boulders = 10%
CS-18	Cold Springs West[1]	1,300	0.14	0.49	0.635	305	565	870	5.7	1.6	1.3	6	0.4	0.5	0.6	0.8	0.9
CS-11	Cold Springs East[1]	2,300	0.10	0.12	0.22	435	465	900	14.9	11.5	6.5	6	1.9	2.6	3.2	3.9	4.5
BV-4	Buena Vista Upper	2,100	0.03	0.13	0.166	135	780	915	40.7	9.7	7.8	6	2.4	3.1	3.9	4.7	5.5
BV-10	Buena Vista Lower	1,000	0.04	0.40	0.433	250	1155	1405	17.2	1.6	1.4	6	0.4	0.6	0.7	0.9	1.0
SY-7A	San Ysidro Upper	960	0.17	0.22	0.389	790	980	1770	3.6	2.7	1.5	6	0.5	0.6	0.8	0.9	1.1
SY-18	San Ysidro Lower	2,700	0.17	0.45	0.62	590	1140	1730	10.0	3.7	2.7	6	0.8	1.1	1.3	1.6	1.9

1 - Does not include 0.34 acreas of storage located downstream of confluence of Cold Spring East and West

Estimates of Actual Sediment Storage Capacity based on Field Verification of Modeling Results

Site Number	Site Name	Net Retention Capacity (cubic yards)	Total Potential Storage (Acreage)			Total Potential Storage (Length)			Depth of Storage at Max Capacity (feet)			Size Threshold for Retaining Sediment in Channel (mm)	Average Depth of Storage for Sediments Finer than Size Criteria (in feet)				
			Upstream	Downstream	Total	Upstream	Downstream	Total	Upstream	Downstream	Total		Boulders = 50%	Boulders = 40%	Boulders = 30%	Boulders = 20%	Boulders = 10%
CS-18	Cold Springs West[1]	1,300	0.17	0.49	0.66	215	565	780	4.7	1.6	1.2	6	0.4	0.5	0.6	0.7	0.8
CS-11	Cold Springs East[1]	2,300	0.11	0.11	0.22	230	105	335	13.0	12.5	6.4	6	1.9	2.5	3.2	3.8	4.5
BV-4	Buena Vista Upper	2,100	0.06	0.27	0.33	135	545	680	21.3	4.9	4.0	6	1.2	1.6	2.0	2.4	2.8
BV-10	Buena Vista Lower	1,000	0.04	0	0.04	250	0	250	17.2	-	17.2	6	5.2	6.9	8.6	10.3	12.1
SY-7A	San Ysidro Upper	960	0	0	0	0	0	0	-	-	-	6	-	-	-	-	-
SY-18	San Ysidro Lower	2,700	0.12	0.73	0.85	400	1140	1540	14.3	2.3	2.0	6	0.6	0.8	1.0	1.2	1.4

1 - Does not include 0.55 acreas of storage located downstream of confluence of Cold Spring East and West

APPENDIX C

SCHR DISTRIBUTION ZONE NOTES

SCHR

The Partnership for Resilient Communities
Pat McElroy
O.O. Box 5476
Montecito, CA 93150

October 22, 2019

RE: Debris Distribution & Net Management Plan – Potential Storage Areas Field Verification Approach & Notes

Summary: On October 16, 2019 South Coast Habitat Restoration (SCHR) conducted a field investigation to evaluate the potential sediment storage areas identified by Waterways Consulting, Inc. (Waterways) via their computer generated hydraulic models described in Appendix B. The stream reaches, upstream and downstream of the net locations, were investigated for the likeliness to become a "receiver site" to place accumulated debris. All, but net SY-7a, have receiver sites in the immediate vicinity of the net. The following is a brief description of the approach used for the investigation and accompanied field notes.

Approach: Potential storage areas identified in the preliminary version of the hydraulic models prepared by Waterways, were ground-truthed by SCHR and evaluated for likeliness to become a receiver site. Likeliness was determined by evaluating physical landscape characteristics, accessibility and mobility of heavy equipment, vegetation presence, recreational trails and other infrastructure such as waterlines, trails, and roads. In addition to evaluating previously identified sites, SCHR identified additional receiver site locations based on the same likeliness characteristics. After the field investigation, the findings were digitized by SCHR in ArcMap and sent to Waterways to include in further analysis of storage capacities for confirmed receiver sites. The tables in the Waterways Memorandum (Appendix B) describe the results from their analysis. Lastly, sites were also evaluated for their likeliness to be 'side-cast' sites. That is, sites likely to retain debris or have debris placed during the wet season if such a debris accumulation event occurs. Side-cast sites were located in reaches in the immediate net proximity.

Field Notes: Notes and photographs describing the stream reaches in each creek (i.e., Cold Spring, San Ysidro, and Buena Vista) are provided below.

Cold Spring Creek

Cold Spring – Reach 1

Receiver Site Likeliness:	Unlikely, due to equipment access
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment unlikely to be mobile within this reach unless debris wedge aggrades channel upstream to this spot
Other Notes & Considerations:	Old disconnected high flow channel; likely disconnected via debris flow event; main channel adjacent is highly incised
Photos	 (Aspect: South, looking downstream)

Cold Spring – Reach 2

Receiver Site Likeliness:	Plausible
Side-cast Site Likeliness:	Likely
Equipment Access Notes:	Equipment likely to be mobile within this reach is event of debris accumulation
Other Notes & Considerations:	Newly identified zone is the same reach 1 high flow channel, however, it is closer in elevation to main channel within this reach.
Photos	 Abandoned high flow channel comes closer to grade in this reach (Aspect: South, looking downstream)

Cold Spring – Reach 3

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment unlikely to be mobile within this reach
Other Notes & Considerations:	Vertical bank and heavy incision would likely confines flows here and offer little room for redistribution
Photos	n/a

Cold Spring – Reach 4

Receiver Site Likeliness:	Likely
Side-cast Site Likeliness:	Likely
Equipment Access Notes:	Equipment likely to be mobile within this reach
Other Notes & Considerations:	Multiple overflow channels exist within this reach. The low flow channel is on river left and high flow channel is located on river right. Wide portion of the canyon and a likely depositional zone. Additional storage identified.
Photos	 (Aspect: South, looking downstream)

Cold Spring – Reach 5

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Likely
Equipment Access Notes:	Equipment likely to be mobile within this reach
Other Notes & Considerations:	A water pipe is adjacent to the stream on the left stream bank before crossing over and downstream the net to right canyon wall where is stay visible before going sub-surface. Considerations at this site should be made when placing material adjacent to the water line.
Photos	 (Aspect: East, looking at left bank)

Cold Spring – Reach 6

Receiver Site Likeliness:	Likely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment likely to be mobile within this reach
Other Notes & Considerations:	Low lying floodplain bench, flat grade, wider portion of canyon
Photos	 (Aspect: South, looking downstream)

Cold Spring – Reach 7

Receiver Site Likeliness:	Likely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment likely to be mobile within this reach.
Other Notes & Considerations:	Largest zone available for distribution of debris. More identified storage potential outside of 100 year flood. River right storage capacity could be affected by trail proximity. River left storage area contains various overflow channels before the confluence of the east and west fork cold spring creek.
Photos	 (Aspect: South, looking downstream)  (Aspect: South, looking downstream)

Cold Spring – Reach 8

Receiver Site Likeliness:	Plausible
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment likely to be mobile within this reach, however, access from the nets will rely on mobility down a vertical drop near the confluence.
Other Notes & Considerations:	1 newly identified areas of storage potential within this reach. New area is a floodplain bench that is being protected from erosion by a 20ft+ diameter boulder. This is located just below the confluence and trail creek crossing.
Photos	 Newly identified areas is located on river right.

Cold Spring – Reach 9

Receiver Site Likeliness:	Plausible
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment likely to be mobile within this reach, however, access from the nets will rely on mobility down a vertical drop near the confluence.
Other Notes & Considerations:	Floodplain bench with cobble deposits; bedrock on river right, high flow channel on river left
Photos	 (Aspect: South, looking downstream)

Cold Spring – Reach 10

Receiver Site Likeliness:	Likely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment unlikely to be mobile within this reach, however, however, access from the nets will rely on mobility down a vertical drop near the confluence.
Other Notes & Considerations:	There are 2 newly identified receiver sites in this reach. The first is located in the 2-year modeled event, however, the site is characterized by a fork in the creek that splits a large depositional gravel bar. On this bar is a potential receiver site. Downstream of that, there is another floodplain bench that potential storage capacity, however access could be limited.
Photos	

San Ysidro Creek

San Ysidro – Reach 1

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Plausible
Equipment Access Notes:	Equipment unlikely to be mobile within this reach unless debris wedge aggrades channel upstream to this spot. Access also confined at confluence.
Other Notes & Considerations:	Bedrock channel; big vertical drop that separates reach 1 from reach 2
Photos	 (Aspect: South, looking downstream)

San Ysidro – Reach 2

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Plausible
Equipment Access Notes:	Equipment unlikely to be mobile within this reach unless debris wedge aggrades channel upstream to this spot. Access also confined at confluence.
Other Notes & Considerations:	One pocket available for storage. Trail crosses creek at lower end on this reach
Photos	 (Aspect: South, looking downstream)

San Ysidro – Reach 3

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Plausible
Equipment Access Notes:	Equipment unlikely to be mobile within this reach unless debris wedge aggrades channel upstream to this spot.
Other Notes & Considerations:	Bedrock channel; big vertical drops
Photos	n/a

San Ysidro – Reach 4

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Plausible
Equipment Access Notes:	Equipment unlikely to be mobile within this reach unless debris wedge aggrades channel upstream to this spot.
Other Notes & Considerations:	Minimal space for storage; tricky mobility constraints; trail on river left
Photos	 (Aspect: South, looking downstream)

San Ysidro – Reach 5

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment unlikely to be mobile within this reach. Multiple big vertical drops (as many as 3 30ft+ drops).
Other Notes & Considerations:	Steep channel gradient, big drops, no equipment mobility
Photos	 (Aspect: North, looking upstream)

San Ysidro – Reach 6

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment unlikely to be mobile within this reach. Multiple big vertical drops (as many as 3 30ft+ drops).
Other Notes & Considerations:	Steep channel gradient, big drops, no equipment mobility
Photos	 One of many representative channel gradient imepdiments (Aspect: North, looking upstream)

San Ysidro – Reach 7

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment unlikely to be mobile within this reach. Multiple big vertical drops (as many as 3 30ft+ drops).
Other Notes & Considerations:	Steep channel gradient, big drops, no equipment mobility
Photos	 (Aspect: North, looking upstream)

San Ysidro – Reach 8

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment unlikely to be mobile within this reach. Multiple big vertical drops (as many as 3 30ft+ drops).
Other Notes & Considerations:	Steep channel gradient, big drops, no equipment mobility
Photos	 (Aspect: South, looking downstream)

San Ysidro – Reach 9

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment likely to be mobile within this reach, however, this location is the furthest upstream reach of SY-18 and would unlikely be used for placement of material
Other Notes & Considerations:	Steep clustered boulders
Photos	 (Aspect: South, looking downstream)

San Ysidro – Reach 10

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment likely to be mobile within this reach, however, this location is the furthest upstream reach of SY-18 and would unlikely be used for placement of material
Other Notes & Considerations:	Steep clustered boulders
Photos	 (Aspect: South, looking downstream)

San Ysidro – Reach 11

Receiver Site Likeliness:	Plausible
Side-cast Site Likeliness:	Likely
Equipment Access Notes:	Equipment likely to be mobile within this reach, however, this location is the furthest upstream reach of SY-18 and would unlikely be used for placement of material
Other Notes & Considerations:	First area available for SY-18 plausible for material storage
Photos	n/a

San Ysidro – Reach 12

Receiver Site Likeliness:	Plausible
Side-cast Site Likeliness:	Likely
Equipment Access Notes:	Equipment likely to be mobile within this reach
Other Notes & Considerations:	Bedrock channel with relatively flat grade
Photos	 Bedrock channel located just around the river bend (Aspect: South, looking downstream)

San Ysidro – Reach 13

Receiver Site Likeliness:	Plausible
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment likely to be mobile within this reach, however it is narrow, ramp likely needs to be built up to floodplain bench
Other Notes & Considerations:	One newly identified storage zone located on river right floodplain bench
Photos	 (Aspect: South, looking downstream)

San Ysidro – Reach 14

Receiver Site Likeliness:	Likely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment likely to be mobile within this reach. Very close to net construction staging area.
Other Notes & Considerations:	One more additionally identified storage areas, creek fans out into wider portion of canyon; depositional zone, lots of area to work.
Photos	 (Aspect: South, from the Edison Catway staging area looking downstream)

San Ysidro – Reach 15

Receiver Site Likeliness:	Likely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment likely to be mobile within this reach. Very close to net construction staging area.
Other Notes & Considerations:	Two more additionally identified storage areas, creek fans out into wider portion of canyon; depositional zone, lots of area to work.
Photos	n/a

Buena Vista

Buena Vista – Reach 1

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment unlikely to be mobile with this reach
Other Notes & Considerations:	n/a
Photos	 (Aspect: South, looking downstream)  (Aspect: South, looking downstream)

Buena Vista – Reach 2

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Likely
Equipment Access Notes:	Equipment likely to be mobile if placement of equipment occurs on accumulated debris wedge. Potential for temporary access and mobility along trail route.
Other Notes & Considerations:	Buena Vista Trail in located on River Left on terrace/potential abandoned roadcut
Photos	 (Aspect: West, looking right bank)

Buena Vista – Reach 3

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment unlikely to be mobile within this reach due to large 20ft drop that partitions reach 2 & 3
Other Notes & Considerations:	Limited space for material; highly vegetated
Photos	 (Aspect: North, looking upstream)

Buena Vista – Reach 4

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment unlikely to be mobile within this reach; many vertical drops and very narrow part of canyon
Other Notes & Considerations:	Terminus of this reach is trail creek crossing
Photos	 Reach is located upstream of trail crossing (Aspect: Northwest, looking upstream)

Buena Vista – Reach 5

Receiver Site Likeliness:	Plausible; need coordination with trails authority
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment likely to be mobile within this reach with temporary access route installed from net along the current trail path to this zone.
Other Notes & Considerations:	From the net, Buena Vista Trail in located on River Left on terrace/potential abandoned roadcut until crossing the creek. The trail continues on a floodplain terrace on river right for several hundred more feet. This floodplain terrace is likely the best receiver site in close proximity to the BV-4. Also located on the terrace is large boulder (25-35ft high, with rock climbing bolts drilled into the rock and is potentially used for recreation purposes)
Photos	 Looking downstream at river right terrace with Buena Vista Trail bifurcating the terrace (Aspect: South). Rock climbing boulder in right foreground.

Buena Vista – Reach 6

Receiver Site Likeliness:	Plausible; need coordination with trails authority
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment likely to be mobile within this reach using same trail path described above
Other Notes & Considerations:	Trail crosses creek again to the river left and continues along toe of canyon wall before migrating back on depositional river bar in middle of the canyon
Photos	 Aspect: South, looking downstream, trail on river left

Buena Vista – Reach 7

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment unlikely to be mobile within this reach due to vertical drops within channel
Other Notes & Considerations:	Furthest upstream from BV-10 and further site downstream from BV-4
Photos	n/a

Buena Vista – Reach 8

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Likely, construction staging area likely a good location
Equipment Access Notes:	Equipment unlikely to be mobile beyond this reach
Other Notes & Considerations:	A bedrock chute partitions reach 7 from reach 8. It will likely remain impassable to equipment unless a very large debris accumulation event occur which provided access via the accumulated debris wedge
Photos	 Construction of BV-10 in progress (Aspect: South, looking downstream)

Buena Vista – Reach 9

Receiver Site Likeliness:	Plausible
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment has the potential to be mobile within this reach. The reach is relatively narrow with some potential boulder impediments
Other Notes & Considerations:	n/a
Photos	n/a

Buena Vista – Reach 10

Receiver Site Likeliness:	Unlikely
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment unlikely to access or be mobile within this reach
Other Notes & Considerations:	Tight creek corridor with various impediments
Photos	n/a

Buena Vista – Reach 11

Receiver Site Likeliness:	Plausible; relatively further downstream
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment likely to be mobile within this reach
Other Notes & Considerations:	Decent vegetation cover; very flat floodplain terrace
Photos	 (Aspect: South, looking downstream)

Buena Vista – Reach 12

Receiver Site Likeliness:	Plausible
Side-cast Site Likeliness:	Unlikely
Equipment Access Notes:	Equipment likely to be mobile with this reach
Other Notes & Considerations:	Fairly vegetated, must cross creek from reach 11 to access this site
Photos	n/a

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BIOLOGICAL RESOURCES ASSESSMENT
FOR THE
MONTECITO DEBRIS FLOW MITIGATION PROJECT
SANTA BARBARA COUNTY, CALIFORNIA

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October 2018

[Revised January 2019]

EXECUTIVE SUMMARY

The following Biological Resources Assessment (Assessment) presents the results of the biological surveys and background investigation conducted by Storrer Environmental Services, LLC (SES), on behalf of The Partnership for Resilient Communities (TPRC). The Assessment is intended to support applications for regulatory agency permits to install thirteen (13) debris flow nets in four creek corridors in Montecito (Cold Spring Creek, , San Ysidro Creek, Buena Vista Creek, and Romero Creek) (Subject Creeks), Santa Barbara County, California.

The Project involves installation of flexible debris flow nets. The basic debris flow protection system consists of a steel ring net engineered to resist the velocities and dynamic and static pressures unique to debris flows. Support ropes are installed into channel banks and transfer debris impact and pressure loads from ring nets to the ground. Excessive energy is absorbed by net braking elements in the wire support ropes. The ring nets are installed a minimum of three feet above the low-flow channel and allow the passage of water, aquatic wildlife, and fine sediment.

The objectives of this Assessment were to: 1) provide a general characterization of existing conditions in each creek corridor and at each proposed net location; 2) inventory plant and wildlife species; 3) evaluate the potential for federally- or state-listed plants and animals or species afforded other special regulatory protection at net locations; 4) map special-status plant and wildlife populations; 5) delineate jurisdictional areas; and, 6) quantify and describe potential impacts to biological resources that may occur as a result of the installation and maintenance of the debris flow nets, and 7) make recommendations to reduce impacts to existing vegetation and sensitive communities.

A delineation of Waters of the U.S., botanical surveys, and wildlife surveys were conducted in September by SES botanist, Jessica Peak and wildlife biologists, John Storrer and Justine Cooper. Special-status species that are known to occur or have the potential to occur in the Project vicinity were targeted during the subsequent biological field surveys (e.g., Santa Barbara honeysuckle, Plummer's baccharis, black-flowered figwort, late-flowered mariposa lily, Humboldt lily, Cooper's hawk, California red-legged frog, coast range newt.).

All of the creeks surveyed as part of the Project are perennial, ultimately discharging into the Pacific Ocean, and therefore, are considered jurisdictional Waters of the U.S. under current federal guidance.

Coast live oak woodland, arroyo willow thickets, and other riparian habitats (e.g., western sycamore woodland, California bay forest) present in the Subject Creek corridors and at proposed net locations are considered valuable biological resources and are classified as Environmentally Sensitive Habitat (ESH). Two special-status plant species, Plummer's baccharis and ocellated Humboldt lily, were observed at Project locations during the field surveys. Suitable habitat for two additional special-status plant species, umbrella larkspur and Ojai fritillary, is present in the creek channels and at proposed net locations.

The field surveys enabled a characterization of habitat quality and assessment of potential for occurrence of special-status wildlife species (e.g., southern California steelhead, California red-legged frog [CRLF], coast range newt, southwestern pond turtle, two-striped gartersnake, Cooper's hawk). No special-status wildlife species were observed during the September and December 2018 field surveys. However, nineteen special-status wildlife species have the potential to occur in the Subject Creeks (Table 3).

Net installation and maintenance, including removal of accumulated debris, are considered temporary impacts. The debris nets are intended to be in place for a period of up to 5 years, and then removed. Direct impacts to plant and wildlife habitat would occur through staging and operation of equipment for net installation, accumulation of debris behind the nets, and redistribution of accumulated material downstream if/when an event occurs.

The proposed Project will result in temporary impacts to the native vegetation that has reestablished in the channels and along the banks at the proposed net locations. The vegetation communities present at the net locations are all associated with the riparian corridor of the Subject Creeks and are therefore, considered sensitive per local, state, and federal policies and guidelines. No trees will be removed as part of the Project. Two sycamore saplings (BV-4) and one arroyo willow sapling (BV-5) may need to be trimmed during net installation.

Impacts to individual Plummer's baccharis plants have the potential to occur at two sites (BV-6 and RC-12) during net installation and maintenance. The recommended avoidance and minimization measures have been developed to reduce impacts to special-status plant species, include pre-construction surveys to flag individuals for avoidance, worker environmental awareness training, and biological monitoring.

Two federally- listed species, Southern California steelhead and California red-legged frog, are known to occur in the Subject Creeks. However, all proposed debris net locations are upstream from barriers that are impassible for Southern California steelhead. Potential for incidental injury or mortality of special status wildlife species can be reduced through method of construction and implementation of minimization and avoidance measures during construction (e.g., pre-construction nesting bird surveys, worker environmental awareness training, biological survey and monitoring).

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1.0 INTRODUCTION

This Biological Resources Assessment (Assessment) presents the results of the biological surveys and background investigation conducted by Storrer Environmental Services, LLC (SES), on behalf of The Partnership for Resilient Communities (TPRC). The Assessment is intended to support applications for regulatory agency permits to install thirteen (13) debris flow nets in four creek corridors in Montecito (Cold Spring Creek, San Ysidro Creek, Buena Vista Creek, and Romero Creek), Santa Barbara County, California (Project) (Figure 1- Site Vicinity).

Following the Thomas Fire in December 2017, a debris flow impacted the community of Montecito on January 9, 2018. The debris flows resulted in 23 fatalities, damage to more than 400 homes, and extensive economic loss. The goal of the Project is to help protect against rockfall and landslides with the installation of temporary debris flow nets until canyon slopes are sufficiently revegetated thereby reducing the debris flow hazard to the community of Montecito.

The objectives of this Assessment were to: 1) provide a general characterization of existing conditions in each creek corridor and at each proposed net location; 2) inventory plant and wildlife species; 3) evaluate the potential for federally- or state-listed plants and animals or species afforded other special regulatory protection at net locations; 4) map special-status plant and wildlife populations; 5) delineate jurisdictional areas; and, 6) quantify and describe potential impacts to biological resources that may occur as a result of the installation and maintenance of the debris flow nets, and 7) make recommendations to reduce impacts to existing vegetation and sensitive communities.

1.1 PROJECT LOCATION AND DESCRIPTION

The Project is located in four creek corridors north of the community of Montecito in Santa Barbara County, California: Cold Spring Creek, San Ysidro Creek, Buena Vista Creek, and Romero Creek (Subject Creeks) (Figures 2a-2d – Project Area Maps).

The Project involves installation of 13 Geobrugg flexible debris flow nets. The basic debris flow protection system consists of a steel ring net engineered to resist the velocities and dynamic and static pressures unique to debris flows. Support ropes are installed into channel banks and transfer debris impact and pressure loads from ring nets to the ground. Excessive energy is absorbed by net braking elements in the wire support ropes. The ring nets are installed 3 to 5 feet above the stream channel and allow the passage of water, aquatic wildlife, and fine sediment (KANE 2018a).

There are two basic versions of the Geobrugg debris net that are being proposed in the Subject Creeks. The VX net, which is intended for relatively narrow channels (up to 40 feet wide), and the Super VX, which is intended for wide channels where foundations cannot be installed. The Super VX (SVX) net is essentially a VX net with additional and stronger top net support ropes (KANE 2018a). Table 1 below provides a description net type, site dimensions, and location of each proposed net. Typical net cross-sectional views are depicted on Figures 3a – 3c.

Table 1 – Net Descriptions and Locations

Net Location	Net Type*	Net Height* (feet)	Bottom Net Width* (feet)	Top Net Width* (feet)	Total Retention Volume (square meters)	Latitude	Longitude
Cold Spring Creek							
CS-11	VX160-H6	18	60	35	2,942	34.460212	-119.653969
CS-18	SVX180-H6	12	81	47	4,421	34.460253	-119.655049
San Ysidro Creek							
SY-7a	SVX180-H6	20	22	60	7,442	34.468114	-119.622978
SY-18	SVX180-H6	16	67	13	4,728	34.459500	-119.623273
Buena Vista Creek							
BV-2	VX140-H4	10	14	41	1,001	34.450823	-119.611076
BV-4	SVX180-H6	17	45	77	5,509	34.454768	-119.611699
BV-5	VX140-H4	12	27	37	1,432	34.455275	-119.610365
BV-6	VX160-H6	15	22.5	44	1,793	34.458348	-119.608772
BV-7	VX160-H6	20	20	50	5,296	34.456103	-119.609459
BV-10	VX160-H6	15	14	56	3,426	34.452384	-119.61148
BV-11	SVX180-H6	20	98	150	11,025	34.455539	-119.611211
Romero Creek							
RC-12	SVX180-H6	12	61	40	2,055	34.465176	-119.590903
RC-15	VX160-H6	10	50	18	960	34.458710	-119.591526

*Net types, site dimensions, and retention volumes provided by the *Design Calculation Report* (KANE 2018b).

The nets are pre-fabricated to specification by the manufacturer for each location. Net installation will be done by Access Limited Construction (ALC), with oversight from KANE Geotech, Inc. (KANE) Engineers. A biologist will be onsite to conduct wildlife surveys, monitor for permit compliance, and provide oversight of construction and maintenance work.

ALC has prepared a Work Plan (ALC 2018) that details the method of installation at each of the 13 net locations. The Work Plan describes access, staging, equipment, and materials to be employed at each net location. The method entails general procedures that are adapted to the specific characteristics unique to each site.

Access to most of the net locations is limited by lack of existing roads and topographic constraints. In general, equipment and materials will be deployed by helicopter. Some staging of equipment and materials may be done at trail heads, outside the stream channel, if available. Equipment and materials will be transported from the staging areas to the work sites by hand if necessary.

Equipment will not be operated in the active stream channel except when a debris flow event should occur and it becomes necessary to restore low-flow conditions, as described in Section

1.1.3 (Net Maintenance). The type of equipment to be used is described in the Work Plan and is illustrated in Attachment A of that document. All equipment will be power-washed prior to mobilization.

Material Data Sheets are provided in Attachment B of the Work Plan. Drilling equipment uses biodegradable fluids and lubricants. No fuel will be stored at the work areas and secondary containment will be used during all fueling operations. Secondary containment will also be set up at grout mixing stations and around anchor locations to prevent spillage.

An Emergency Action Plan (EAP) is appended to the Work Plan (Attachment C). The EAP describes how and under what circumstances work will be curtailed in the event of inclement weather. The EAP explains how weather data will be monitored and analyzed and what thresholds will be used to trigger evacuation protocol.

1.1.1 Net Installation

Anchor installation into the channel banks will be accomplished using a mobile drill with an air rotary percussion drill to advance borings. Anchors will be grouted in place using a non-shrink cement grout mixed with water. Grouting of the annular space around the anchors will be accomplished by pressure grouting through a heavy-duty plastic grout tube with a portable grout pump (KANE 2018c). Storage and mixing of grout will be done within secondary containment, to prevent spillage and any contact with the active stream channel. The grout mixing station will be placed as far as possible from the active stream channel at each net location. Where space is limited, a minimum distance of 15 feet from the active stream channel will be maintained at all locations. Drilling and grouting equipment will be mobilized to the work locations via aerial transport.

Once anchors are installed, wire support ropes are attached to the channel banks and the custom-fabricated ring nets will be hung on the wire ropes, much like a shower curtain, and secured. The net design calls for a minimum elevation of 3 feet above the water surface of the low-flow channel to allow for natural stream processes and wildlife use. This space between the water surface and the bottom of the net will be maintained except during high-flow or debris flow events.

1.1.2 Net Monitoring

Condition of the debris nets will be monitored following storm events. KANE and/or ALC personnel will inspect nets within 72 hours of a rain event to determine whether maintenance is required. Monitoring of the nets will be conducted on-foot via existing trails in the canyons. In the event the net sites cannot be accessed on foot, a drone or helicopter may be used to inspect the nets within the 72-hour time frame.

1.1.3 Net Maintenance and Management of Accumulated Debris

Maintenance of the debris nets may be necessary if damaged and in need of repair. Annual and post-event inspections will be conducted. Minor maintenance can typically be done using tools and materials transported by hand. Major damage may require equipment and materials to be delivered in the same manner as installation (i.e., via helicopter).

The need for removal of accumulated debris will depend on frequency, intensity, and the amount of precipitation experienced in the surrounding watershed. Intense and localized rainfall events as occurred on January 9, 2018 have potential to mobilize soil and debris. The debris retention system will be monitored as described in the following section.

Nets will be inspected within 72 hours of a rain event. Should the nets accumulate sufficient material to block the channel, equipment will be mobilized to the location via aerial transport once streamflow has subsided sufficiently to allow safe access and working conditions. The first action will be to restore the low-flow channel to pre-event elevation. Material removed from above the net will be redistributed downstream in a manner that does not impede surface flow.

Redistribution of accumulated material would be done under the supervision of a biologist with the intent of minimizing impacts to resources while maximizing potential for habitat restoration. This would include assurance that flow conditions are maintained and creation of pools or eddies that mimic natural deposition of material.

1.2 ENVIRONMENTAL SETTING

The Project is located north of the community of Montecito, within the Montecito Planning Area. The Montecito Planning Area is situated between the Pacific Ocean and foothills of the Santa Ynez Mountain Range. The Montecito Planning Area is bounded to the north by East Camino Cielo Road in the Los Padres National Forest (LPNF), by the City of Santa Barbara to the west, the unincorporated community of Summerland to the east, and the Pacific Ocean to the south.

The Montecito region experiences a Mediterranean climate with mild, moist winters and warm, dry summers. A heavy marine layer or fog is often present in late spring and early summer mornings. Temperatures in the region are relatively mild, with an average maximum temperature of 75 degrees Fahrenheit (F) in August and September and an average minimum temperature of 40 degrees (F) in December and January (WRCC 2018). Average annual precipitation is 16.34 inches, with the majority of that falling between October and April.

The Project is located in four drainages depicted as “blue-line streams” (Subject Creeks) on the Santa Barbara and Carpinteria USGS 7.5-minute quadrangles. All four originate on the south slopes of the Santa Ynez Mountains and discharge into the Pacific Ocean. The Subject Creeks are perennial, sustaining surface flow for some of their length throughout the year during years of normal rainfall. Streamflow is augmented by seasonal rainfall.

The drainages are similar in terms of geology and elevational gradient. Upper reaches of the channels are strewn with rock and large boulders that form intermittent pools. Geomorphology of the Project locations is described in the KANE *General Report of Findings* (2018a).

Most of the upper reaches of the Subject Creeks fall within the LPNF boundary and two of the net locations (RC-12 and RC-15) are located on LPNF-owned land. The lower, more urban segments of the creeks are in private ownership.

All of these drainages were burned in the Thomas Fire in the winter of 2018. The condition of the vegetation reflects early succession. The drainages were further impacted by the debris flow that occurred on January 9, 2018. This event profoundly altered the landscape throughout its path.

Santa Barbara County Flood Control District debris dams are present in Cold Spring Creek, San Ysidro Creek, and Romero Creek. There is also an impassible concrete channel in Montecito Creek, south of the confluence of Cold Spring Creek. The concrete channel is just north of the Montecito Creek debris dam, near the private road crossing at the Casa Dorinda retirement community. These barriers are depicted in Figures 2a-2d.

2.0 REGULATORY FRAMEWORK

Biological resources including special-status plant and wildlife species, sensitive plant communities, wildlife corridors, nesting birds, and jurisdictional waters and wetlands, may be protected under various federal, state, and local laws, regulations, and land use policies. The following sections summarize the regulations and policies administered by resource agencies pertaining to biological resources that are known to occur or have the potential to occur in the Project vicinity.

2.1 FEDERAL REGULATIONS

2.1.1 Endangered Species Act (16 U.S.C. § 1531 et seq.)

The Endangered Species Act of 1973 (ESA) provides for the protection of plant and animal species listed by the federal government as “endangered” or “threatened,” and “the ecosystems upon which they depend.” The USFWS and National Marine Fisheries Service (NMFS) share responsibility for administration of the federal ESA. An “endangered” species is one that is “in danger of extinction” throughout all or a significant portion of its range. A “threatened” species is one that is “likely to become endangered” within the foreseeable future. The ESA prohibits “take” of threatened or endangered species except under certain circumstances and only with authorization from the USFWS. “Take” as defined by the ESA, “means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” This can also include the modification of a species’ habitat. For plants, this statute governs removing, possessing, maliciously damaging, or destroying any listed plant on federal land and removing, cutting, digging up, damaging, or destroying any listed plant on non-federal land in knowing violation of state law (16 U.S.C. § 1538(c)).

When non-federal entities, such as states, counties, local governments, and private landowners, wish to conduct an otherwise lawful activity that might incidentally, but not intentionally, “take” a listed species, an incidental take permit must first be obtained via formal consultation with the USFWS using one of two methods. If a federal nexus is not available, an incidental take permit (ITP) must be obtained for the Project following formal consultation with the USFWS via Section 10 of the ESA (ESA § 10(a)(1)(B)).

If a federal nexus is available, then an incidental take permit may be obtained by the federal agency involved in the nexus (e.g., USACE) via Section 7 of the ESA (ESA § 7). Section 7 stipulates that any federal agency action that may affect a species listed as threatened or endangered requires a formal consultation with USFWS to ensure that the action is not likely to jeopardize the continued existence of the listed species or result in destruction or adverse modification of designated critical habitat (16 U.S.C. 1536(a)(2)). The Biological Opinion issued by the USFWS at the conclusion of the consultation may include authorization for incidental take of a listed species.

2.1.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MTBA) of 1918 (16 USC 703-711) is also administered by the USFWS. The MTBA provides protection of nearly all species of birds, their nests, and their eggs, including all native bird species. Under the MTBA, it is it is unlawful to "take", kill, collect, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR 10, including feathers or other parts, nests, eggs or products, except as allowed by implementing regulations (50 CFR 21). Certain game bird species are allowed to be hunted for specific periods determined by federal and state governments.

2.1.3 Clean Water Act – Section 404

The Clean Water Act (CWA) is comprehensive legislation established to protect the nation's water from pollution by setting water quality standards and by limiting the discharge of effluents in the waters of the United States. Section 404 of the CWA regulates the discharge of dredged and/or fill material into waters of the U.S., including wetlands. Section 404 of the CWA is jointly administered and enforced by the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA). Activities in waters of the U.S. regulated under Section 404 include dredge or fill for development, water resources projects (i.e., dams and levees), infrastructure development (i.e., highways and airports), and mining projects. With the exception of certain farming and forestry activities that are exempt from Section 404 regulation, a Section 404 permit is required before any dredged or fill material may be discharged into waters of the U.S. The Section 404 program prohibits discharge of dredged or fill material if waters of the U.S. would be significantly degraded or a practical alternative exists that is less damaging to the aquatic environment.

2.1.3.1 Waters of the U.S.

The limit of USACE's jurisdiction in non-tidal waters extends to the ordinary high water mark (OHWM) and includes all adjacent wetlands.

Waters of the U.S. are defined as:

> *"All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; including all interstate waters including interstate wetlands, all other waters such as intrastate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce."*

U.S. Supreme Court decisions (i.e., Solid Waste Agency of Northern Cook County [SWANCC] v. USACE [531 U.S. 159, 2001] January 9, 2001 and Rapanos *et ux., et al.* v. United States, June 19, 2006) have led to the development of federal guidance that requires a careful examination and documentation of the physical location(s) and hydrologic connections among waters and wetlands. To determine federal jurisdiction, particular focus is given to (1) surface hydrologic connections between a wetland and "navigable waters in fact," (2) "adjacency" of a wetland to traditionally navigable waters, and thus (3) a "significant nexus" to interstate commerce. In addition, waters and wetlands features can be determined to be under federal jurisdiction by the

USACE if a "significant nexus" can be shown between the wetland feature in question and its contribution to the maintenance or restoration of the physical, chemical, or biological integrity of downstream waters that are traditionally navigable.

2.1.4 U.S. Department of Agriculture Environmental Compliance Fish and Wildlife Policy (Departmental Regulation 9500-4)

The Secretary of Agriculture's Policy on Fish and Wildlife directs the U.S. Forest Service (USFS) to "manage habitats for all native and desired nonnative plants, fish and wildlife species to maintain viable populations of each species; identify and recover threatened and endangered plant and animal species" and to avoid actions "which may cause species to become threatened or endangered."

2.1.5 U.S. Forest Service Manual

The Forest Service Manual (FSM) contains legal authorities, objectives, policies, responsibilities, instructions, and guidance for the planning and execution of programs and activities within and related to national forests. FSM Chapter 2670 directs the USFS to "develop/implement management practices to ensure that species do not become threatened or endangered because of Forest Service actions," and to "avoid or minimize impacts to species whose viability has been identified as a concern." If impacts cannot be avoided, the UFSF "can allow or disallow the impact, but the decision must not result in loss of species viability or create a significant trend towards federal listing." FSM Chapter 2672.4 specifies that a Biological Evaluation (BE) be prepared to determine if a project may affect any USFS or USFWS listed species. In addition to protections to federally listed species, FSM Chapter 2672.11 delegates to each Regional Forester the authority to designate "Sensitive" species, which are defined as:

> *"Those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by: a.) significant current or predicted downward trends in population numbers or density, or b.) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution."*

2.1.6 Land Management Plan: Southern California National Forests

The Land and Resource Management Plans (Plans) established by USFS for the southern California national forests describe the strategic direction at the broad program level for managing the land and its resources over the next 10 to 15 years. As stated in the LPNF Strategy, the objective of USFS threatened, endangered, proposed, candidate, and sensitive species management is to "manage habitat to move listed species toward recovery and de-listing" and to "prevent listing of proposed and sensitive species." For management of species of concern, the primary objective is to "maintain and improve habitat for fish, wildlife, and plants, including those with the following designations: game species, harvest species, management indicator species and watch list species."

2.1.7 National Environmental Policy Act (NEPA)

The National Environmental Policy Act (NEPA) was signed into law on January 1, 1970 to establish policy, set goals, and provide means for carrying out policies to protect the environment on Federal lands. The Council on Environmental Quality (CEQ) oversees NEPA implementation and reviews and approves Federal agency NEPA procedures. NEPA applies to all Federal actions including not only broad actions, such as establishing or updating management plans, programs, or policies, but also to specific projects (*id*. at § 1508.18(b)). With regard to private actions, NEPA applies to any Federal decisions on approvals, permits, or funding required for the private action. For example, private projects may involve Federal loan guarantees, Clean Water Act section 404 permits, and Endangered Species Act Incidental Take Permits.

The CEQ *Regulations for Implementing the Procedural Provisions of the National Environmental Policy* (40 CFR Parts 1500-1508) encourage integration of the NEPA process with other planning and environmental reviews, such as the California Environmental Quality Act (CEQA) described below. NEPA and CEQA are similar, both in their intent and review process (i.e., the analyses, public engagement, and document preparation). Importantly, both statutes encourage a joint Federal and State review where a project requires both Federal and State approvals.

NEPA requires that an Environmental Impact Statement (EIS) be prepared when the proposed Federal action as a whole has the potential to "significantly [affect] the quality of the human environment…." (42 U.S.C. § 4332) (CEQ 2014). The NEPA determination of significance is based on context and intensity (40 C.F.R. § 1508.27). Under NEPA, an Environmental Assessment (EA) can be prepared to determine whether a finding of no significant impact can be made (*id*. at § 1508.9). An EIS is needed when the proposal has the potential for a significant impact as shown by an EA or when an agency's initial determination indicates an EIS is appropriate (*id*. at § 1501.4).

The portions of the Project located in Romero Canyon are located on LPNF land and are subject to NEPA.

2.2 STATE REGULATIONS

2.2.1 California Endangered Species Act (California Fish and Game Code § 2050, et seq.)

Fish and wildlife resources are protected by a number of laws and programs administered by the CDFW, formerly the California Department of Fish and Game. The California Endangered Species Act (CESA) generally parallels the provisions of the federal ESA, and states that "all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation, will be protected or preserved."

Under the CESA, "endangered" is defined as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range;" and "threatened" is defined as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts." "Take" is defined as "to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill" an individual of a species, but the definition does not include "harm" or "harass," as the ESA does. As a result, the threshold for a take under the CESA is higher than that under the federal ESA. Exceptions to the take prohibition are limited to authorization of collection for "necessary scientific research".

Consistent with the CESA, CDFW has established lists of endangered, threatened, and candidate species that may or may not be included on a federal ESA list. CDFW also maintains a list of Species of Special Concern for those species that have declining populations, limited distribution, diminishing habitat, or unusual scientific, educational, or recreational value. In addition, CDFW manages a "watch list" of species that have been de-listed or are vulnerable. Species of Special concern and watch list species are not afforded the same legal protection as listed species.

Pursuant to California Fish and Game Code Section 2081, CESA allows for incidental take permits to otherwise lawful development projects that could result in the take of a state-listed threatened or endangered species. The application for an incidental take permit under Section 2081(b) has a number of requirements including the preparation of a conservation plan, generally referred to as a Habitat Conservation Plan. CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate mitigation planning to offset project-caused losses of listed species.

2.2.2 Native Plant Protection Act (California Fish and Game Code §§ 1900 - 1913, § 2062 and § 2067)

The CDFW also manages the California Native Plant Protection Act (NPPA), which designates and protects species eligible for state listing. Eligible species include those identified on California Native Plant Society (CNPS) Rare Plant Ranks (CRPRs) 1A, 1B, and 2 meet the definitions of Sections 1901, Chapter 10 (NPPA) or Sections 2062 and 2067 (CESA) of the California Fish and Game Code. CRPR 3 and 4 species, though not meeting the criteria for listing by CDFW, may be considered during project review by the agencies.

2.2.3 Clean Water Act – Section 401

The CWA Section 401 Water Quality Certification (Section 401 Certification) provides states and authorized tribes an opportunity to address the aquatic resource impacts of federally issued permits and licenses, to help protect water quality. Under Section 401 of the CWA, any applicant for a federal license or permit to conduct any activity that may result in any discharge into waters of the U.S. must obtain a Section 401 Certification from the State Water Resources Control Board (SWRCB) that the proposed activity will comply with state water quality standards. In California, Section 401 Certifications are issued by Regional Water Quality Control Boards (RWQCB) located throughout the state. The Central Coast RWQCB issues Section 401 Certifications for projects in the County. The federal CWA Section 404 permit is dependent on and subject to the terms of the Section 401 Certification. Therefore, under Section 401, a federal agency cannot issue a permit or license for an activity that may result in discharge into waters of the U.S. until the RWQCB has granted or waived the Section 401 Certification. Section 401 Certification is limited to federally jurisdictional waters and wetlands.

2.2.4 Lake and Streambed Alteration Program (California Fish and Game Code (California Fish and Game Code §1600-1616)

Under Sections 1600-1616 of the California Fish and Game Code, the CDFW regulates all activity that may substantially divert or obstruct the natural flow of any river, stream, or lake; change or use any material from the bed, channel or bank of any river, stream, or lake; or, deposit debris, waste or other materials that could pass into any river, stream or lake. Notification of Lake or Streambed Alteration must be submitted to CDFW for such activities. CDFW defines a stream as:

> "*…a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation.*"

CDFW jurisdiction typically includes all portions of the bed, banks, and channel of a stream, including intermittent and ephemeral streams, and extends outward to the upland edge of the riparian vegetation.

2.2.5 California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) requires an evaluation of a project's potentially significant impacts on biological resources and ways that such impacts can be avoided, minimized, or mitigated. CEQA also provides thresholds and guidelines for use by lead agencies to assess the significance of proposed impacts.

Section 15065 of the act states that a lead agency shall find that a project may have a significant effect on the environment, and thereby require an Environmental Impact Report to be prepared for the project, where the project has the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range of a rare or endangered plant or animal.

CEQA states that a project will normally have a significant effect on the environment if it will:

> *"(a) Conflict with adopted environmental plans and goals of the community where it is located; (b) Substantially affect a rare or endangered species of animal, plant or the habitat of the species; (c) Interfere substantially with the movement of any resident or migratory fish or wildlife species; and (d) Substantially diminish habitat for fish, wildlife or plants"* (County 2008).

2.3 LOCAL LAND USE POLICIES

Requirements for the protection of biological resources in the unincorporated areas of the County are provided in the Comprehensive Plan Conservation Element, Environmental Resource Management Element, Land Use Element, and the County Code. These Plans/Elements provide a framework of policies designed to protect special-status species and sensitive habitat areas.

2.3.1 Environmental Thresholds and Guidelines Manual

The Environmental Thresholds and Guidelines Manual (County 2008) provides definitions of sensitive biological resources and guidance for determining levels of impacts to sensitive areas, including appropriate methods for avoidance, minimization, and/or mitigation.

Disturbance to habitats or species may be considered significant by the County if a project substantially impacts sensitive resources in the following ways:

1. Substantially reduce or eliminate species diversity or abundance.
2. Substantially reduce or eliminate quantity or quality of nesting areas.
3. Substantially limit reproductive capacity through losses of individuals or habitat.
4. Substantially fragment, eliminate, or otherwise disrupt foraging areas and/or access to food sources.
5. Substantially limit or fragment range and movement (geographic distribution or animals and/or seed dispersal routes).
6. Substantially interfere with natural processes, such as fire or flooding, upon which the habitat depends.

Examples of less than significant impacts, where the habitat is given little or no importance and it is presumed that disturbance would not create a significant impact include:

1. Small acreages of non-native grassland if wildlife values are low.
2. Individuals or stands of non-native trees if not used by important animal species such as raptors or monarch butterflies.
3. Areas of historical disturbance such as intensive agriculture.
4. Small pockets of habitats already significantly fragmented or isolated, and degraded or disturbed.
5. Areas of primarily ruderal species resulting from pre-existing man-made disturbance.

2.3.2 Oak Tree Protection

As described in the Comprehensive Plan Conservation Element Oak Tree Protection in the Inland Rural Areas of Santa Barbara County, Development Standard 1 (2009), the following applies for the protection of all species of mature oak trees:

> *"All development shall avoid removal of or damage to mature oak trees, to the maximum extent feasible. Mature oak trees are considered to be live oak trees six inches or greater diameter at breast height and blue oak trees four inches or greater diameter at breast height, or live and blue oaks six feet or greater in height. Native oak trees that cannot be avoided shall be replanted on site. When replanting oak trees on site is not feasible, replanting shall occur on receiver sites known to be capable of supporting the particular oak tree species, and in areas contiguous with existing woodlands or savannas where the removed species occurs. Replanting shall conform to the County's Standard Conditions and Mitigation Measures. (This development standard applies to oak trees other than valley oaks, valley oak trees are address in separate Development Standards.)"*

The County's Standard Conditions and Mitigation Measures (County 2011) require that grading, trenching, ground disturbance, construction activities and structural development occur beyond six feet of the dripline of all oak trees. Mitigation for impacted oak trees requires posting of a performance security and tree replacement at a 10:1 ratio, preferably on-site.

2.3.3 Stream and Riparian Habitat Protection

The Environmental Thresholds and Guidelines Manual (County 2008) defines riparian habitat as the "terrestrial or upland area adjacent to freshwater bodies, such as the banks of creeks and streams, the shores of lakes and ponds, and aquifers which emerge at the surface as springs or seeps. This habitat can also occur along arroyos and barrancas, and other types of drainages throughout the County".

The County prescribed setback (i.e., buffer area) from the outer (upland) edge of the riparian canopy, or the top-of-bank of the water body in the absence of riparian vegetation, is 50 feet in urban areas and 100 feet in rural areas. Intrusion within the buffer areas for riparian habitats and streams may be considered significant.

2.3.4 Montecito Community Plan

The Montecito Planning Area is one of seven planning areas under the jurisdiction of the County. The Montecito Community Plan sets out specific goals relating to community development, public facilities and services, and resources and constraints (County 1995). Applicable policies and development standards from the Montecito Community Plan are summarized below.

Policy BIO-M-1.2 The following biological resources and habitats shall be identified as environmental1y sensitive and shall be protected and preserved to the extent feasible through the Environmentally Sensitive Habitat (ESH) overlay: riparian woodland corridors, monarch butterfly roosts, sensitive native flora, and coastal sage scrub.

Policy BIO-M-1.3 Environmentally Sensitive Habitat (ESH) areas within the Montecito Planning Area shall be protected, and where appropriate, enhanced.

Policy BIO-M-1.5 Trimming or clearing of vegetation within 50 feet of a known Monarch Butterfly Habitat or along riparian habitats shall not occur without the review and the approval of the Resource Management Department.

Policy BIO-M-1.6 Riparian vegetation shall be protected as part of a stream or creek buffer. Where riparian vegetation has previously been removed, (except for channel cleaning necessary for free-flowing conditions as determined by the County Flood Control District) the buffer shall allow the reestablishment of riparian vegetation to its prior extent to the greatest degree possible. Restoration of degraded riparian areas to their former state shall be encouraged.

Policy BIO-M-1.7 No structures shall be located within a riparian corridor except: public trails that would not adversely affect existing habitat; dams necessary for water supply projects; flood control projects where no other method for protecting existing structures in the floodplain is feasible and where such protection is necessary for public safety, other development where the primary function is for the improvement of fish and wildlife habitat and where this policy would preclude reasonable development of a parcel. Culverts, fences, pipelines, and bridges (when support structures are located outside the critical habitat) may be permitted when no alternative route/location is feasible. All development shall incorporate the best mitigation measures feasible to minimize the impact to the greatest extent.

Policy BIO-M-1.10 All development, including dredging, filling and grading within stream corridors, shall be limited to activities necessary for the construction of uses specified in Policy B-1.7. When such activities would require removal of riparian plant species, revegetation with local native plants shall be required on both banks and extending outward 25 feet from each top of bank, except where it would preclude reasonable development of a parcel.

Policy BIO-M-1.11 Areas of one or more acres of coastal sage scrub shall be preserved to the maximum extent feasible.

Policy BIO-M-1.13 The habitat located on the hillside area north of Mountain Drive and Bella Vista Road and reaching the northern boundary of the Planning Area shall be recognized as particularly valuable because of the presence of chaparral, sensitive native flora and riparian resources to be protected and/or preserved. Any development proposal in this area shall be designed to avoid areas which contain these habitats and/or identified sensitive species.

Policy BIO-M-1.14 Significant biological communities shall not be fragmented into small non-viable pocket areas by development.

Policy BIO-M-1.16 All existing native trees regardless of size that have biological value shall be preserved to the maximum extent feasible.

Policy BIO-M-1.17 Oak trees, because they are particularly sensitive to environmental conditions, shall be protected to the maximum extent feasible. All land use activities, including agriculture shall be carried out in such a manner as to avoid damage to native oak trees. Regeneration of oak trees shall be encouraged.

Policy BIO-M-1.18 Trees serving as known raptor nesting or key raptor roosting sites shall be preserved to the maximum extent feasible.

Policy BIO-M-1.20 Pollution of streams, sloughs, drainage channels, underground water basins, estuaries, the ocean and areas adjacent to such waters shall be minimized.

Policy BIO-M-1.23 Where sensitive plant species and sensitive animal species are found pursuant to the review of a discretionary project, efforts shall be made to preserve the habitat in which they are located to the maximum extent feasible. For the purposes of this policy sensitive plant species are those species which appear on a list in the California Native Plant Society's *Inventory of Endangered Vascular Plants of California.* Sensitive animal species are defined as those animal species identified by the CDFW, the USFWS and/or are listed in Tate's *The Audubon Blue List* (birds).

3.0 METHODS

To document existing conditions and biological resources in the Cold Spring Creek, San Ysidro Creek, Buena Vista Creek, and Romero Creek corridors, SES conducted background research, review of previous botanical and biological assessments completed in in the region, and field investigations at each of the 13 net locations.

3.1 LITERATURE REVIEW

Prior to conducting the field surveys, a background review was performed to identify any special-status plant and wildlife species and sensitive natural communities that have the potential to occur in the Project vicinity. The literature review included an examination of the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (CNPS 2018), the California Department of Fish and Wildlife's (CDFWs) California Natural Diversity Database (CNDDB 2018), the USFWS Endangered Species Database (USFWS 2018a), and the USFWS critical habitat portal (USFWS 2018b). SES also reviewed the Steelhead Assessment and Recovery Opportunities in Southern Santa Barbara County, California (Stoecker et al. 2002), the NRCS Web Soil Survey of Santa Barbara County, California, Southern Santa Barbara Area (NRCS 2018), the USGS CA 7.5-minute quadrangle maps, the National Hydrography Dataset (NHD) (USGS-NHD 2018), National Wetlands Inventory (USFWS 2018c), and weather data.

The four-quadrangle CNDDB query provided locations of special-status plant populations, sensitive natural communities, and special-status wildlife documented within the Santa Barbara, Carpinteria, Little Pine Mountain, and Hildreth Peak USGS CA 7.5-minute quadrangles. The CNDDB search included both the Santa Barbara and Carpinteria quadrangles, which encompass the Project area, and the two quadrangles to the north, in order to evaluate the potential for special-status plant and wildlife species documented in the Project vicinity. Special-status species known to occur in the region are depicted in Figures 4 and 5. The likelihood for special-status species to occur within the habitats present at the net locations was evaluated (see Table 3).

3.2 FIELD METHODOLOGY

Biological field investigations included mapping of net locations and impact areas, botanical surveys, wildlife surveys, and a jurisdictional delineation at each net location. Table 2 provides a summary of survey types, dates, locations, and field personnel.

Table 2 – Biological Surveys Conducted in 2018

Type of Survey	Survey Locations	Date	Field Personnel
Field Reconnaissance with KANE Impact Area Mapping Wildlife Surveys	CS-11, CS-18, BV-2, BV-3	September 5, 2018	Jessica Peak John Storrer Bill Kane Mallory Jones
Field Reconnaissance with KANE Impact Area Mapping Wildlife Surveys	SY-18, BV-4, BV-5, BV-6, BV-7, BV-8	September 6, 2018	Jessica Peak John Storrer Bill Kane Mallory Jones
Field Reconnaissance with KANE Impact Area Mapping Wildlife Surveys	RC-12, RC-15	September 11, 2018	Jessica Peak John Storrer Bill Kane Mallory Jones
Field Reconnaissance with KANE Impact Area Mapping Wildlife Surveys	BV-2, BV-10, BV-11, SY-18, CS-18	September 17, 2018	Jessica Peak Justine Cooper Bill Kane Mallory Jones
Botanical Surveys Wildlife Surveys Jurisdictional Delineation	CS-11, CS-18, HS-6, HS-7	September 18, 2018	Jessica Peak Justine Cooper
Botanical Surveys Wildlife Surveys Jurisdictional Delineation	RC-12, RC-15	September 19, 2018	Jessica Peak Justine Cooper
Botanical Surveys Wildlife Surveys Jurisdictional Delineation	BV-5, BV-6, BV-7. BV-10, BV-11	September 20, 2018	Jessica Peak Justine Cooper
Botanical Surveys Wildlife Surveys Jurisdictional Delineation	BV-4, SY-18	September 21, 2018	Jessica Peak Justine Cooper
Field Reconnaissance with KANE & ALC Impact Area Mapping Wildlife Surveys	SY-7a	December 4, 2018	Jessica Peak Bill Kane Mallory Jones Simon Boone
Botanical Surveys Wildlife Surveys Jurisdictional Delineation	SY-7a	December 7, 2018	Jessica Peak Justine Cooper

As part of the initial field reconnaissance, SES accompanied KANE personnel to each of the net locations and mapped proposed impact areas (i.e., net anchor sites, staging areas) and discussed site access for construction and maintenance. Net anchor locations were mapped using an iPad tablet with ArcCollector and an EOS Arrow 100 High Accuracy Global Navigation Satellite System (GNSS) receiver.

Additional field surveys were performed in December 2018 to relocate one net location in San Ysidro Creek (SY-7a) approximately 190 feet downstream to avoid a public trail crossing in the creek channel.

Special-status species that are known to occur or have the potential to occur in the Project vicinity of the were targeted during the subsequent biological field surveys (e.g., Santa Barbara honeysuckle, Plummer's baccharis, black-flowered figwort, late-flowered mariposa lily, Humboldt lily, Cooper's hawk, California red-legged frog, coast range newt) (Table 3).

3.2.1 Botanical Surveys

Surveys were consistent with the botanical survey guidelines outlined in *Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009), *Guidelines for Conducting And Reporting Botanical Inventories For Federally Listed, Proposed, And Candidate Plants* (USFWS 1996), and the CNPS *Botanical Survey Guidelines* (CNPS 2001). Special-status plant species were mapped as part of the field reconnaissance using an iPad tablet with ArcCollector and an EOS Arrow 100 High Accuracy GNSS receiver.

A Vegetation Rapid Assessment (RA) was conducted at each net location, per the CDFW-CNPS Vegetation Rapid Assessment Protocol (CDFW 2016). The RA was conducted within a 30 meter radius of each net location and data was collected on the CDFW-CNPS Combined Rapid Assessment Field Form (see Appendix B – Vegetation Rapid Assessment Field Forms). All vascular plant species observed within the 30 meter survey plots and along the surrounding banks at each net location were recorded. At each net location a species list and percent cover intervals for each species were recorded for the both the vegetation communities along the creek channel/lower banks, as well as the vegetation communities along the upper banks/TOB (see Appendix B – Vegetation Rapid Assessment Field Forms). A complete vascular plant inventory for the Project is included as Appendix C.

Plant specimens that were not positively identified in the field were further examined using a dissecting microscope and appropriate botanical keys, including *The Jepson Manual, Second Edition* (Baldwin et al. 2012) and *A Flora of the Santa Barbara Region, California, Second Edition* (Smith 1998).

The botanical survey took place late in the typical blooming season (i.e., spring and summer) for several of the special-status plant species that have the potential to occur in the vicinity of the net locations (see Table 3).

3.2.2 Wildlife Surveys

During the September and December 2018 surveys, a list of all wildlife species observed within the Cold Spring Creek, San Ysidro Creek, Buena Vista Creek, and Romero Creek corridors was compiled (see Appendix D – Wildlife Inventory), and a general evaluation of the character and quality of wildlife habitat at each net location was made. Protocol aquatic surveys were not performed as part of the investigation.

The evaluation of wildlife use of the net locations was made in part through field reconnaissance but was also based on habitat suitability and known occurrence of various species in the Project vicinity. Habitat conditions and current status of special-status wildlife species, including California red-legged frog (CRLF) and southern California steelhead, were a particular focus of the wildlife surveys. Potential for nesting, roosting, or foraging by sensitive bird species, including various species of raptors was also assessed.

3.2.3 Delineation of Waters of the U.S.

Pursuant to Section 401 of the CWA, the limit of USACE jurisdiction in non-tidal waters extends to the OHWM and includes all adjacent wetlands. The OHWM is an element used to identify the lateral limits of non-wetland waters based on stream geomorphology and vegetation response to the dominant stream discharge (Lichvar and McColley 2008). The width of the channel at the OHWM was mapped by using an iPad tablet with ArcCollector and an EOS Arrow 100 High Accuracy GNSS receiver and jurisdictional acreages were calculated using aerial imagery and ArcGIS.

Due to the debris flows in January 2018, the creek corridors are highly altered from what would be considered typical or "ordinary", and indicators of high water were not always evident or reliable. "Ordinary high water" implies flow levels that are above average, but less than extreme, that occur with some regularity (USACE 2008). Therefore, the approximate OHWM was established at each net location using physical marks on the landscape (e.g., drainage patterns, topographic breaks in slope, changes in sediment characteristics, etc.) that represented a reasonable judgement of water levels at "above average, but not extreme" levels.

3.2.4 Delineation of CDFW Jurisdiction

The stream banks and canyon walls at the majority of the proposed net locations are steeply incised and most of the vegetation along the slopes was burned in the Thomas Fire. Approximate top-of-bank (TOB) was mapped in the field using obvious topographic changes and ridgelines as boundaries. In many locations the TOB was well above the stream channel (i.e., 30 to 50 feet) and was mapped with the greatest accuracy possible. At all of the proposed net locations, the TOB corresponds to the extent of CDFW jurisdiction and was mapped by using an iPad tablet with ArcCollector and an EOS Arrow 100 High Accuracy GNSS receiver. CDFW jurisdictional acreages were calculated using aerial imagery and ArcGIS.

4.0 RESULTS

The following sections provide a summary of environmental conditions at the Project locations including existing plant communities, wildlife habitat, and jurisdictional areas documented during the field surveys. Representative photographs of environmental conditions present at Project locations are provided in Appendix A.

4.1 HYDROLOGY

All of the creeks surveyed as part of the Project are perennial and ultimately discharge into the Pacific Ocean. With the exception of one location in a tributary to Buena Vista Creek (BV-11), all of the proposed net locations had active flow in the channel. Estimated width of the active channel, depth of flow, and width of channel at OHWM are summarized for each net location in Table 3.

During the December survey of SY-7a, recent scour was evident in the San Ysidro Creek channel from storm events on November 27-29, 2018 and December 4-5, 2018.

Table 3 – Summary of Stream Characteristics at Proposed Net Locations

Net Location	Approximate Width of Active Flow in Channel	Approximate Depth of Flow in Channel	Approximate Width of Channel at OHWM
Cold Spring Creek			
CS-11	16 inches to 3 feet	1 to 6 inches (intermittent pools)	7 to 12 feet
CS-18	8 inches to 2 feet	1 to 2 inches	6 to 12 feet
San Ysidro Creek			
SY-7a	14 inches to 4 feet	2 to 6 inches	10 to 25 feet
SY-18	2 to 6 feet	1 to 6 inches (intermittent pools)	12 to 20 feet
Buena Vista Creek			
BV-2	1 to 3 feet	1 to 8 inches (intermittent pools)	4 to 15 feet
BV-4	6 inches to 3 feet	1 to 5 inches (intermittent pools)	10 to 20 feet
BV-5	8 inches to 3 feet	1 to 3 inches at north end of survey plot, no flow under net location	15 to 20 feet
BV-6	8 inches to 5 feet	1 to 3 inches	10 to 18 feet
BV-7	1 to 2 feet	1 to 2 inches (one pool 4 to 6 inches deep)	8 to 15 feet
BV-10	1 to 5 feet	2 to 10 inches (intermittent pools)	5 to 16 feet
BV-11	no water in channel	N/A	10 to 25 feet
Romero Creek			
RC-12	14 inches to 4 feet	1 to 5 inches	6 to 12 feet
RC-15	10 inches to 3 feet	1 to 6 inches (intermittent pools)	8 to 15 feet

4.2 VEGETATION COMMUNITIES

A CNPS Vegetation Rapid Assessment was performed within a 30-meter plot around each net location to document existing conditions including total vascular vegetation cover, non-vascular cover, individual species cover, and vegetation alliances/associations (see Appendix B – Vegetation Rapid Assessment Field Forms). A plant inventory, including cover intervals for each species, was compiled at each net location for the channel/lower banks, as well as the upper banks/TOB. Although vegetation was sparse at the proposed net locations due to the Thomas Fire and subsequent debris flows, as well as scour and sediment deposition from storms in late November/early December 2018, the vegetation alliances/associations were described based on dominant species present at each survey plot. Adjacent (upslope) vegetation communities were also documented. Descriptions of vegetation communities are adapted from *A Manual of California Vegetation, Second Edition* (MV-II) (Sawyer et al. 2009). Table 4 summarizes the vegetation communities and percent cover at each net location.

Table 4 – Summary of Vegetation Communities and Cover

Net Location	Field-assessed Vegetation Alliance	Field-assessed Vegetation Association	Adjacent Alliances	Percent Total Non-vascular Cover	Percent Total Vascular Vegetation Cover
Cold Spring Creek					
CS-11	Arroyo willow thicket/ Western sycamore woodland	Scarlet monkey flower seep	Coast live oak woodland	85	15
CS-18	Arroyo willow thicket/ Canyon sunflower scrub	California bay forest/ Western sycamore woodland	Coast live oak woodland	65	35
San Ysidro Creek					
SY-7a	Canyon sunflower scrub	California bay forest	Coast live oak woodland	95	5
SY-18	Arroyo willow thicket	California bay forest	Coast live oak woodland	85	15
Buena Vista Creek					
BV-2	White alder grove/ Western sycamore woodland	Western sycamore woodland	Big-pod ceanothus/ Laurel sumac chaparral	55	45
BV-4	Arroyo willow thicket/ Western sycamore woodland	Canyon sunflower scrub	Big-pod ceanothus chaparral	70	30
BV-5	Arroyo willow thicket	Western sycamore woodland	Big-pod ceanothus/ Laurel sumac chaparral (upslope west); Coast live oak woodland (upslope east)	70	30
BV-6	Canyon sunflower scrub	Arroyo willow thicket	Coast live oak/ California bay forest	60	40
BV-7	Arroyo willow thicket	Poison oak scrub	Coast live oak woodland	70	30
BV-10	White alder grove	Western sycamore woodland	Coast live oak woodland	60	40
BV-11	Canyon sunflower scrub	Western sycamore woodland	Big-pod ceanothus chaparral	80	20
Romero Creek					
RC-12	Western sycamore woodland/ California bay forest	Scarlet monkey flower seep	Coast live oak woodland	80	20
RC-15	Arroyo willow thicket/ Western sycamore woodland	Canyon sunflower scrub	Coast live oak woodland	85	15

4.2.1 Woodland and Forest Alliances

There are several woodland/forest communities along the Subject Creek corridors. As a result of the Thomas Fire and debris flows, these communities are sparse along the creek channels and slopes but are regenerating.

4.2.1.1 White Alder Grove (Alnus rhombifolia Forest Alliance)

White alder (*Alnus rhombifolia*) groves occur in riparian corridors, incised canyons, seeps, stream banks, mid-channel bars, floodplains, and terraces (Sawyer et al. 2009). White alder was dominant to co-dominant in the channel and lower banks at two locations: BV-2 and BV-10. Saplings of this species were commonly observed in many of the Subject Creek corridors, particularly Buena Vista and San Ysidro Creeks. Western Sycamore Woodland (Platanus racemosa Woodland Alliance)

Western sycamore (*Platanus racemosa*) woodlands occur in gullies, intermittent streams, springs, seeps, along streambanks, and on terraces adjacent to floodplains (Sawyer et al. 2009). Western sycamore is one of the dominant tree species in all of the Subject Creek corridors. Many of the western sycamores damaged in the fire and debris flows are re-sprouting from the base and saplings are present throughout the creek channels. Western sycamore was dominant to co-dominant in the tree stratum at 11 of the proposed 13 net locations.

4.2.1.2 Coast Live Oak Woodland (Quercus agrifolia Woodland Alliance)

Coast live oak is a drought-resistant evergreen tree ranging from 20 to 80 feet in height, with massive spreading branches and a dense canopy of thick, waxy leaves. Coast live oaks are a long-lived species and can survive for 300 years or more. Although seemingly ubiquitous on the central coast of California, coast live oak woodlands are limited in distribution to a 50-mile wide swath along the coast from Mendocino County to northern Baja California and are absent from the interior ranges and Sierra Nevada (Sawyer et al. 2009).

Coast live oak woodlands are generally present along the upper slopes of the Subject Creek corridors, above the TOB. In many locations, coast live oak trees also extend downslope to the edges of the creek banks and co-dominate the tree canopy with western sycamore. Common understory species in this community include canyon sunflower (*Venegasia carpesioides*), poison oak (*Toxicodendron diversilobum*), toyon (*Heteromeles arbutifolia*), and giant wild rye (*Elymus condensatus*).

Populations of two special-status plant species: Plummer’s baccharis (*Baccharis plummerae*) and ocellated Humboldt lily (*Lilium humboldtii* ssp. *ocellatum*) were observed along slopes in the understory of the coast live oak woodland community. Ocellated Humboldt lily was observed at one proposed net location (RC-15) and Plummer’s baccharis was observed at seven of the proposed net locations (CS-11, SY-7a, BV-5, BV-6, BV-7, RC-12, and RC-15). Special-status plant populations are discussed in detail in Section 4.4.2 below.

4.2.1.3 California Bay Forest (Umbellularia californica Forest Alliance)

California bay (*Umbellularia californica*) forests occur on alluvial benches, streamsides, valley bottoms, coastal bluffs, inland ridges, steep north-facing slopes, and rocky outcrops. In the Santa Ynez Mountains, they generally occupy either semi-riparian settings or rocky recesses on upper slopes (Sawyer et al. 2009). California bay trees are co-dominant in the tree canopy at several proposed net locations: RC-12, SY-7a, SY-18, and CS-18.

4.2.2 Shrubland Alliances

With the exception of big pod ceanothus chaparral, the shrubland alliances described below are recolonizing the channels and lower banks of the Subject Creek corridors. The species comprising these communities are often the dominant regrowth in the channels and represent the majority of the total vegetation cover that is summarized in Table 5 and on the Vegetation Rapid Assessment Field Forms.

4.2.2.1 Big pod Ceanothus Chaparral (Ceanothus megacarpus Shrubland Alliance)

Big pod ceanothus (*Ceanothus megacarpus*) chaparral is present along the upper slopes of the canyons at several locations. This community is either dominated by big pod ceanothus or it is co-dominant with laurel sumac (*Malosma laurina*). Other shrub species commonly observed in this community include holly-leaf cherry (*Prunus ilicifolia*), toyon, giant wild rye, poison oak, and chaparral yucca (*Hesperoyucca whippleyi*).

4.2.2.2 Arroyo Willow Thicket (Salix lasiolepis Shrubland Alliance)

Arroyo willow (*Salix lasiolepis*) is a riparian shrub or tree that grows to 25 feet in height. Arroyo willows form thickets along stream banks and benches, slope seeps, and drainages. Arroyo willow was the dominant or co-dominant species at 10 of the net locations and was present at all but one site (BV-11). Red willow (*Salix laevigata*), sand bar willow (*Salix exigua*), Fremont cottonwood (*Populus fremontii*), and mulefat (*Baccharis salicifolia*) were also frequently observed in the creek channels at the proposed net locations.

4.2.2.3 Poison Oak Scrub (Toxicodendron diversilobum Shrubland Alliance)

Along the Southern California coast, stands of poison oak often occupy mesic canyons and disturbed dry slopes (Sawyer et al. 2009). Poison oak is abundant in the understory of the coast live oak woodland along the slopes of the Subject Creek corridors and is dominant along the creek channels in numerous locations. This community often intergrades with the canyon sunflower scrub described below. Poison oak scrub was particularly abundant at BV-7, where it co-dominated with arroyo willow.

4.2.2.4 Canyon Sunflower Scrub (Venegasia carpesioides Shrubland Alliance)

Canyon sunflower is one of the most abundant species in the Subject Creek corridors and is present at every proposed net location. Seedlings of this species establish readily after fire or other disturbances and have been found to proliferate significantly after fire in mesic areas (Sawyer et al. 2009). Canyon sunflower comprises the dominant cover in the channel at four proposed net locations (CS-18, SY-7a, BV-6, and BV-11). Other species frequently observed in this community include California blackberry (*Rubus ursinus*), poison oak, golden yarrow (*Eriophyllum confertiflorum*), deerweed (*Acmispon glaber*), and mugwort (*Artemisia douglasiana*).

4.2.3 Herbaceous Alliances

Herbaceous plant species are scattered throughout the Subject Creek corridors, although they are not typically dominant components of the vegetation cover. The species that dominate the alliances described below are ubiquitous in all of the creeks surveyed.

4.2.3.1 Scarlet Monkey Flower Seeps (Erythranthe [Mimulus] cardinalis Herbaceous Alliance)

Although scarlet monkey flower seeps are not an accepted alliance in MV-II, the habitat descriptions for common monkey flower (*Erythranthe guttata*) seeps (which generally occur further north) closely align with what was observed in the field for scarlet monkey flower seeps.

Scarlet monkey flower occurs in moist to wet places along streams and seepage areas (Baldwin et al. 2012). At the time of the field surveys, it was in bloom and was one of the most abundant herbaceous species in the Subject Creek corridors. Scarlet monkey flower dominated the cover in the channel at two of the proposed net locations (CS-11, and RC-12). Other species frequently observed in relatively dense cover in this community include giant flowered phacelia (*Phacelia grandiflora*), Douglas' nightshade (*Solanum douglasii*), smilo grass (*Stipa miliacea*), coast morning-glory (*Calystegia macrostegia* ssp. *cyclostegia*), California figwort (*Scrophularia californica*) and common horsetail (*Equisetum arvense*).

4.2.4 Non-native Plant Infestations

There are several notable non-native plant infestations that were documented in the Subject Creek corridors during the field surveys. All of the non-native plant species noted below are considered invasive by the California Invasive Plant Council (Cal-IPC).

Saltcedar (*Tamarix ramosissima*) seedlings were observed in all of the creeks surveyed and were particularly abundant in San Ysidro Creek and Romero Creek. Due to the highly invasive tendencies of this species, an effort was made to pull all saltcedar seedlings observed during field surveys.

In Cold Spring Creek, saltcedar, greater periwinkle (*Vinca major*), and tree tobacco (*Nicotiana glauca*) were observed at CS-11 and CS-18. Four fig (*Ficus carica*) saplings are also becoming established at CS-18.

Cape ivy was observed at three of the proposed net locations in Buena Vista Creek (BV-5, BV-6, and BV-7).

4.3 SPECIAL-STATUS SPECIES AND SENSITIVE HABITATS WITH THE POTENTIAL TO OCCUR IN THE PROJECT REGION

Special-status species and sensitive habitats include plant and wildlife taxa, vegetation communities, or other unique biological features that are afforded special protection by local land use policies and/or state and federal regulations. Vegetation communities may warrant special status if they are of limited distribution, support protected plants and animals, have high wildlife value, or are particularly vulnerable to disturbance. Special-status plant and animal species are those that are listed as rare, threatened, or endangered under the state and/or federal

Endangered Species Acts or those that appear on various "watch lists" compiled by academic institutions, conservation organizations, and wildlife agencies. These include the CNDDB lists of "*Special Animals*" and "*Special Plants*" (CNDDB 2018), CNPS Inventory of Rare and Endangered Vascular Plants of California (CNPS 2018), "*California Bird Species of Special Concern*" (Shuford and Gardali 2008), "*Amphibian and Reptile Species of Special Concern in California*" (Jennings and Hayes 1994), and "*Mammalian Species of Special Concern in California*" (Williams 1986).

Nineteen (19) special-status plant species and thirty-three (33) special-status wildlife species are documented (i.e., are tracked by the CNDDB) within the four-quadrangle area surrounding the Project. The likelihood for special-status plant and wildlife species documented within the Little Pine Mountain, Santa Barbara, Carpinteria, and Hildreth Peak USGS CA 7.5-minute quadrangles to occur within the habitats present in the vicinity of the proposed Project locations was evaluated. Special-status species known to occur in the four quadrangle CNDDB query area are depicted in Figure 4 – CNDDB Plant Occurrences and Figure 5 – CNDDB Wildlife Occurrences

Species or vegetation communities dependent on coastal habitats (e.g., Miles' milk-vetch, Coulter's saltbush, Davidson's saltscale, salt marsh bird's beak, tidewater goby, western snowy plover, sandy beach tiger beetle, globose dune beetle, obscure bumble bee, yellow rail, California black rail, light-footed Ridgway's rail, snowy egret, Belding's savannah sparrow, California brown pelican, saltmarsh skipper, and California least tern) are excluded from consideration due to the lack of suitable habitat and distance of the proposed Project locations from the coast (2 to 4 miles).

Table 5 lists special status plants and animals that have a reasonable possibility to occur in the vicinity of Project locations based on habitat suitability and requirements, elevation and geographic range, soils, topography, surrounding land uses, and proximity of known occurrences in the CNDDB database. The likelihood for special-status species to occur within or near Project locations was assessed using information from the various listed sources and wildlife and botanical surveys. Narratives are provided for species for which there are land use planning and regulatory implications.

Table 5. Special-status Plant and Wildlife Species Occurrences Documented within the Project Region.

Common Name ***Scientific Name (Arranged alphabetically by scientific name)***	**Listing Status/ Rarity Ranking***	**Habitat Requirements/Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near Proposed Net Locations**
Plants				
Plummer's baccharis *Baccharis plummerae* ssp. *plummerae*	CRPR 4.3 G3, S3	Rocky slopes near beach, sea bluffs, brushy canyons. Elevation range: 0 – 6,100 feet. Blooming period: August – November.	Yes	Observed and mapped during the September 2018 field surveys along the slopes at seven proposed net locations (CS-11, SY-7a, BV-5, BV-6, BV-7, RC-12, and RC-15).
Late-flowered mariposa lily *Calochortus fimbriatus*	CRPR 1B.3 G3, S3	Dry, open coastal woodland and chaparral. Elevation range: 0 – 3,000 feet. Blooming period: July – August.	No	Suitable coast live oak woodland and chaparral habitat for late-flowered mariposa lily is present along the trails above the creek channels and upland areas surrounding the proposed net locations. This species was observed in fruit along the trail in Buena Vista Canyon during September 2018 surveys. No late-flowered mariposa lily was observed at the net locations and this species would not be expected to occur in the creek channels.
Palmer's mariposa lily *Calochortus palmeri* var. *palmeri*	CRPR 1B.2 G3, S2	Meadows, vernally moist places in yellow-pine forest and chaparral. Elevation range: 3,900 – 7,260 feet. Blooming period: May – July.	No	Suitable habitat for Palmer's mariposa lily is not present in the Subject Creek corridors or at net locations. This species is known from one occurrence documented in 1981 southwest of Juncal Dam (CNDDB 2018). Palmer's mariposa lily is not expected to occur in the creek channels or at the proposed net locations.
Santa Barbara morning glory *Calystegia sepium* ssp. *binghamiae*	1A G5, SX	Coastal marshes and riverbanks. Elevation range: 0 – 70 feet. Blooming period: April – June.	No	All California populations of this species are considered to be extirpated (CNDDB 2018). Santa Barbara morning-glory is not expected to occur in the Project vicinity.
Umbrella larkspur *Delphinium umbraculorum*	CRPR 1B.3 G3, S3	Oak woodland and chaparral, prefers moist locations. Elevation range: 1,320 – 5,300 feet. Blooming period: April – June.	Yes	Suitable habitat for umbrella larkspur is present in the creek corridors and around proposed net locations. This species would not have been detectable at the time of the September 2018 surveys. Spring surveys should be conducted to confirm presence/absence of this species in the Subject Creek corridors.

Table 5. Special-status Plant and Wildlife Species Occurrences Documented within the Project Region.

Common Name ***Scientific Name*** ***(Arranged alphabetically by scientific name)***	**Listing Status/ Rarity Ranking***	**Habitat Requirements/Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near Proposed Net Locations**
Ojai fritillary *Fritillaria ojaiensis*	CRPR 1B.2 G2, S2	Occurs on rocky slopes and in river basins. Known from mesic broadleaf upland forest, chaparral, and lower montane coniferous habitats. Elevation range: 990 – 1,650 feet. Blooming period: February – May.	Yes	Suitable habitat for Ojai fritillary is present in the creek corridors and around proposed net locations. This species would not have been detectable at the time of the September 2018 surveys. Spring surveys should be conducted to confirm presence/absence of this species in the Subject Creek corridors. Ojai fritillary within the Survey Area.
Mesa horkelia *Horkelia cuneata* var. *puberula*	CRPR 1B.1 G4, S1	Dry, sandy, coastal chaparral. Elevation range: 200 – 2,900 feet. Blooming period: March – July.	No	Suitable chaparral habitat for mesa horkelia is present in upland areas above the creek channels. Mesa horkelia is a perennial species that would have been detectable at the time of the September 2018 surveys. No mesa horkelia was observed at the net locations and this species would not be expected to occur in the creek channels.
Coulter's goldfields *Lasthenia glabrata* ssp. *coulteri*	CRPR 1B.1 G4, S2	Saline places, marshes and swamps, playas, and vernal pools. Elevation range: 0 – 3,300 feet. Blooming period: April – May.	No	Suitable habitat for Coulter's goldfields is not present in the Subject Creek corridors or at net locations. This species would not be expected to occur in the creek channels.
Ocellated Humboldt lily *Lilium humboldtii* ssp. *ocellatum*	CRPR 4.2 G4, S4	Oak canyons, chaparral, and yellow-pine forests. Elevation range: 0 – 6,000 feet. Blooming period: May – August.	Yes	Observed and mapped during the September 2018 field surveys along the western slope at RC-15.
Santa Barbara honeysuckle *Lonicera subspicata* var. *subspicata*	CRPR 1B.2 G5, S2	Chaparral, cismontane woodland, coastal scrub. Elevation range: 0 – 3,300 feet. Blooming period: April – May.	Yes	Suitable chaparral and oak woodland habitat is present in the Subject Creek corridors to support Santa Barbara honeysuckle. No Santa Barbara honeysuckle shrubs were observed during the September 2018 surveys and this species is not expected to occur at net locations.

Table 5. Special-status Plant and Wildlife Species Occurrences Documented within the Project Region.

Common Name *Scientific Name* *(Arranged alphabetically by scientific name)*	**Listing Status/ Rarity Ranking***	**Habitat Requirements/Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near Proposed Net Locations**
Carmel Valley malacothrix *Malacothrix saxatilis* var. *arachnoidea*	CRPR 1B.2 G5, S2	Rocky, open banks, shale outcrops, cliff faces, coastal scrub, chaparral. Elevation range: 80 – 3,000 feet. Blooming period: May – August (October)	No	Suitable chaparral habitat for Carmel Valley malacothrix is present in upland areas above the creek channels. This is a perennial species that would have been detectable at the time of the September 2018 surveys. No Carmel Valley malacothrix was observed during field surveys and this species is not expected to occur at proposed net locations.
White-veined monardella *Monardella hypoleuca* ssp. *hypoleuca*	CRPR 1B.3 G4, S3	Oak woodland and chaparral. Elevation range: 0 – 5,000 feet. Blooming period: May – October.	Yes	Suitable chaparral and oak woodland habitat is present in the Subject Creek corridors to support white-veined monardella. White-veined monardella is a perennial species that would have been detectable at the time of the September 2018 surveys. No white-veined monardella was observed during field surveys and this species is not expected to occur at proposed net locations.
Gambel's watercress *Nasturtium gambelii*	FE, ST/ CRPR 1B.1 G1, S1	Marshes, streambanks, lake margins. Elevation range: 0 – 1,200 feet. Blooming period: May – August.	Yes	Suitable habitat is present in the Subject Creek corridors for this aquatic species. Gambel's watercress is a perennial species that would have been detectable at the time of the September 2018 surveys. No Gambel's watercress was observed during field surveys and this species is not expected to occur at proposed net locations.
Nuttall's scrub oak *Quercus dumosa*	CRPR 1B.1 G3, S3	Generally sandy soils near the coast, sandstone, chaparral, coastal sage scrub. Elevation range: 0 – 600 feet. Blooming period: March – May.	No	Suitable chaparral habitat for Nuttall's scrub oak is present in upland areas above the creek channels. This species is typically restricted to elevations less than 600 feet along the coast. No Nuttall's scrub oak was observed during the September 2018 field surveys and this species would not expected to occur in the creek channels or at proposed net locations.

Table 5. Special-status Plant and Wildlife Species Occurrences Documented within the Project Region.

Common Name ***Scientific Name*** ***(Arranged alphabetically by scientific name)***	**Listing Status/ Rarity Ranking***	**Habitat Requirements/Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near Proposed Net Locations**
Black-flowered figwort *Scrophularia atrata*	CRPR 1B.2 G2, S2	Calcium and diatom-rich soils in chaparral, coastal dunes, coastal scrub, and riparian woodland. Elevation range: 0 – 1,300 feet. Blooming period: April – July.	Yes	Suitable chaparral and riparian woodland habitat is present in the Subject Creek corridors to support black-flowered figwort. A similar species, California figwort (*Scrophularia atrata*), was in bloom at the time of the September 2018 field surveys and was observed at numerous net locations. Black-flowered figwort is a perennial species and would have also been detectable during field surveys. No black-flowered figwort was observed during the September 2018 surveys and this species is not expected to occur at net locations.
Sonoran maiden fern *Thelypteris puberula* var. *sonorensis*	CRPR 2B.2 G5, S2	Meadows, along streams and seepage areas. Elevation range: 150 – 2,600 feet. Blooming period: N/A.	Yes	Suitable habitat is present in the Subject Creek corridors to support Sonoran maiden fern. Sonoran maiden fern is a perennial species and would have been detectable during field surveys. No Sonoran maiden fern was observed during the September 2018 surveys and this species is not expected to occur at net locations.
Santa Ynez false lupine *Thermopsis macrophylla*	SR/ CRPR 1B.3 G1, S1	Sandstone and chaparral. Elevation range: 3,300 – 4,600 feet. Blooming period: May – June.	No	Suitable sandstone and chaparral habitat for Santa Ynez false lupine is present in upland areas above the creek channels. Santa Ynez false lupine is a perennial species and would have been detectable during field surveys. No Santa Ynez false lupine was observed during the September 2018 surveys and this species is not expected to occur at net locations.
Invertebrates				

Table 5. Special-status Plant and Wildlife Species Occurrences Documented within the Project Region.

Common Name *Scientific Name* ***(Arranged alphabetically by scientific name)***	**Listing Status/ Rarity Ranking***	**Habitat Requirements/Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near Proposed Net Locations**
Monarch Butterfly *Danaus plexippus* (California overwintering population)	SA G4, S2	Overwintering sites (i.e., roosts) extend from Mendocino to Baja California, Mexico and are located in wind-protected tree groves (typically eucalyptus, Monterey pine, and cypress), with nectar source and water nearby.	No	Suitable protected eucalyptus, Monterey pine, or cypress groves for roosting are not present in the Subject Creek corridors or at proposed net locations. Nearby documented occurrences are in Montecito, closer to the coast (e.g., Ennisbrook, Romero Creek near 101) (CNDDB 2018). Overwintering populations of monarch butterflies are not expected to occur at proposed net locations.
Fish				
Southern California steelhead DPS *Oncorhynchus mykiss irideus*	FE, SSC/ G5, S1	Coastal streams less than 8,000 feet in elevation.	Yes	Southern California steelhead are known to occur historically in Cold Spring Creek, Romero Creek, and San Ysidro Creek, but are not able to access proposed net locations due to impassible barriers downstream . Portions of Cold Spring, Romero, and San Ysidro Creek have been designated Critical Habitat by the NMFS.
Amphibians				
Arroyo Toad *Anaxyrus californicus*	FE, SSC/ G2, S2	Inhabits washes, arroyos, sandy riverbanks, riparian areas with willows, sycamores, oaks, cottonwoods. Require exposed sandy stream sides with stable terraces for burrowing with scattered vegetation for shelter, and areas of quiet water or pools free of predatory fishes with sandy or gravel bottoms without silt for breeding.	No	Arroyo toad is not documented on the coastal slopes of the Santa Ynez Mountains. Nearby occurrences are documented from near the Gibraltar reservoir (CNDDB 2018). Arroyo toad is not expected to occur at proposed net locations.

Table 5. Special-status Plant and Wildlife Species Occurrences Documented within the Project Region.

Common Name ***Scientific Name*** ***(Arranged alphabetically by scientific name)***	**Listing Status/ Rarity Ranking***	**Habitat Requirements/Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near Proposed Net Locations**
Foothill yellow-legged frog *Rana boylii*	FC, SSC/ G3, S3	Rocky streams and rivers in forests, chaparral, and woodlands. Sometimes found in isolated pools, vegetated backwaters, and deep, shaded, spring-fed pools. Elevation range: sea level to 6,000 feet.	No	Nearby occurrences are documented from the Santa Ynez River and near the Mono Debris Dam (CNDDB 2018). Museum records show only two records for this species in Santa Barbara County. The likelihood of occurrence of this species at proposed net locations is considered low.
California Red-legged Frog (CRLF) *Rana draytonii*	FT, SSC/ G2, S2	Found primarily in coastal drainages of central California, from Marin County, California, to northern Baja California, Mexico. Uses a variety of aquatic, riparian, and upland habitats. Requires a pond, slow-flowing stream reach, or deep pool within a stream with vegetation or other material to which egg masses may be attached. Uses both riparian and upland habitats for foraging, shelter, cover. Will also use small mammal burrows and moist leaf litter as refugia.	Yes	CRLF have been documented 0.35-mile north of the confluence of Hot Springs Creek and Cold Spring Creek (CNDDB 2018). CRLF have also been recorded in the main stem of Montecito Creek (SES 2005). The likelihood of occurrence of this species at proposed net locations is considered moderate.
Reptiles				
Northern (silvery) legless lizard *Anniella pulchra*	SSC/ G3, S3	Inhabits moist soil in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks. Leaf litter under trees and shrubs in sunny areas and dunes stabilized with bush lupine and mock heather often indicate suitable habitat. Can also be found under surface objects such as rocks, boards, driftwood, and logs.	Yes	Suitable stream terrace habitat with sycamores and oaks are present along the Subject Creek corridors and at proposed net locations. Debris present in the channels could provide surface cover as well. The closest known occurrence is Sandyland, northeast El Estero, 2 miles WNW of Carpinteria (CNDDB 2018). The likelihood of occurrence of this species at proposed net locations is considered moderate.

Table 5. Special-status Plant and Wildlife Species Occurrences Documented within the Project Region.

Common Name ***Scientific Name*** ***(Arranged alphabetically by scientific name)***	**Listing Status/ Rarity Ranking***	**Habitat Requirements/Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near Proposed Net Locations**
Southwestern pond turtle *Actinemys pallida*	SSC/ G3, S3	Inhabits permanent or nearly permanent bodies of water in many habitat types; at elevations below 6,000 feet. Requires basking sites such as partially submerged logs, vegetation mats, or open mud banks. Needs suitable upland nesting sites with silty soils for egg laying.	Yes	Closest documented occurrence of southwestern pond turtle is from the Andre Clark Bird Refuge, 0.3-mili ESE of Highway 101 at Salinas Street (CNDDB 2018). The likelihood of occurrence of this species at proposed net locations is considered moderate.
San Diegan Tiger (Coast) whiptail *Aspidoscelis tigris stejnegeri*	SSC/ G5, S3	Found in a variety of ecosystems, primarily hot and dry open areas with sparse foliage; chaparral, woodland, riparian areas.	No	Closest documented occurrence is from the Santa Ynez River, 1.4 miles NW of Gibraltar Dam (CNDDB 2018). This is a possible misidentification, as this subspecies is known to occur from Ventura County south to Baja California. San Diegan tiger whiptail is not expected to occur at proposed net locations.
Blainville's (Coast) horned lizard *Phrynosoma blainvillii*	SSC/ G3, S3	Occur in various scrublands, grasslands, coniferous and broadleaf forests, and woodlands at elevations up to 6,000 feet. Require loose, fine soils with open areas for basking and shrubs for refugia. Often occur in sandy sites.	No	Blainville's (coast) horned lizard was documented 0.2-mile east of Mountain Drive at Coyote Road in 1981 (CNDDB 2018). Suitable dry sandy habitat for this species may be present in upland chaparral areas above the creek channels and proposed net locations. Blainville's (coast) horned lizard would not be expected to occur in the stream channels and is not expected to occur at proposed net locations.

Table 5. Special-status Plant and Wildlife Species Occurrences Documented within the Project Region.

Common Name ***Scientific Name*** ***(Arranged alphabetically by scientific name)***	**Listing Status/ Rarity Ranking***	**Habitat Requirements/Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near Proposed Net Locations**
Coast patch-nosed snake *Salvadora hexalepis virgultea*	SSC/ G5, S2	Inhabits semi-arid brushy areas and chaparral in canyons, rocky hillsides, and plains.	Yes	Suitable chaparral habitat to support coast patch-nosed snake is present in upland areas above the Subject Creek channels. The likelihood of occurrence of this species in at net locations is considered low due to its limited regional distribution.
Coast range newt *Taricha torosa*	SSC/ G4, S4	Occurs in coastal drainages. Breeds in ponds, reservoirs, and slow flowing streams.	Yes	Coast range newt was documented in Cold Spring Creek near the Mountain Drive bridge in 2000 and 2006 (CNDDB 2018). There are several records in SBNHM files, also from Cold Spring Creek. All five of the Subject Drainages offer suitable habitat. The likelihood of occurrence of this species at proposed net locations is considered high.
Two-striped garter snake *Thamnophis hammondii*	SSC/ G4, S3	Generally found around pools, creeks, cattle tanks, and other water sources. Often in rocky areas in oak woodland, chaparral, brushland and coniferous forests.	Yes	Closest documented occurrence of two-striped garter snake is from Rattlesnake Canyon, 1 mile north of Las Canoas Road (CNDDB 2018). There is suitable habitat for this species in each of the Subject Creeks. The likelihood of occurrence of this species at proposed net locations is considered moderate.
Birds				
Cooper's hawk *Accipiter cooperii*	WL, MBTA/ G5, S4	Nests in oak, riparian, and non-native woodlands. Frequents a wide variety of habitats while hunting.	Yes	Closest documented occurrences of Cooper's hawk are from Mission Canyon in Santa Barbara (CNDDB 2018). The likelihood of occurrence of this species at proposed net locations is considered high.

Table 5. Special-status Plant and Wildlife Species Occurrences Documented within the Project Region.

Common Name ***Scientific Name*** ***(Arranged alphabetically by scientific name)***	**Listing Status/ Rarity Ranking***	**Habitat Requirements/Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near Proposed Net Locations**
Southwestern willow flycatcher *Empidonax traillii extimus*	FE, SE, MBTA/ G5, S1	Breeds in relatively dense riparian tree and shrub communities associated with rivers, swamps, and other wetlands including lakes and reservoirs.	No	Dense riparian tree and shrub communities are not currently present in the Survey Area. The three documented nesting occurrences in the region are in the Santa Ynez River near the Gibraltar Reservoir and in Mono Creek (CNDDB 2018). This species is not expected to breed at net locations due to lack of dense riparian habitat. It may occur as a seasonal migrant.
Black-crowned night heron (nesting colonies) *Nycticorax nycticorax*	MBTA/ G5, S4	Found in all types of wetland habitats: fresh, brackish, and salt water in swamps, rivers, streams, impoundments canals, ponds, and reservoirs. Roost in clumps of dense trees (particularly eucalyptus) near large coastal bodies of water.	No	Closest documented occurrence of a black-crowned night heron nesting colony is from Shoreline Drive at Castillo Street in Santa Barbara (CNDDB 2018). This species is not expected to roost at proposed net locations due to a lack of suitable dense clumps of trees and distance from the coast.
Bank swallow *Riparia riparia*	ST, MBTA/ G5, S2	Nest colonially in eroded banks of rivers, streams, lake, reservoirs, and coastal cliffs.	No	Bank swallows are rare to very rare migrants in Santa Barbara County and no longer breed in the County or elsewhere in southern California (Lehman 2018). Nearby historical occurrences of bank swallow are documented from Santa Barbara and Arroyo Burro Beach in 1913 and 1927 (CNDDB 2018). This species is not expected to occur at proposed net locations.
Least Bell's vireo *Vireo bellii pusillus*	FE, SE, MTBA/ G5, S2	Breeds in riparian habitat in southern California, primarily along the coast and the western edge of the Mojave Desert. Nearest recent nesting records are from the upper Santa Ynez River drainage. Require dense riparian areas, dominated by willows and adjacent to freshwater streams.	No	Dense riparian habitat is not currently present in the Subject Creek corridors. The nearest known occurrence of least Bell’s vireo in the region is from the Santa Ynez River near Gibraltar Reservoir (CNDDB 2018). This species is not expected to occur at proposed net locations, except as a rare transient.
Mammals				

Table 5. Special-status Plant and Wildlife Species Occurrences Documented within the Project Region.

Common Name ***Scientific Name*** ***(Arranged alphabetically by scientific name)***	**Listing Status/ Rarity Ranking***	**Habitat Requirements/Habitat Affinity**	**Suitable Habitat Present at Project Locations (Y/N)**	**Likelihood for Occurrence within or near Proposed Net Locations**
Townsend's Big-Eared Bat *Corynorhinus townsendii*	SSC/ G3, S2	Found in a variety of habitats including coniferous forests and woodlands, deciduous riparian woodland, semi-desert and montane shrublands. Hibernates in mines or caves in the winter months. Roosts in a variety of features including limestone caves, lava tubes, and man-made structures.	Yes	Townsend's big eared bat may use the canyons in the Project region for foraging and roosting. Occurrences in the region are from El Estero just west of Carpinteria and the Monte Vista Elementary School in Santa Barbara (CNDDB 2018). The likelihood of occurrence of this species in at net locations is considered low.
Big free-tailed bat *Nyctinomops macrotis*	SSC/ G5, S3	Rugged, rocky terrain. Roost in crevices, buildings, caves, tree holes. Migratory.	No	Big free-tailed bat may use the canyons in the Project region for foraging and roosting. There is one documented occurrence of big free-tailed bat in Santa Barbara from 1996 (CNDDB 2018). The range of this species does not extend into Santa Barbara County. No roosting habitat was observed at proposed net locations and this species is not expected to occur.

*Listing Status/ Rarity Ranking Notes:

Federal:	FE – Federally listed Endangered
	FT – Federally listed Threatened
	FC – Federal Candidate Species
	WL – USFWS Watch list
	BCC – USFWS Bird of Conservation Concern
	MTBA – Migratory Bird Treaty Act
State:	SE – State listed Endangered
	ST – State listed Threatened
	SC – State Candidate Species
	SR – State Rare Species
	SA – State Special Animal
	FP – CDFW Fully Protected Species
	SSC – CDFW Species of Special Concern
	WL – CDFW Watch List
CRPR:	California Native Plant Society Rare Plant Rank

CBR – Considered but Rejected
1B – Rare, threatened, or endangered in CA and elsewhere
2 – Rare, threatened, or endangered in CA but common elsewhere
4 – Limited distribution (Watch-list)
CBR – Considered but Rejected

CRPR Extensions
0.1 – Seriously endangered in California
0.2 – Fairly endangered in California
0.3 – Not very endangered in California

CNDDB Element Rankings

Global/State Rarity Ranking:
G1/S1 – Critically imperiled. At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
G2/S2 – Imperiled. At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
G3/S3 – Vulnerable. At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
G4/S4 – Apparently Secure. Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5/S5 – Demonstrably Secure. Common; widespread and abundant.

[1] – Unless otherwise noted, habitat, elevation, and blooming period for special-status plant species is from *The Jepson Manual, Second Edition* 2012 and CNPS 2018.

4.4 BOTANICAL RESOURCES

One-hundred three (103) plant species were observed within or surrounding the proposed net locations during the September and December 2018 field surveys. A comprehensive list of vascular plant species observed in the Survey Area is provided in Appendix C.

Two special-status plant species, Plummer's baccharis and ocellated Humboldt lily, were observed at Project locations during the field surveys. In addition, suitable habitat for umbrella larkspur and Ojai fritillary is present in the creek channels and at proposed net locations. These four species are discussed in detail in Section 4.4.2 below.

Suitable habitat is not present in the creek channels at the proposed net locations for late-flowered mariposa lily, Palmer's mariposa lily, Santa Barbara morning-glory, mesa horkelia, Coulter's goldfields, Carmel Valley malacothrix, Nuttall's scrub oak, and Santa Ynez false lupine. These species are not expected to occur at proposed net locations and are not discussed further.

Perennial special-status plant species know to occur in the Project region (i.e., Santa Barbara honeysuckle, white-veined monardella, Gambel's watercress, black-flowered figwort, and Sonoran maiden fern) would have been detectable at the time of the field surveys and were not observed. These species are not expected to occur at proposed net locations and are not discussed further.

4.4.1 Sensitive Vegetation Communities

Coast live oak woodland, arroyo willow thickets, and other riparian habitats (e.g., western sycamore woodland, California bay forest) present in the Subject Creek corridors and at proposed net locations are considered valuable biological resources and are classified as Environmentally Sensitive Habitat (ESH) per the *Environmental Thresholds and Guidelines Manual* (County 2008). Individual mature coast live oak trees (6 inches or greater diameter at breast height) are considered sensitive by the County and are provided protection by the *Comprehensive Plan Conservation Element Oak Tree Protection Supplement* (2009).

One additional sensitive vegetation community, southern coastal salt marsh was documented by the CNDDB (2018) within the Project region. Salt marsh habitat is not present in the Subject Creek corridors.

4.4.2 Special-status Plant Species with the Potential to Occur at Proposed Net Locations

Umbrella larkspur (*Delphinium umbraculorum*) (*CRPR 1B.3, G3, S3*). Umbrella larkspur is a perennial herb that occurs in moist oak woodlands and occasionally chaparral habitat at elevations between 1,300 and 5,300 feet. This species blooms between April and June. Umbrella larkspur has a rarity ranking of "Vulnerable" at a global and state level and is considered to be rare, threatened, or endangered in California and elsewhere by the CNPS. The Subject Creeks may have suitable habitat to support umbrella larkspur. Botanical surveys conducted during the appropriate blooming period would be necessary to confirm that this species is not present at proposed net locations.

Ojai fritillary (*Fritillaria ojaiensis*) (*CRPR 1B.2*). Ojai fritillary is a perennial bulb-forming herb with three to five large bulb scales. Stems are usually 40 to 70 cm, with whorled leaves at the base, and nodding flowers that are greenish-yellow with brown spots. This plant blooms early, from February to May, and occurs on rocky slopes in mesic locations in woodlands, chaparral, and river basins from 900 to 1,650 feet in elevation. Ojai fritillary is known only from San Luis Obispo, Santa Barbara, and Ventura Counties. This species has a rarity ranking of "Imperiled" at a global and state level and is considered fairly endangered in California by the CNPS. Similar to the umbrella larkspur, Ojai fritillary prefers mesic sites suitable habitat is present at net locations to support this species. Botanical surveys conducted during the appropriate blooming period would be necessary to confirm that this species is not present at proposed net locations.

4.4.3 Special-status Plant Species Observed at Proposed Net Locations

Plummer's baccharis (*Baccharis plummerae* ssp. *plummerae*) (*CRPR 4.2, G3, S3*). Plummer's baccharis is a small, broad-leaved winter-deciduous shrub (< 2 meters tall) in the sunflower family (Asteraceae). Plummer's baccharis typically occurs on rocky, well-drained, north-facing slopes in coastal sage scrub and oak woodland plant communities. Flowers generally bloom between August and November, but are not particularly showy (Appendix A – Site Photographs). Plummer's baccharis has a rarity ranking of "Vulnerable" at a global and state level and is considered uncommon in California by the CNPS, but can be locally abundant where it occurs. It ranges in distribution from southern coastal Santa Barbara County to coastal Los Angeles County, as well as Santa Cruz and Anacapa islands, below 6,000 feet in elevation. Occurrences of Plummer's baccharis were observed and mapped at seven of the proposed net locations (CS-11, SY-7a, BV-5, BV-6, BV-7, RC-12, and RC-15) (Figures 6b, 6c, 6e, 6f, 6g, 6l, 6m – Proposed Net Locations, Jurisdictional Boundaries & Sensitive Resources).

Ocellated Humboldt lily (*Lilium humboldtii* ssp. *ocellatum*) (*CRPR 4.2, G4, S4*). Ocellated Humboldt lily is a bulb-forming perennial herbthat typically blooms from May to August. Flowers are yellow or light orange, with spots margined in red. Ocellated Humboldt lily can be found in oak canyons, chaparral, yellow-pine forest, and riparian woodland at elevations below 6,000 feet. Ocellated Humboldt lily has rarity ranking of "Apparently Secure" at a global and state level and is considered uncommon in California, but can be locally abundant where it occurs. This species ranges in distribution from San Luis Obispo County south to San Diego County and also exists on Anacapa Island and Santa Rosa Island. One ocellated Humboldt lily individual was observed and mapped at RC-15, along the western bank (Figure 6m – Proposed Net Locations, Jurisdictional Boundaries & Sensitive Resources).

4.4.4 Special-Status Plant Species Abundance & Distribution at Proposed Net Locations

Table 6 provides a summary of the occurrences of special-status plant species observed and mapped at the proposed net locations during the 2018 field surveys. CDFW CNDDB forms for observations of special-status species are included in Appendix E.

Table 6 – Summary of Special-status Plant Species Abundance & Distribution

Net Location	Feature Type[1]	Latitude [2]	Longitude [2]	Number of Plants Observed/ Description of Location	Total Area[3] (square feet)
Plummer's baccharis					
CS-11	Polygon	34.460414	-119.65411	27 plants along TOB on east slope	585
	Polygon	34.460267	-119.653856	5 plants on west slope	124
SY-7a	Point	34.468207	-119.622870	4 plants on slope east of net site; 30 feet above the channel and 6 feet downslope of the public trail	16
BV-5	Polygon	34.45539	-119.610297	3 plants on west slope; 30-40 feet above channel	130
BV-6	Polygon	34.458358	-119.608668	12 plants on east bank	349
	Polygon	34.458405	-119.608906	10 plants on west bank	56
BV-7	Polygon	34.456101	-119.609351	8 plants on east bank	298
RC-12	Polygon	34.465268	-119.591019	55 plants along west bank/TOB	1,404
RC-15	Point	34.458732	-119.591580	1 plant on west bank	4
	Point	34.458719	-119.591484	3 plants on west bank	12
Ocellated Humboldt lily					
RC-15	Point	34.458747	-119.591657	1 plant on west bank; 20 feet above channel	2

[1] Populations with multiple individuals were mapped as polygon features; individual plants were mapped as point features.

[2] All features were collected in datum NAD83, State Plane CA Zone 5. Waypoints of polygon features are at the approximate center of the feature.

[3] Approximate area for point features was visually estimated in the field. Area for polygon features was generated using ArcGIS.

4.5 WILDLIFE RESOURCES

The field surveys enabled a characterization of habitat quality and assessment of potential for occurrence of special-status wildlife species (e.g., southern California steelhead, California red-legged frog [CRLF], coast range newt, southwestern pond turtle, two-striped gartersnake, Cooper's hawk.). A list of all wildlife species observed within the Subject Creeks is included as Appendix D – Wildlife Inventory.

4.5.1 General Wildlife Habitat

Bird species typically associated with foothill canyon riparian and chaparral habitats were observed during the field surveys (Appendix D). Exmples include California quail (*Callipepla californica*), red-tailed hawk (*Buteo jamaicensis*), Anna's humminghbird (*Calypte anna*), northern flicker (*Colaptes auratus*) acorn woodpecker (*Melanerpes formicivorus*), black phoebe (*Sayornis nigricans*), Stellar's jay (*Cyanocitta stelleri*), western scrub jay (*Aphelocoma* *californica*), Canyon wren (*Ctherpes mexicanus*), spotted towhee (*Pipilo maculatus*), California towhee (*Pipilo crissalis*), and dark-eyed junco (*Junco hyemalis*).

Two amphibian species were observed during field surveys, California treefrog (*Pseudacris cadaverina*) and Baja California treefrog (*P. hypochondriaca*). Four reptile species were recorded: California striped racer (*Coluber lateralis*), coast mountain kingsnake (*Lampropeltis zonata*); western fence lizard (*Sceloporus occidentalis*); and southern alligator lizard (*Elgaria multicarinata*).

Evidence (i.e., scat, and tracks) indicated the presence of grey fox *(Urocyon cinereoargentes*) and mule deer (*Odocoileus hemionus*).

4.5.2 Special-status Wildlife Species Observed in the Survey Area

No special-status wildlife species were observed during the September and December 2018 field surveys. However, nine special-status wildlife species have to the potential to occur, as summarized in Table 5. The narratives below describe the special-status wildlife species with a likelihood of occurrence in the Subject Creeks and/or at proposed net locations. Each species' habitat preferences, distribution, and key characteristics are provided.

4.5.3 Special-status Wildlife Species with the Potential to Occur in the Survey Area

Special-status wildlife species that have the potential to occur in the Subject Creeks based on presence of suitable habitat and/or documented occurrences are discussed below.

Southern California steelhead DPS (*Oncorhynchus mykiss irideus*) (*FE, SSC, G5, S1*). The Southern California Distinct Population Segment (DPS) of steelhead is listed as endangered under the Federal ESA and is considered a Species of Special Concern by CDFW. Steelhead are anadromous, born in freshwater streams, they migrate to the ocean and remain pelagic until returning to freshwater to spawn. Stoecker (2002) cites historic records for Southern California steelhead in three of the four Subject Drainages: Cold Spring, San Ysidro, and Romero Creeks. Portions of Cold Spring, Romero, and San YsidroCreeks are designated Critical Habitat for Southern California steelhead (NMFS 2005) (Figure 5 – CNDDB Wildlife Occurrences).

Stoecker (2002) also identified barriers to migration in several "focal watersheds", including Montecito (= Hot Springs and Cold Spring) Creek and San Ysidro Creek. The lower-most elevation barrier in the drainages that are considered "impassible" for federally listed DPS are shown in Figures 2a through 2d. There is a barrier (concrete channel) in the main stem of Montecito Creek and debris basin dams on Cold Spring, Romero, and San Ysidro Creeks. Given these barriers, each of which is downstream from the proposed debris net locations, there is presently no potential for federally listed DPS to be present in the work areas.

Between 2014 and 2016, CDFW biologists relocated *O. mykiss* from portions of Montecito and San Ysidro Creeks where water quality was degraded by persistent drought conditions (Larson 2018 personal communication). The fish were re-introduced in reaches of Hot Springs, Cold Spring, and San Ysidro Creeks with greater depth and better water quality.

California red-legged frog (*Rana draytonii*) (*FT, SSC, G2, S2*). The CRLF is listed as threatened under the Federal ESA and is considered a Species of Special Concern by CDFW.

CRLF has a rarity ranking of “Imperiled” at a global and state level. CRLF are typically found in segments of streams and rivers sustaining prolonged surface flow or standing pools that afford cover and food resources. Upland dispersal and migration typically occur under wet conditions during fall and winter.

The CNDDB query revealed one record for CRLF in Cinquefoil Creek, 0.35 miles north of the confluence of Cold Spring and Hot Springs Creeks. Adult CRLF were observed in Montecito Creek, below the confluence with Cold Spring/Hot Springs Creeks during nighttime surveys conducted in September of 2005 (SES 2005). There is also a record for San Ysidro Canyon from 1982 (SBMNH unpublished).

Each of the five drainages supports suitable habitat for CRLF. If present, local populations were undoubtedly affected the recent fire and subsequent debris flow. Habitat value will improve with recovery of the riparian overstory and understory.

Northern (silvery) legless lizard (*Anniella pulchra*) (*SSC, G3, S3*). The northern legless lizard has a rarity ranking of “Vulnerable” at a global and state level and is recognized as a California Species of Special Concern. It occurs in scrub and woodland habitats associated with loose, sandy substrates. Based on habitat association and soil type, legless lizards should be considered a likely resident in upland reaches of the Subject Creeks.

Southwestern pond turtle (*Actinemys pallida*) (*SSC, G3, S3*). The southwestern pond turtle has a rarity ranking of “Vulnerable” at a global and state level and is recognized as a California Species of Special Concern. They inhabit freshwater ponds, streams, and artificial impoundments, using the adjacent uplands for egg laying. The CNDDB query did not reveal any records for the Subject Creeks, nor did a review of unpublished museum data (SBMNH undated). However, suitable habitat is present and the species could be encountered at proposed net locations.

Coast patch-nosed snake (*Salvadora hexalepis virgultea*) (*SSC, G5, S2*). The coast patch-nosed snake has a rarity ranking of “Secure” at a global level, “Imperiled” at a state level, and is recognized as a California Species of Special Concern. There are few records for the Santa Barbara Region, but the species could be found in upland habitats above the Subject Creek channels and proposed net locations.

Coast range newt (*Taricha torosa*) (*SSC, G4, S4*). The coast range newt has a rarity ranking of “Apparently Secure” at a global and state level and is recognized as a California Species of Special Concern. Coast range newts are known to occur in Cold Spring and Hot Springs Creeks (SBMNH unpublished, CNDDB 2018). There is suitable habitat for Coast Range Newt in each of the Subject Creeks.

Two-striped gartersnake (*Thamnophis hammondii*) (*SSC, G4, S3*). The two-stripe gartersnake has a rarity ranking of “Apparently Secure” at a global level, “Vulnerable” at a state level, and is recognized as a California Species of Special Concern. There is suitable habitat for two-striped garter snake in each of Subject Creeks.

Cooper’s hawk (*Accipiter cooperii*) (*WL, MBTA, G5, S4*). Cooper’s hawk is a CDFW Watch List species and is protected by the MBTA. It has a rarity ranking of “Secure” at a global level, “Apparently Secure” at a state level. Cooper’s hawks are relatively common, year-round resident in the Santa Barbara Region. They nest with uncommon frequency in foothill canyons and are likely to occur in the Subject Creek corridors.

Townsend's Big-Eared Bat (*Corynorhinus townsendii*) (*SSC, G3, S2*). The Townsend's big-eared bat has a rarity ranking of "Vulnerable" at a global level, "Imperiled" at a state level, and is recognized as a California Species of Special Concern. Townsend's big-eared bat is widely distributed with the Santa Barbara Region. They typically roost in caves, mine tunnels, or buildings. There is no suitable roosting habitat in the Project vicinity. Foraging would be unlikely to be affected, since all work will occur during daylight hours.

4.6 JURISDICTIONAL WATERS AND WETLANDS

A delineation of waters of the U.S. and CDFW jurisdiction was conducted during the September 2018 surveys (Figures 6a-6m – Proposed Net Locations, Jurisdictional Boundaries & Sensitive Resources).

4.6.1 Waters of the U.S.

All of the creeks surveyed as part of the Project are perennial, ultimately discharging into the Pacific Ocean, and therefore, are considered jurisdictional Waters of the U.S. under current federal guidance. Due to the debris flows in January 2018, the creek corridors are highly altered from what would be considered typical or "ordinary", and indicators of high water were not always evident or reliable. Therefore, the approximate OHWM was established at each net location using physical marks on the landscape (e.g., drainage patterns, topographic breaks in slope, changes in sediment characteristics, etc.) that represented a reasonable judgement of water levels at above average, but not extreme levels (Figures 6a-6m – Proposed Net Locations, Jurisdictional Boundaries & Sensitive Resources). Table 3 summarizes stream characteristics (e.g., estimated width of the active channel, depth of flow, and width of channel at OHWM) at each proposed net location.

No jurisdictional wetlands are present at proposed net locations.

4.6.2 CDFW Jurisdictional Streambed

The stream banks at the majority of the proposed net locations are steeply incised and most of the vegetation along the slopes was burned in the Thomas Fire. In many locations, the TOB was well above the stream channel (i.e., 30 to 50 feet). Approximate TOB was mapped in the field using obvious topographic changes and ridgelines as boundaries. At all of the proposed net locations, the upland limit of CDFW jurisdiction corresponds to the TOB (Figures 6a-6m – Proposed Net Locations, Jurisdictional Boundaries & Sensitive Resources). All proposed net locations are wholly within CDFW jurisdiction.

5.0 IMPACT DISCUSSION

The follow sections describe the potential impacts of the proposed Project on biological resources. For the purposes of this analysis, net installation and maintenance, including removal of accumulated debris, are considered temporary impacts. The debris nets are intended to be in place for a period of up to 5 years, and then removed as the watersheds effected by the Thomas

Fire revegetate. Temporary impacts would result from net installation and required maintenance activities.

Direct impacts to plant and wildlife habitat would occur through staging and operation of equipment for net installation, accumulation of debris behind the nets, and redistribution of accumulated material downstream if/when an event occurs. The construction and maintenance areas are is depicted in Figures 6a through 6m for each proposed net location.

5.1 IMPACTS TO JURISDICTIONAL RESOURCES

The Subject Creeks contain USACE non-wetland Waters of the U.S. and CDFW Streambeds. The impacts to USACE, CDFW, and County are summarized in Table 7 below.

Table 7 – Summary of Impacts to Jurisdictional Resources

Net Location	Construction			Maintenance/Debris Flow Removal		
	Non-Wetland Waters of the U.S. (acres)	CDFW Streambed[1] (acres)	County ESH[2] (acres)	Non-Wetland Waters of the U.S. (acres)	CDFW Streambed[1] (acres)	County ESH[2] (acres)
Cold Spring Creek						
CS-11	0.01	0.04	0.04	0.1	0.32	0.32
CS-18	0.01	0.05	0.05	0.07	0.18	0.18
Subtotal:	**0.02**	**0.09**	**0.09**	**0.17**	**0.5**	**0.5**
San Ysidro Creek						
SY-7a	0.04	0.05	0.05	0.07	0.09	0.09
SY-18	0.01	0.03	0.03	0.1	0.26	0.26
Subtotal:	**0.05**	**0.08**	**0.08**	**0.17**	**0.35**	**0.35**
Buena Vista Creek						
BV-2	0.01	0.03	0.03	0.03	0.07	0.07
BV-4	0.01	0.07	0.07	0.05	0.18	0.18
BV-5	0.01	0.04	0.04	0.05	0.14	0.14
BV-6	0.01	0.03	0.03	0.04	0.11	0.11
BV-7	0.01	0.03	0.03	0.04	0.11	0.11
BV-10	0.01	0.03	0.03	0.06	0.17	0.17
BV-11	0.02	0.08	0.08	0.1	0.18	0.18
Subtotal:	**0.08**	**0.31**	**0.31**	**0.37**	**0.96**	**0.96**
Romero Creek						
RC-12	0.01	0.04	0.04	0.05	0.09	0.09
RC-15	0.01	0.03	0.03	0.06	0.16	0.16
Subtotal:	**0.02**	**0.07**	**0.07**	**0.11**	**0.25**	**0.25**
Totals:	**0.17**	**0.55**	**0.55**	**0.82**	**2.06**	**2.06**

[1] Acreage for CDFW-jurisdictional areas includes Non-wetland Waters of the U.S.
[2] Acreage for County ESH includes Non-wetland Waters of the U.S. and CDFW-jurisdictional areas.

5.2 U.S. ARMY CORPS OF ENGINEERS

USACE jurisdiction extends to the OHWM on the banks of the creek at each net location. Installation and maintenance of the 13 proposed nets will result in cumulative, temporary impacts to 0.99-acre of USACE-jurisdictional Waters of the U.S.

Projects that result in discharge of dredged or fill material to jurisdictional Waters of the U.S. require a CWA Section 404 permit from the USACE. USACE-defined waters are also subject to the permitting authority of the County.

5.3 CDFW JURISDICTIONAL STREAMBED

All of the nets would be installed below the TOB and therefore, wholly within CDFW jurisdiction. The installation and maintenance of the 13 proposed nets will result in cumulative, temporary impacts to 2.61 acres of CDFW-jurisdictional stream bed and bank and associated riparian habitat.

The CDFW administers Streambed Alteration Agreements under Sections 1600-1607 of the Fish & Game Code. Sections 1600-1607 address any project that will “(1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake designated by the department [California Fish and Wildlife] in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit, (2) use materials from the streambeds designated by the department, or (3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass in to any river, stream, or lake designated by the department” (Section 1601). A Streambed Alteration Agreement (SAA) is required for any work occurring within a water with defined bed and bank features.

5.3.1 Central Coast Regional Water Quality Control Board

All of the Subject Creeks are perennial and discharge into downstream waters (i.e., Pacific Ocean). The Central Coast RWQCB regulates work involving discharge of pollutants into waters/wetlands under Section 402 of the CWA and the National Pollutant Discharge Elimination System permit (NPDES) program. Under the NPDES program, projects involving discharge of pollutants into waters/wetlands must have a Stormwater Pollution Prevention Plan (SWPPP), which is reviewed and approved by the Central Coast RWQCB and the County.

5.3.2 County of Santa Barbara

Jurisdictional streams and associated riparian vegetation are considered ESH by the County. The lateral extent of County jurisdiction in streams corresponds to CDFW jurisdiction, which in this case is the TOB at each net location. The installation and maintenance of the proposed nets will result in cumulative, temporary impacts to 2.61 acres of County-designated ESH. Project-related impacts to streams/riparian areas must be mitigated or avoided, consistent with County land use policies protecting streams and wetlands.

5.4 IMPACTS TO EXISTING VEGETATION AND SENSITIVE COMMUNITIES

The proposed Project will result in temporary impacts to the native vegetation that has reestablished in the channels and along the banks at the proposed net locations. The vegetation communities present at the net locations are all associated with the riparian corridor of the Subject Creeks and are therefore, considered sensitive per local, state, and federal policies and guidelines.

Vegetation at the net locations is sparse due to the Thomas Fire and subsequent debris flows. Total vegetation cover ranges from 5 to 45 percent at net locations (see Table 4). The installation and maintenance of the proposed nets will result in impacts to 2.61 acres of riparian vegetation, which corresponds to the area of impacts to County-designated ESH.

Temporary impacts to vegetation due to net installation include trampling from construction equipment, personnel, and staging of materials. Ground disturbance for net installation is limited to the area where anchors are drilled and grouted into the banks (Figures 6a-6m – Proposed Net Locations, Jurisdictional Boundaries & Sensitive Resources).

No trees will be removed as part of the Project. Two sycamore saplings (BV-4) and one arroyo willow sapling (BV-5) may need to be trimmed during net installation.

Impacts due to net maintenance will include excavation of the accumulated debris behind the nets and redistribution of the material downstream. Avoidance and minimization measures outlined in Section 6.0 are recommended to reduce impacts to existing vegetation and sensitive communities.

5.5 IMPACTS TO SPECIAL-STATUS PLANT SPECIES

Two special-status plant species were observed and mapped at net locations: Plummer's baccharis and ocellated Humboldt lily (Figures 6b, 6c, 6e, 6f, 6g, 6l, 6m).

Populations of Plummer's baccharis are present near construction and maintenance areas at seven proposed net locations: CS-11, SY-7a, BV-5, BV-6, BV-7, RC-12, and RC-15. Impacts to individual Plummer's baccharis plants at two sites (BV-6 and RC-12) have the potential to occur during net installation.

Approximately 64 square feet of Plummer's baccharis is within the Construction Area at BV-6 and 265 square feet of Plummer's baccharis is in the Construction Area at RC-12 (see Figures 6e and 6l). Individual plants within these mapped areas will be flagged during pre-construction surveys and avoided if possible. In the event that Plummer's baccharis individuals are impacted by anchor installation, the number of plants will be documented and appropriate mitigation (e.g., reseeding, replanting) will be developed to compensate for impacts.

Ocellated Humboldt lily is present at one location, RC-15. This plant is located along the west bank, approximately 20 feet above the channel and will not be impacted by net installation. However, if a large debris flow occurs it would likely be removed from the slope.

The recommended avoidance and minimization measures have been developed to reduce impacts to special-status plant species, include pre-construction surveys to flag specimens for avoidance, worker environmental awareness training, and biological monitoring during construction, maintenance, and removal of nets.

5.6 IMPACTS TO WILDLIFE

5.6.1 Impediment to Wildlife Movement

The nets will not impede dispersal or migration of aquatic wildlife species or small mammals unless filled with debris. The design calls for a freeboard of 3 to 5 feet between the low-flow water surface and bottom of the net. This will allow sufficient space for the majority of wildlife species, including larger animals such as bear and mountain lion, to pass under the net. Some large wildlife, such as mule deer, may not be able to pass under the net and would have to traverse the adjacent canyon slopes to move upstream and downstream.

5.6.2 Potential for Incidental Take of Listed Species

Two federally-listed species, Southern California steelhead and California red-legged frog, are known to occur in the Subject Creeks. There is little or no possibility of incidental take of Southern California steelhead because downstream barriers currently prevent upstream migration.

CRLF could be killed or injured if present in the construction or maintenance areas. The species is most likely to be found in the active stream channel, but may also be present in the adjacent upland where work will occur.

Potential for incidental injury or mortality of special status wildlife species can be reduced through minimization and avoidance measures during construction (e.g., pre-construction nesting bird surveys, worker environmental awareness training, biological survey and monitoring).

5.6.3 Potential for Impacts to Non-listed Resident Salmonids

Resident salmonids could occur in the Subject Creeks and if present, might be killed or injured when accumulated material is redistributed. With the exception of restoring low flow conditions, there will be no operation of equipment in the active stream channel.

5.6.4 Degradation of Water Quality

Degradation of water quality could occur from two main sources: contaminants resulting from spills and increased turbidity during removal of accumulated debris.

Drilling equipment uses biodegradable fluids and lubricants (ALC 2018). No fuel will be stored at the work area and secondary containment will be used during all fueling operations. Secondary containment will also be set up at grout mixing stations and around anchor locations to prevent spillage.

A temporary increase in stream turbidity will occur as the low-flow channel is re-established when accumulated material is removed. Sediment controls (e.g., silt fence, straw wattles) will be installed downstream.

6.0 RECOMMENDED AVOIDANCE & MINIMIZATION MEASURES

Features inherent in the site selection, Project design, and method of debris net installation and maintenance are intended to reduce impacts to biological resources. Sites were initially chosen exclusively on the basis of geotechnical analysis and in consideration of capacity to capture and temporarily store debris. Those sites were vetted through a preliminary biological survey and reconnaissance. At some locations, the design of the debris nets was modified or redesigned in consideration of likely effects on resources. Sites that required soil excavation and/or tree removal were eliminated. Methods of construction that are minimally intrusive were developed. These include aerial deployment of equipment and materials and use of specialized machinery that can accomplish Project objectives with minimal effect on resources.

The following avoidance and minimization measures are recommended to reduce impacts to biological resources that might result from net installation and maintenance. Recommended species-specific and sensitive habitat protection measures are listed first, followed by general construction measures/BMPs.

6.1 SPECIES-SPECIFIC AND SENSITIVE HABITAT AVOIDANCE AND MINIMIZATION MEASURES

- All special-status plant populations (Plummer’s baccharis and ocellated Humboldt lily) present near net locations shall be flagged for avoidance prior to commencement of net installation to prevent impacts and/or disturbance. If special-status plant species cannot be avoided during construction, the number of plants impacted shall be documented and appropriate mitigation shall be developed.

- No oak trees shall be removed as part of net installation or maintenance. The area protected from disturbance should include the area 6 feet outside of the dripline of an oak. In the event oak trees are removed or damage to the Critical Root Zone (CRZ) of a tree occurs during net construction or maintenance, they shall be replaced in a manner consistent with County standards.

- A qualified biologist shall conduct a pre-construction survey of the net locations and access points for special-status wildlife that have the potential to occur. Wildlife observed within work areas will be captured and relocated to suitable habitat outside the construction zone. Incidental take permits are not being requested, so no handling (i.e., capture and relocation) of state- and/or federally-listed species is proposed. If listed species are observed within or near the work area, work will be suspended and the CDFW and USFWS notified.

6.2 GENERAL CONSTRUCTION AVOIDANCE AND MINIMIZATION MEASURES

- An agency-approved biologist (Project Biologist) will be onsite to conduct wildlife surveys, monitor for permit compliance, and provide oversight of construction and maintenance work.

- If the Project is implemented during the bird nesting season (February 1 to August 31), an agency-approved biologist shall conduct a pre-construction survey of the proposed development envelope and adjacent habitats within 7 days of construction commencement (i.e., mobilization, staging, vegetation clearing, or excavation) to avoid impacts to nesting raptors and other birds. Surveys shall be conducted in all areas within 500 feet of proposed disturbance areas, or a lesser distance if dense vegetation renders a 500-foot survey radius infeasible. If breeding birds with active nests are found prior to (or during) Project construction, an agency-approved biologist shall oversee the establishment of a buffer (prescriptively 300 feet for passerines and 500 feet for raptors) around the nest; no activities will be allowed within the buffer(s) until the young have fledged from the nest or the nest fails.

- Prior to the start of work, an agency-approved biologist shall provide worker orientation for all construction contractors (including site supervisors, equipment operators, and laborers) which emphasizes the presence of special-status species within the Subject Creeks and/or adjacent to the net locations, identification of those species, their habitat requirements, applicable regulatory policies and provisions regarding their protection, measures being implemented to avoid and/or minimize impacts, and penalties for noncompliance will be conducted. No staging of equipment or construction supplies shall occur prior to the tailgate meeting.

- All construction equipment shall be limited to designated work and staging areas. Minor adjustments may be made in the field in consideration of topography and current flow conditions, with the approval of the biological monitor.

- No equipment, diesel fuel, or grout will be staged or stored within the stream channel. Fueling of equipment will not be done within 100 feet of the active channel. Grout mixing stations will be placed a minimum of 15 feet from the active flow line of the creek. BMPs (e.g., silt fencing, straw wattles) shall be installed around the anchor construction work area to ensure grout from anchor installation does not enter the stream channel or adjacent habitat.

- Stationary equipment and fluid storage vessels will be equipped with secondary containment. A spill containment and cleanup kit will be onsite at each location while work is in progress.

- No construction shall occur within 24 hours of a National Weather Service forecasted 0.25-inch rain event.

- All motorized equipment used shall be maintained in proper working condition and shall be free of drips and leaks of coolant, hydraulic, and petroleum products. No equipment shall be used for the Project unless such equipment is free of leaks and drips. Equipment will be power-washed before mobilization to the work site.

- Trash and food items will be kept in closed containers and removed daily.

- Sediment controls will be installed downstream from the work area when accumulated material from behind the net is redistributed. Once the low-flow channel has been re-established, soil and rock will be cast to the side of the active channel. If feasible, a temporary retention basin may be used to control turbidity.

- Rocks, boulders, and coarse materials will be redistributed in a manner that mimics natural stream deposition and is favorable to wildlife. Re-distribution of accumulated material will be done under the supervision of a qualified biologist.

7.0 INVASIVE PLANT MANAGEMENT PROGRAM

In addition to the recommended avoidance and minimization measures outlined above, an invasive plant management program is also proposed in portions of the Subject Creek channels, to compensate for 2.61 acres of temporary impacts to ESH, reduce the spread of non-native plants, and assist in the recovery of native species.

The proposed invasive plant management program would include twice-annual removal of target invasive species for a period of five years or until the nets are removed. The non-native plants targeted for management were observed becoming established and spreading in the creek channels during field surveys. All of the target plant species are considered invasive by the California Invasive Plant Council (Cal-IPC). Target species are listed below along with their Cal-IPC rating (i.e., High, Moderate, or Limited):

- giant reed (*Arundo donax*) (High)
- black mustard (*Brassica nigra*) (Moderate)
- cape ivy (*Delairea odorata*) (High)
- fig (*Ficus carica*) (Moderate)
- sweet fennel (*Foeniculum vulgare*) (Moderate)
- tree tobacco (*Nicotiana glauca*) (Moderate)
- castor bean (*Ricinus communis*) (Limited)
- saltcedar (*Tamarix ramosissima*) (High)
- greater periwinkle (*Vinca major*) (Moderate)

Removal of the target invasive plant species will be conducted by crews walking the creek channels and hand pulling plants or removing plants with the assistance of hand tools (e.g., trowels, shovels, hand-held trimmers). The crews will be trained on what species will be targeted for removal and supervised by a restoration specialist or biologist. Plant removal efforts will be timed appropriately to reduce invasive species seed bank (i.e., before plants set seed). All plants will be bagged and disposed of appropriately off-site. No motorized equipment or herbicide will be used.

7.1 INVASIVE PLANT MANAGEMENT AREAS

The proposed invasive plant management areas are depicted in Figure 7. Each management area extends from a designated access point where crews can enter the creek channels (e.g., East Mountain Drive, Hot Springs Road, Park Lane, Edison Catway, or Romero Canyon Road) to the northern-most net location in each of the four Subject Creeks. Table 8 summarizes the areas proposed for invasive plant management in each creek.

Table 8 – Summary of Proposed Invasive Plant Management Areas

Creek Name	**Management Area**			
	Access Point	**Northern Net Location**[1]	**Approximate Linear Feet**	**Approximate Acreage**[1]
Cold Spring Creek	East Mountain Drive	CS-11 & CS-18	2,270	2.6
San Ysidro Creek	Edison Catway Road Crossing	SY-7a	4,000	4.6
Buena Vista Creek	Park Lane	BV-6 & BV-11	4,200	4.8
Romero Creek	Romero Canyon Road Crossing	RC-12	2,800	3.2
		Total	**13,270**	**15.2**

[1] Two net locations are listed for creek channels that branch.
[2] Acreages were calculated assuming an average 50-foot width of the creek channels.

As described in Section 5.0 (Impact Discussion), the Project has the potential to result in 2.61 acres of temporary impacts to ESH from construction of the nets and removal of accumulated debris, as necessary. Implementation of the proposed invasive plant management program will result in removal of numerous highly invasive plant species within approximately 15.2 acres of the Subject Creek channels.

Although management of the target plants is temporary, species such as saltcedar, giant reed, and cape ivy are known to cause severe ecological impacts on plant and animal communities, particularly in creek channels, due to their high rates of dispersal and establishment. Addressing the spread of these species quickly and repeatedly over the duration of the Project will help considerably to reduce establishment both within the management areas and downstream.

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FIGURES

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Site Vicinity Map
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The Partnership for Resilient Communities (TPRC)
Santa Barbara County, CA

Figure 1

January 18, 2019

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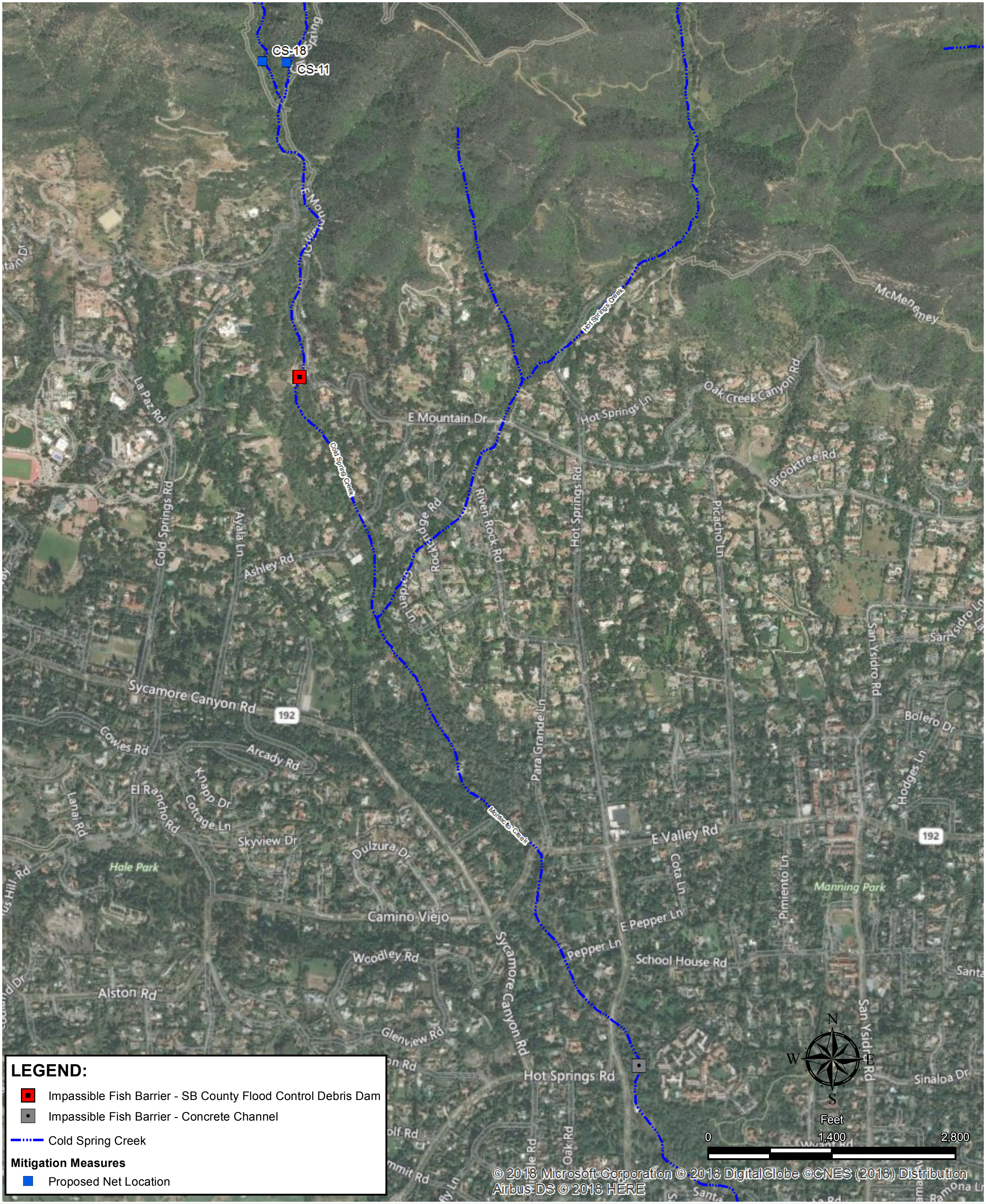

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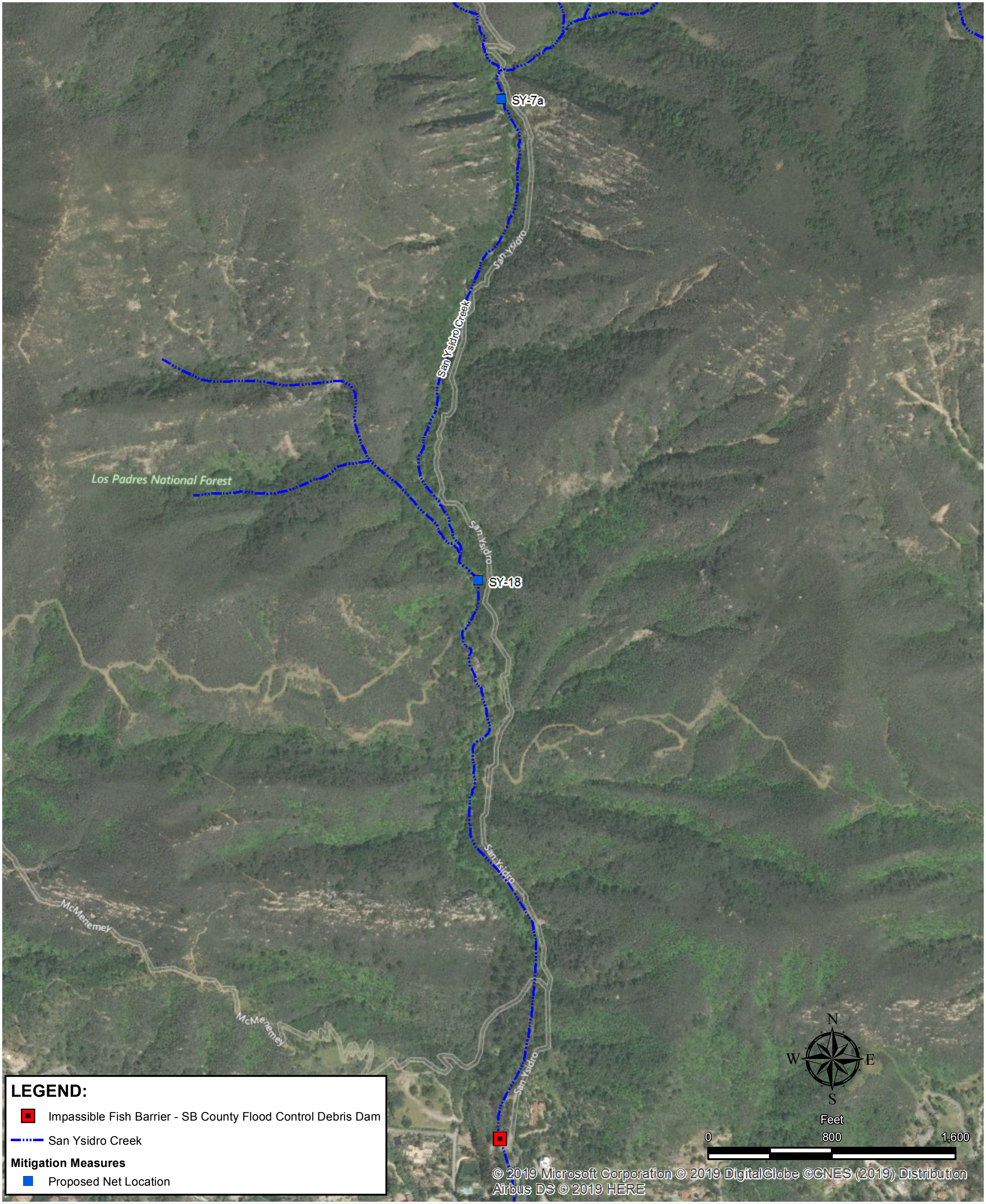
Project Area Map - Cold Spring Creek
Montecito Debris Flow Mitigation Project
The Partnership for Resilient Communities (TPRC)
Santa Barbara County, CA

Figure 2a

October 10, 2018



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Project Area Map - San Ysidro Creek
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The Partnership for Resilient Communities (TPRC)
Santa Barbara County, CA

Figure 2b

January 18, 2019

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Project Area Map - Buena Vista Creek
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Santa Barbara County, CA

Figure 2c

October 22, 2018

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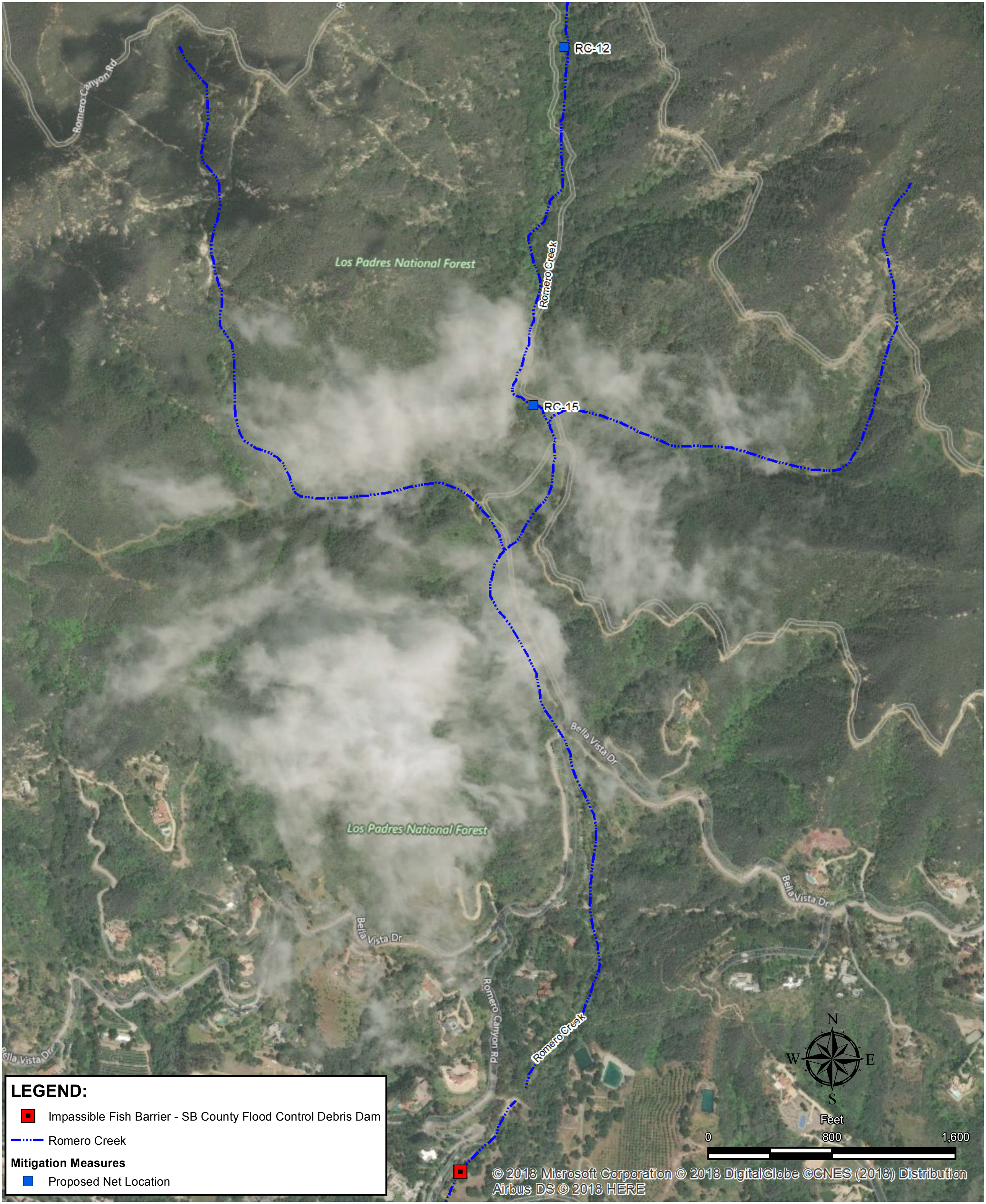

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Project Area Map - Romero Creek
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Santa Barbara County, CA

Figure 2d

October 8, 2018

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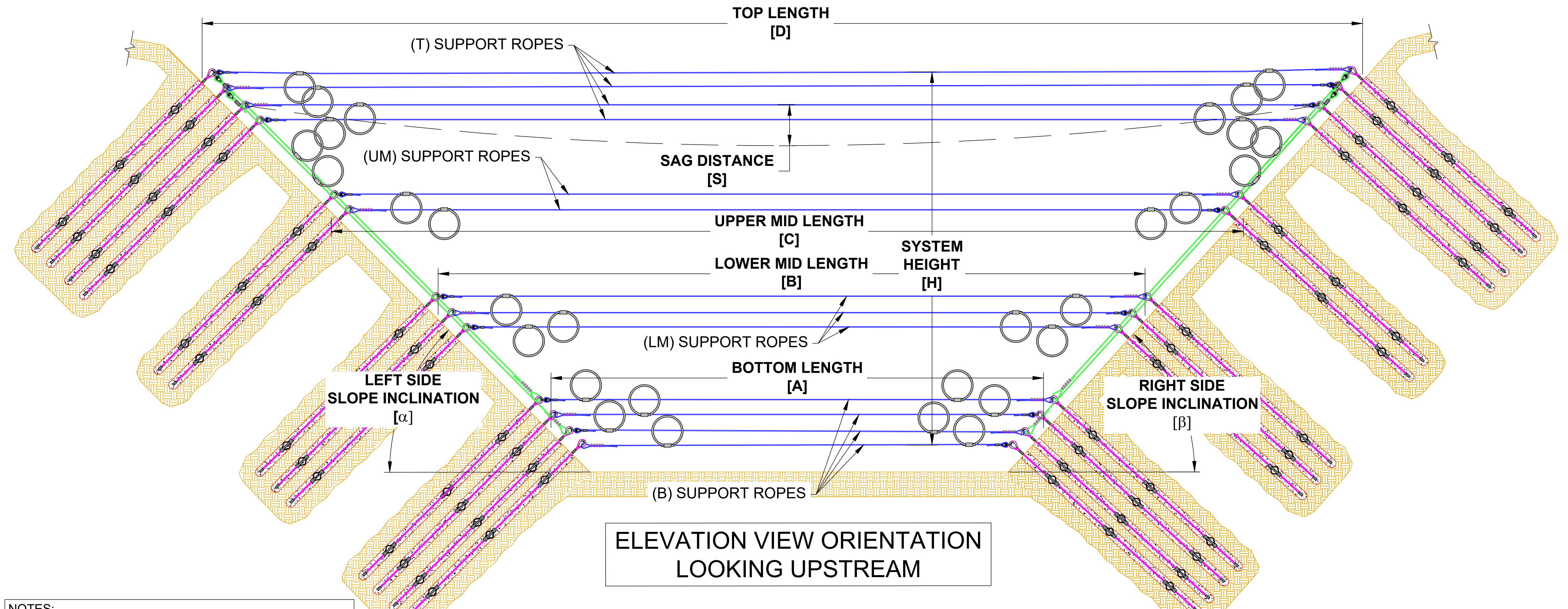
GEOBRUGG SVX180-H6 DEBRIS FLOW MITIGATION SYSTEM DIMENSIONAL SCHEDULE - 1

LOCATION DESIGNATION	SYSTEM HEIGHT [H] (FT)	BOTTOM LENGTH [A] (FT)	LOWER MID LENGTH [B] (FT)	UPPER MID LENGTH [C] (FT)	TOP LENGTH [D] (FT)	SAG DISTANCE [S] (FT)	LEFT SIDE AVG. SLOPE INCLINATION [α] (DEG.)	RIGHT SIDE AVG. SLOPE INCLINATION [β] (DEG.)
BUENA VISTA BV-1	10	70	76	83	90	1.5	45	50
BUENA VISTA BV-4	17	45	54	69	77	1.5	55	66
BUENA VISTA BV-11	20	98	116	134	150	3	30	30
HOT SPRINGS HS-6	17	48	67	81	94	2	65	55
COLD SPRING CS-18	12	47	60	70	81	1.5	45	30
SAN YSIDRO SY-7	20	41	58	65	75	1.5	75	55
SAN YSIDRO SY-18	16	13	47	57	67	1.5	60	60
ROMERO RC-12	12	40	45	52	61	1	55	60

NOTE: SLOPE INCLINATIONS FROM HORIZONTAL PROVIDED ARE AVERAGED.

GEOBRUGG SVX180-H6 SUPPORT ROPE CONFIGURATION SCHEDULE - 2

LOCATION DESIGNATION	BOT. SUPPORT ROPE QUANTITY (B)	LOWER MID SUPPORT ROPE QUANTITY (LM)	UPPER MID SUPPORT ROPE QUANTITY (UM)	TOP SUPPORT ROPE QUANTITY (T)
BUENA VISTA BV-1	5	5	6	6
BUENA VISTA BV-4	5	5	6	6
BUENA VISTA BV-11	6	6	7	7
HOT SPRINGS HS-6	5	5	6	6
COLD SPRING CS-18	5	5	6	5
SAN YSIDRO SY-7	4	5	6	6
SAN YSIDRO SY-18	4	6	8	6
ROMERO RC-12	4	4	5	5



D-1
13

GEOBRUGG SVX180-H6 DEBRIS FLOW MITIGATION SYSTEM
TYPICAL DIMENSIONAL ELEVATION VIEW

SCALE: N.T.S.

NOTES:

1. GEOBRUGG SVX180-H6 DEBRIS FLOW MITIGATION SYSTEM DIMENSIONS AND CHANNEL GEOMETRIES ARE APPROXIMATE.
2. DETAIL D-1/8 ELEVATION VIEW IS LOOKING UPSTREAM DIRECTION.
3. SUPPORT WIRE ROPE CONFIGURATIONS VARY BASED ON SITE LOCATION. SEE SCHEDULE 2 FOR WIRE ROPE QUANTITIES FOR EACH SECTION.

THIS DRAWING IS A DRAFT REVIEW
AND NOT FOR CONSTRUCTION

GEOBRUGG SVX180-H6 LOCATION DIMENSIONS

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Debris Flow Mitigation Systems
Santa Barbara County, California

PREPARED AT THE REQUEST OF
Partnership For Resilient Communities
Montecito, California

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OF 14

DRAWN BY:
BJF

DESIGNED BY:
WFK

CHECKED BY:
WFK

SCALE: N.T.S.

DATE: 2018 10-01

PROJECT NO:
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Net Cross-Sectional Plan View
Montecito Debris Flow Mitigation Project
The Partnership for Resilient Communities (TPRC)
Santa Barbara County, CA

Figure 3a

October 2, 2018

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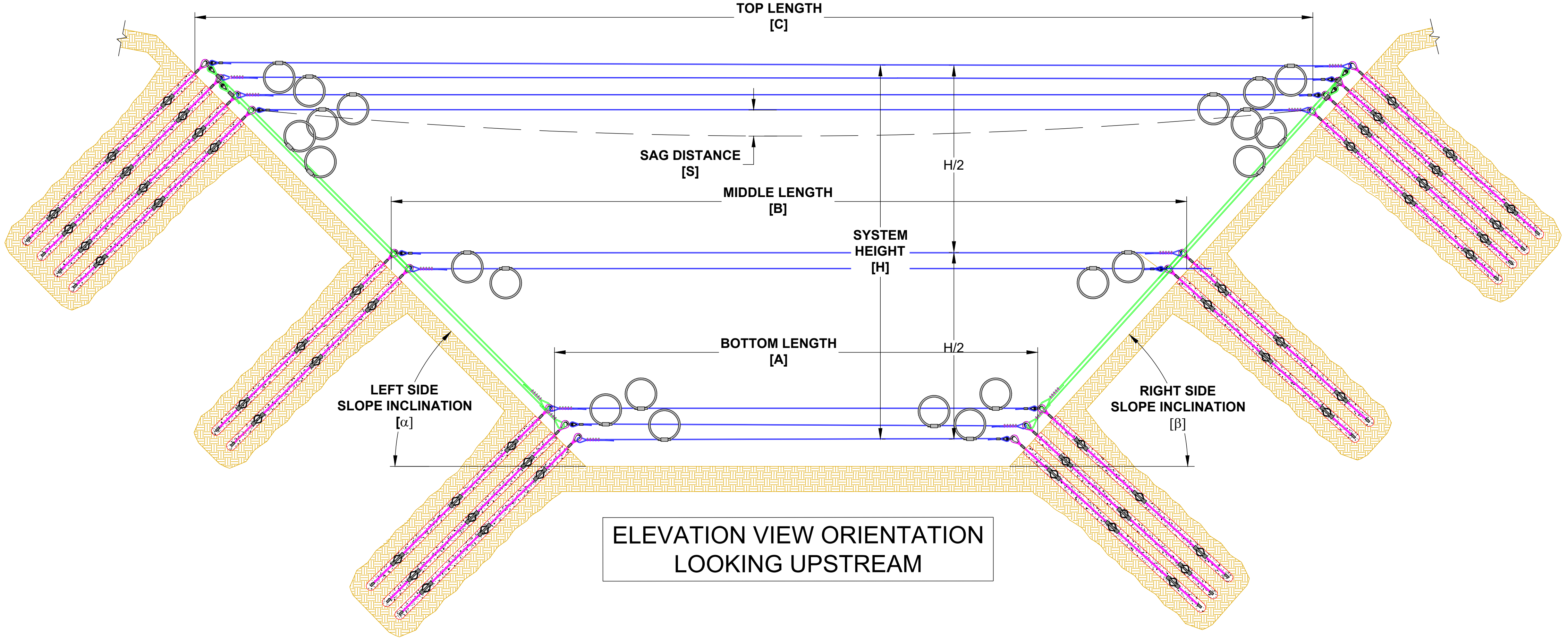
GEOBRUGG VX140-H4 DEBRIS FLOW MITIGATION SYSTEM DIMENSIONAL SCHEDULE

LOCATION DESIGNATION	SYSTEM HEIGHT **[H]** (FT)	BOTTOM LENGTH **[A]** (FT)	MIDDLE LENGTH **[B]** (FT)	TOP LENGTH **[C]** (FT)	ALLOWABLE SAG DISTANCE **[S]** (FT)	LEFT SIDE AVG. SLOPE INCLINATION [α]	RIGHT SIDE AVG. SLOPE INCLINATION [β]
BUENA VISTA BV-2	10	14	30	41	1	35°	33°
BUENA VISTA BV-5	12	27	34	37	1	70°	80°
HOT SPRINGS HS-7	11	19	35	49	1	52°	40°

NOTE: SLOPE INCLINATIONS FROM HORIZONTAL PROVIDED ARE AVERAGED.



NOTES:

1. GEOBRUGG VX140-H4 DEBRIS FLOW MITIGATION SYSTEM DIMENSIONS AND CHANNEL GEOMETRIES ARE APPROXIMATE.
2. DETAIL D-1/8 ELEVATION VIEW IS LOOKING UPSTREAM DIRECTION.

D-1 / 8 GEOBRUGG VX140-H4 DEBRIS FLOW MITIGATION SYSTEM TYPICAL DIMENSIONAL ELEVATION VIEW

SCALE: N.T.S.

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GEOBRUGG VX140-H4 LOCATION DIMENSIONS

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SCALE: N.T.S.	DRAWN BY: BJF	
DATE: 2018 10-01	DESIGNED BY: WFK	
PROJECT NO: KGT18-18	CHECKED BY: WFK	

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Santa Barbara County, CA

Figure 3b

October 2, 2018

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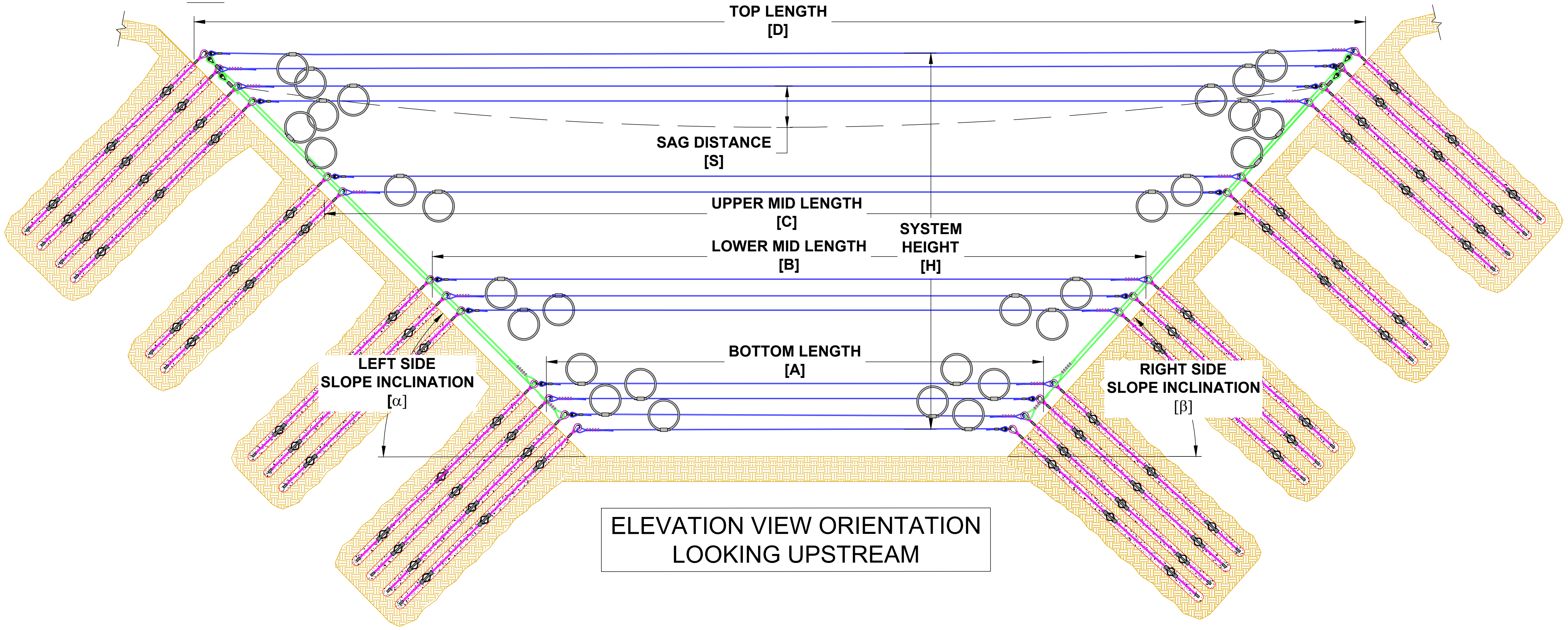
GEOBRUGG VX160-H6 DEBRIS FLOW MITIGATION SYSTEM DIMENSIONAL SCHEDULE

LOCATION DESIGNATION	SYSTEM HEIGHT **[H]** (FT)	BOTTOM LENGTH **[A]** (FT)	LOWER MID LENGTH **[B]** (FT)	UPPER MID LENGTH **[C]** (FT)	TOP LENGTH **[D]** (FT)	ALLOWABLE SAG DISTANCE **[S]** (FT)	LEFT SIDE AVG. SLOPE INCLINATION [α]	RIGHT SIDE AVG. SLOPE INCLINATION [β]
BUENA VISTA BV-6	15	22.5	29	34	44	1	65°	50°
BUENA VISTA BV-7	20	20	33	41	50	1	70°	65°
BUENA VISTA BV-10	15	14	26	50	56	1	55°	25°
COLD SPRING CS-11	15	35	40	52	66	1	45°	50°
ROMERO RC-15	10	18	33	39	50	1	55°	55°

NOTE: SLOPE INCLINATIONS FROM HORIZONTAL PROVIDED ARE AVERAGED.



NOTES:

1. GEOBRUGG VX160-H6 DEBRIS FLOW MITIGATION SYSTEM DIMENSIONS AND CHANNEL GEOMETRIES ARE APPROXIMATE.
2. DETAIL D-1/11 ELEVATION VIEW IS LOOKING UPSTREAM DIRECTION.

D-1
11
GEOBRUGG VX160-H6 DEBRIS FLOW MITIGATION SYSTEM
TYPICAL DIMENSIONAL ELEVATION VIEW
SCALE: N.T.S.

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GEOBRUGG VX160-H6 LOCATION DIMENSIONS

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Net Cross-Sectional Plan View
Montecito Debris Flow Mitigation Project
The Partnership for Resilient Communities (TPRC)
Santa Barbara County, CA

Figure 3c

October 2, 2018

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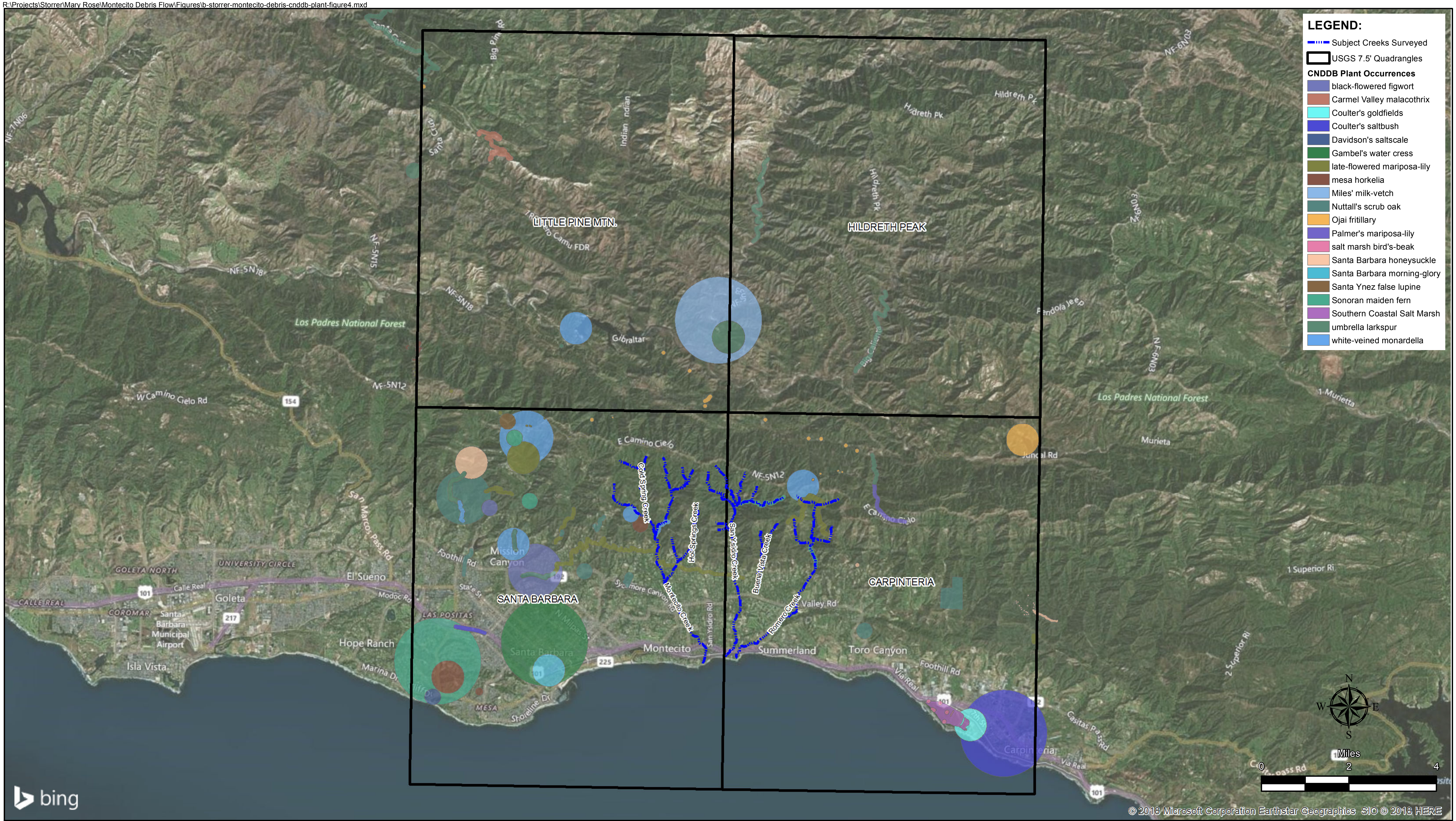

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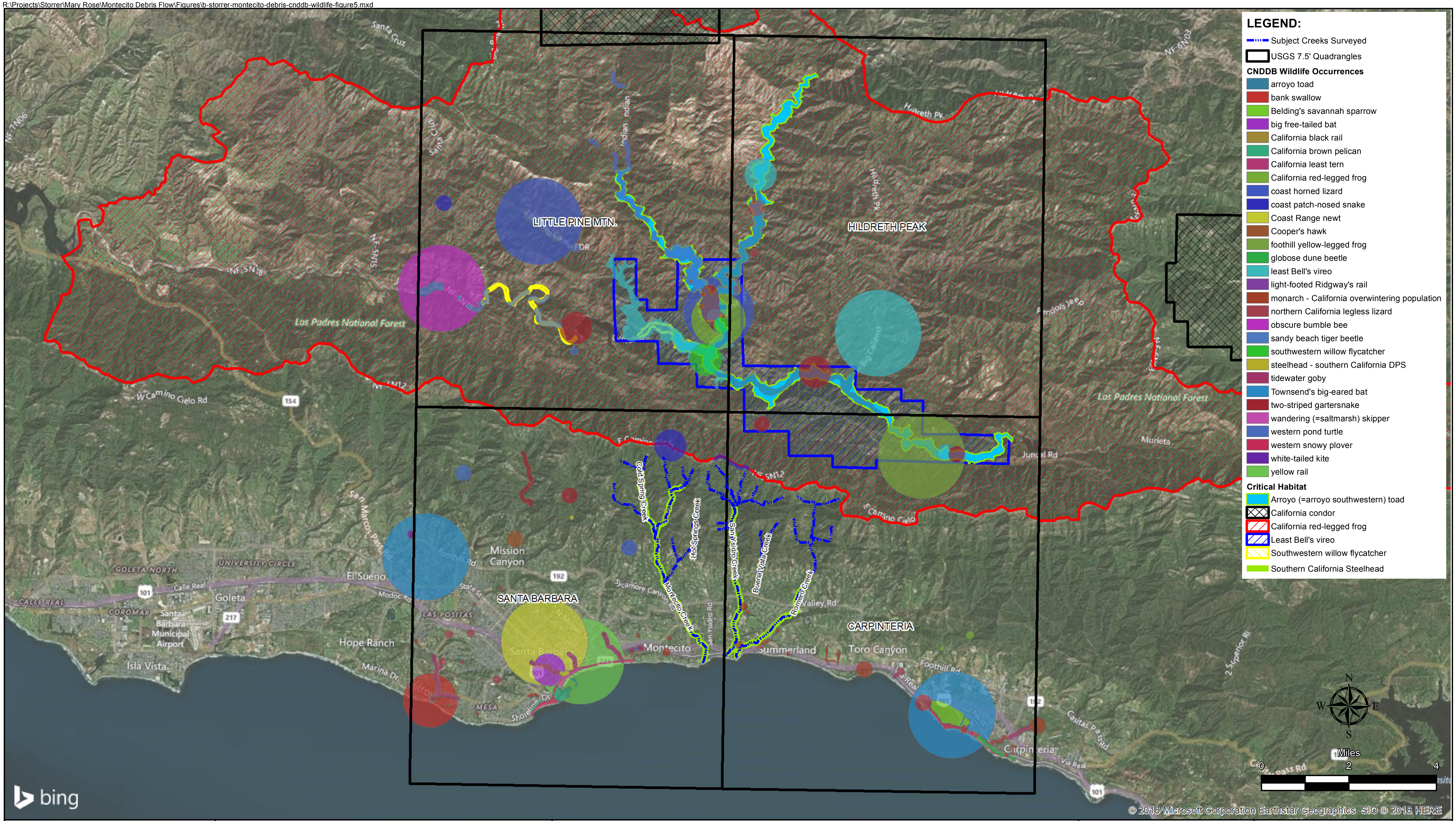
CNDDB Plant Occurrences
Montecito Debris Flow Mitigation Project
The Partnership for Resilient Communities (TPRC)
Santa Barbara County, CA

Figure 4

October 6, 2018



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CNDDB Wildlife Occurrences
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The Partnership for Resilient Communities (TPRC)
Santa Barbara County, CA

Figure 5

October 6, 2018

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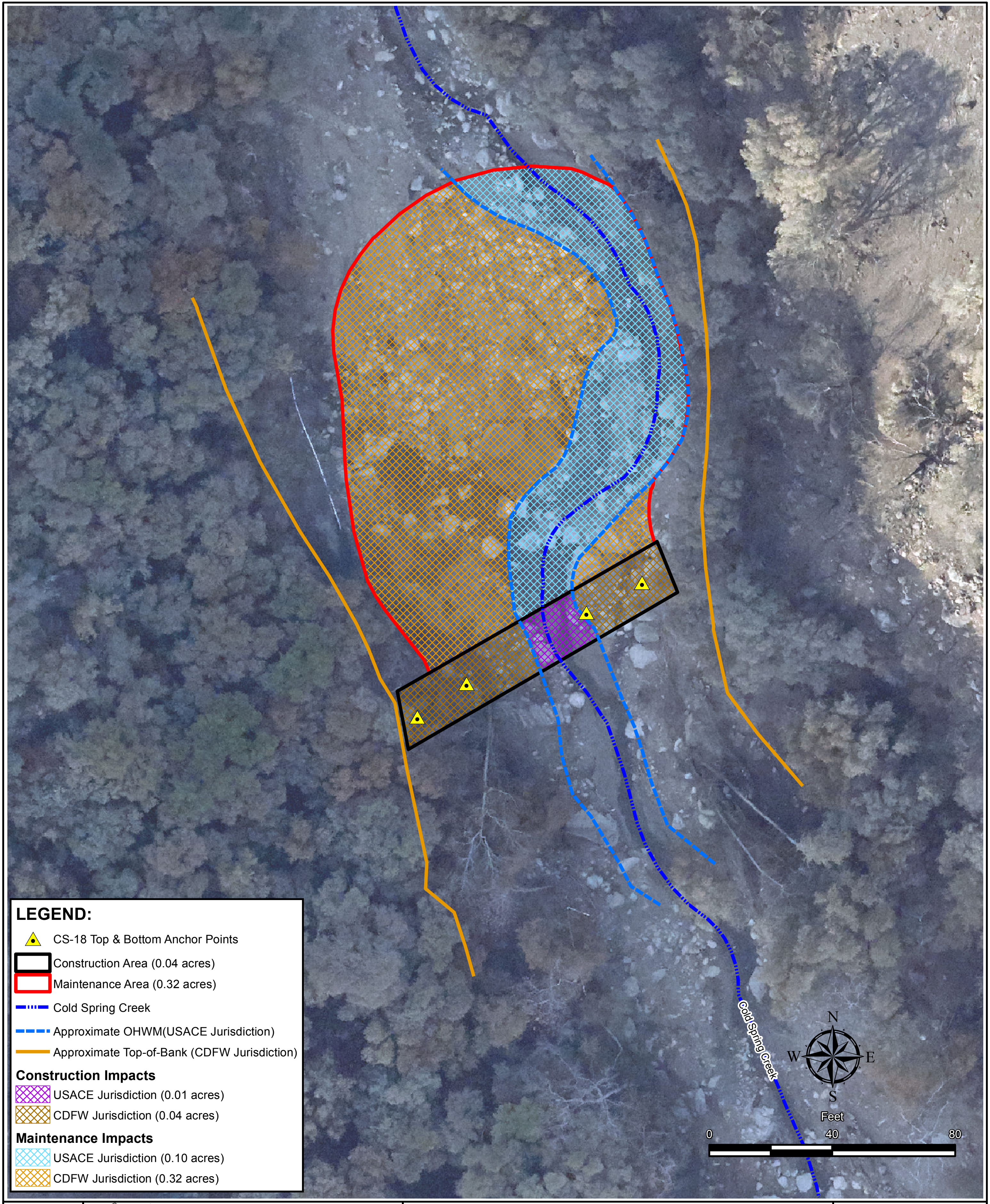

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**Proposed Net Locations, Jurisdictional Boundaries,
and Sensitive Resources
Montecito Debris Flow Mitigation Project
The Partnership for Resilient Communities (TPRC)
Santa Barbara County, CA**

Figure 6a

October 11, 2018

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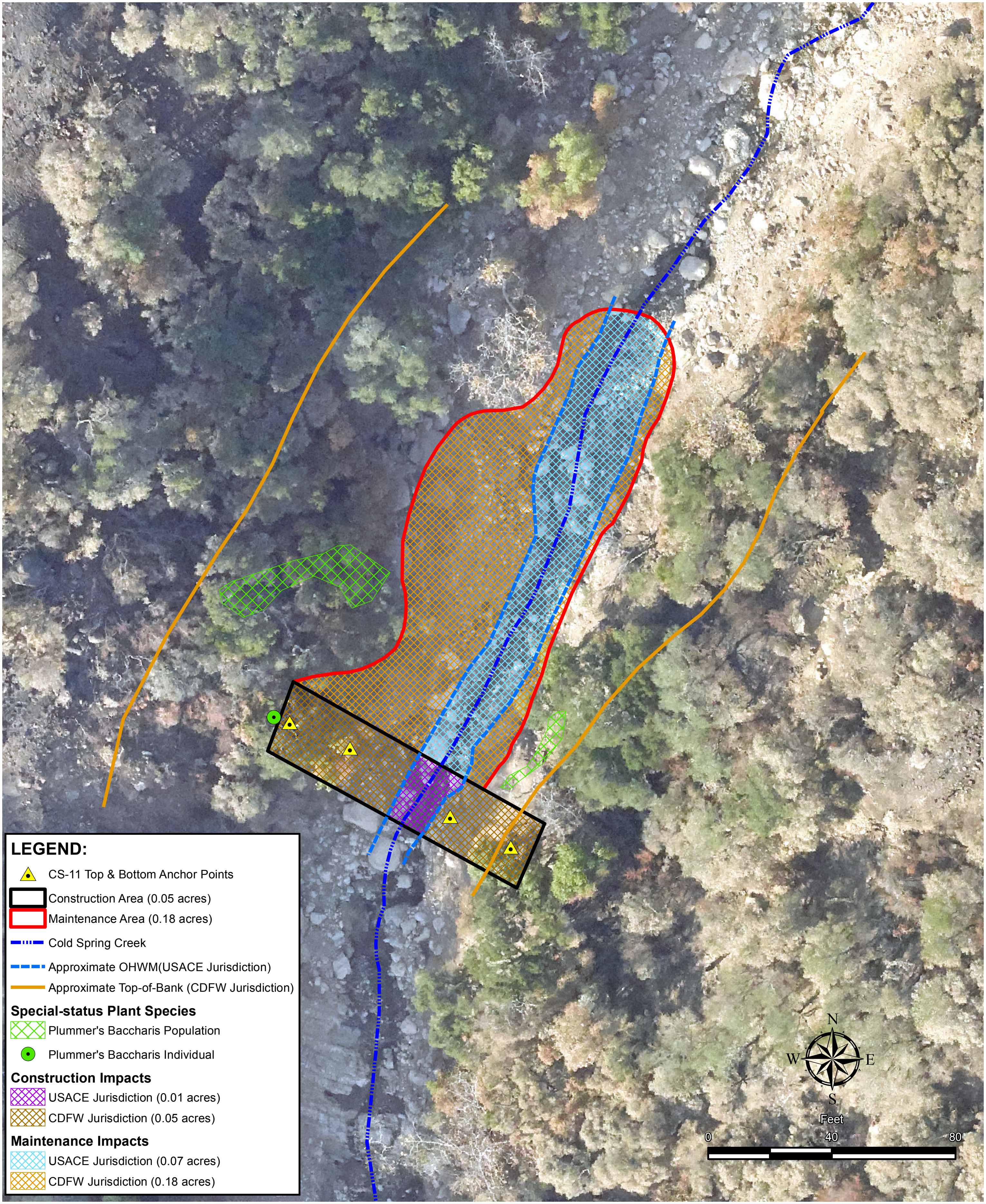

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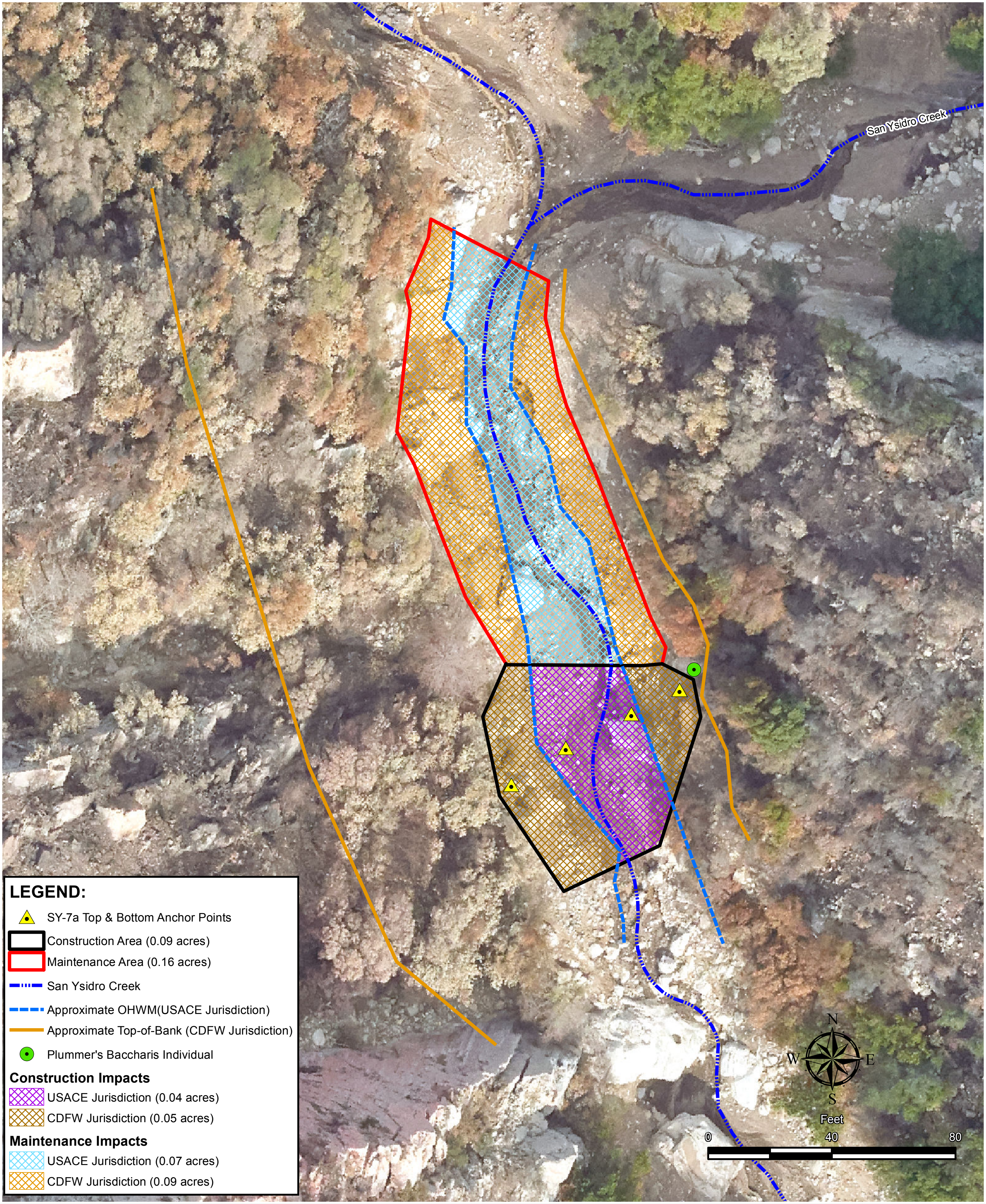
Proposed Net Locations, Jurisdictional Boundaries, and Sensitive Resources
Montecito Debris Flow Mitigation Project
The Partnership for Resilient Communities (TPRC)
Santa Barbara County, CA

Figure 6b

October 11, 2018

R:\Projects\Storrer\Mary Rose\Montecito Debris Flow\Figures\V2\a-montecito-debris-flow-proposed-nets-figure6e-REV.mxd



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The Partnership for Resilient Communities (TPRC)
Santa Barbara County, CA

Figure 6c

December 13, 2018

R:\Projects\Storrer\Mary Rose\Montecito Debris Flow\Figures\a-montecito-debris-flow-proposed-nets-figure6f.mxd

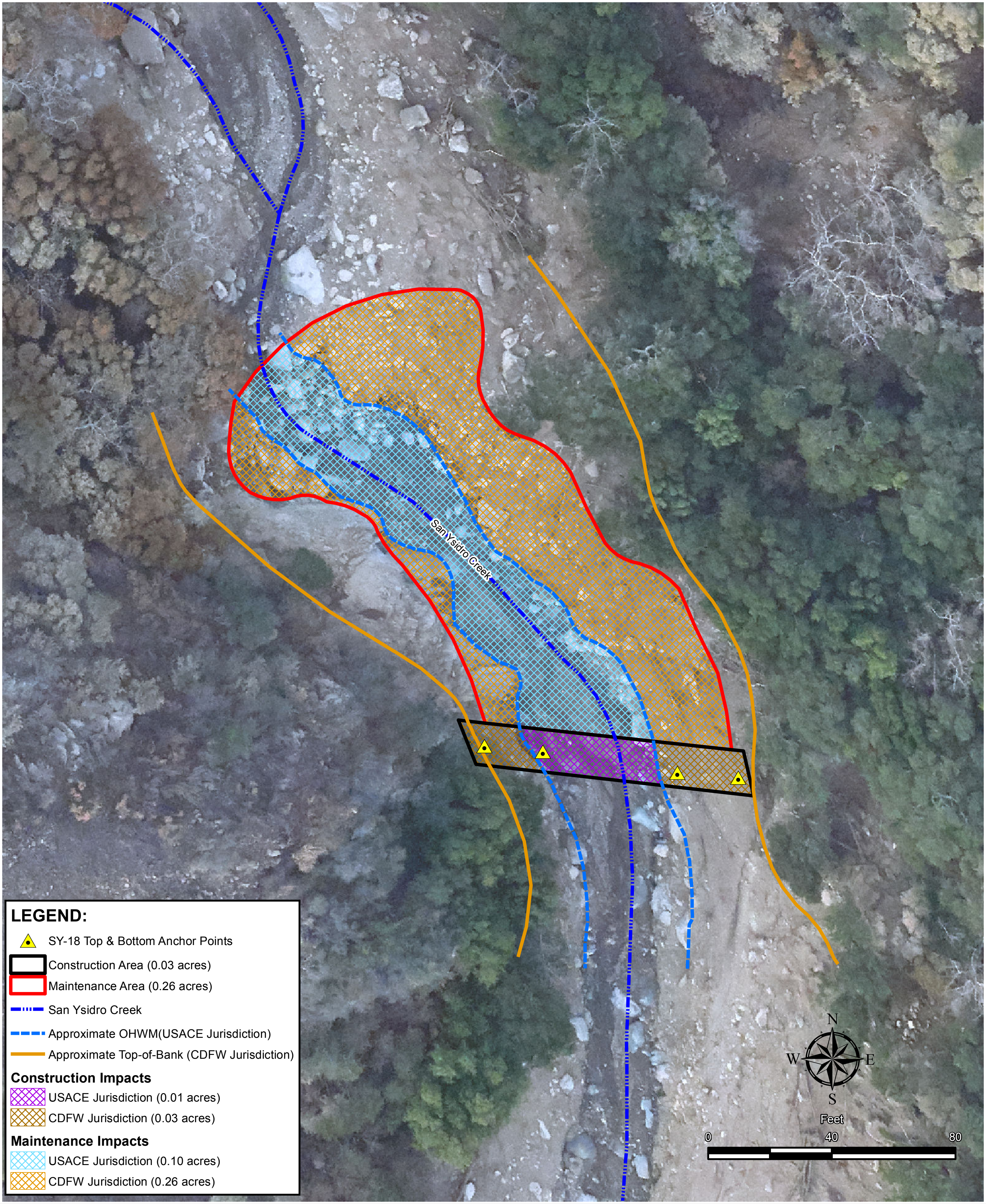

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Figure 6d

October 11, 2018

R:\Projects\Storrer\Mary Rose\Montecito Debris Flow\Figures\a-montecito-debris-flow-proposed-nets-figure6g.mxd

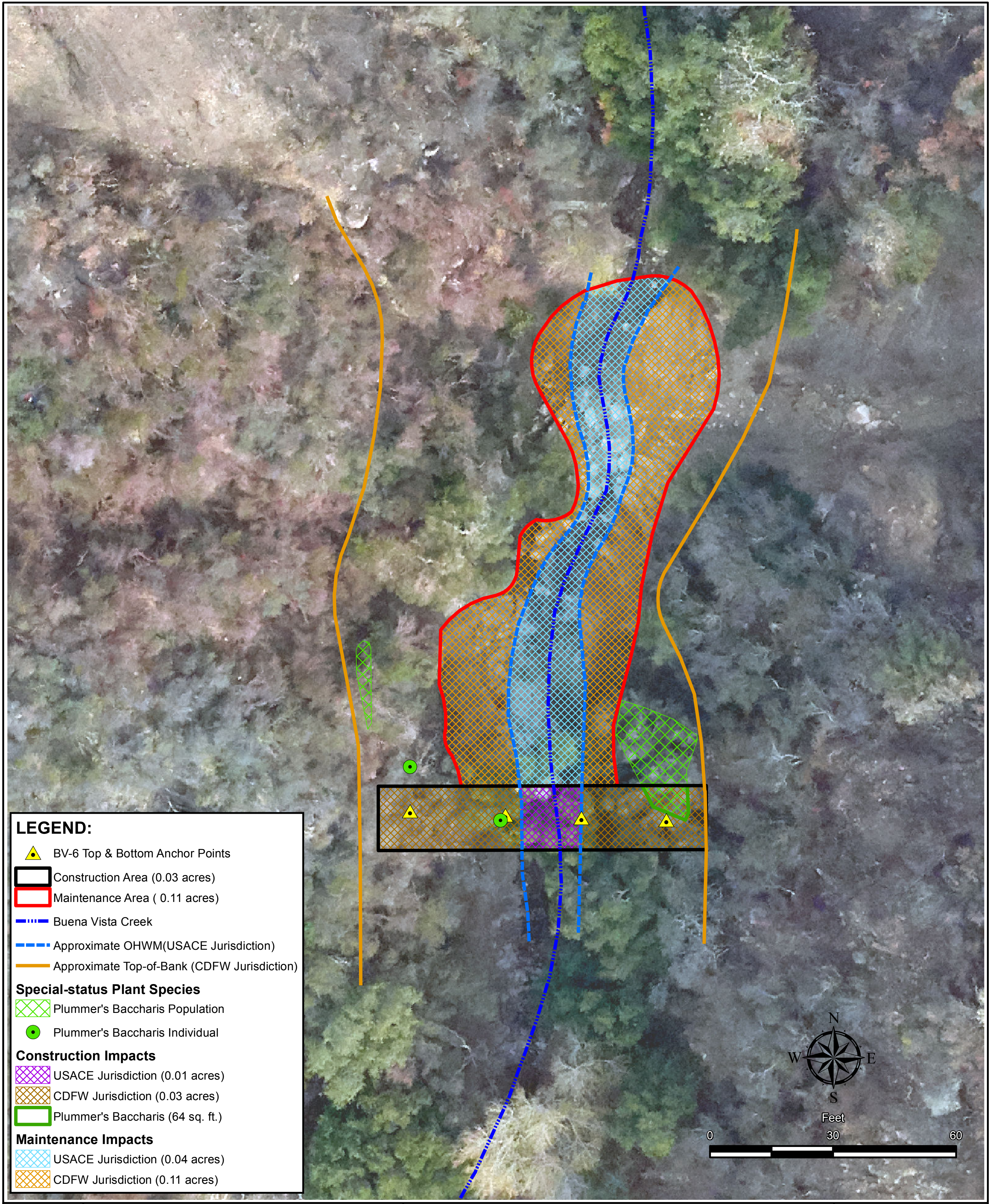

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Figure 6e

October 11, 2018

R:\Projects\Storrer\Mary Rose\Montecito Debris Flow\Figures\a-montecito-debris-flow-proposed-nets-figure6h.mxd

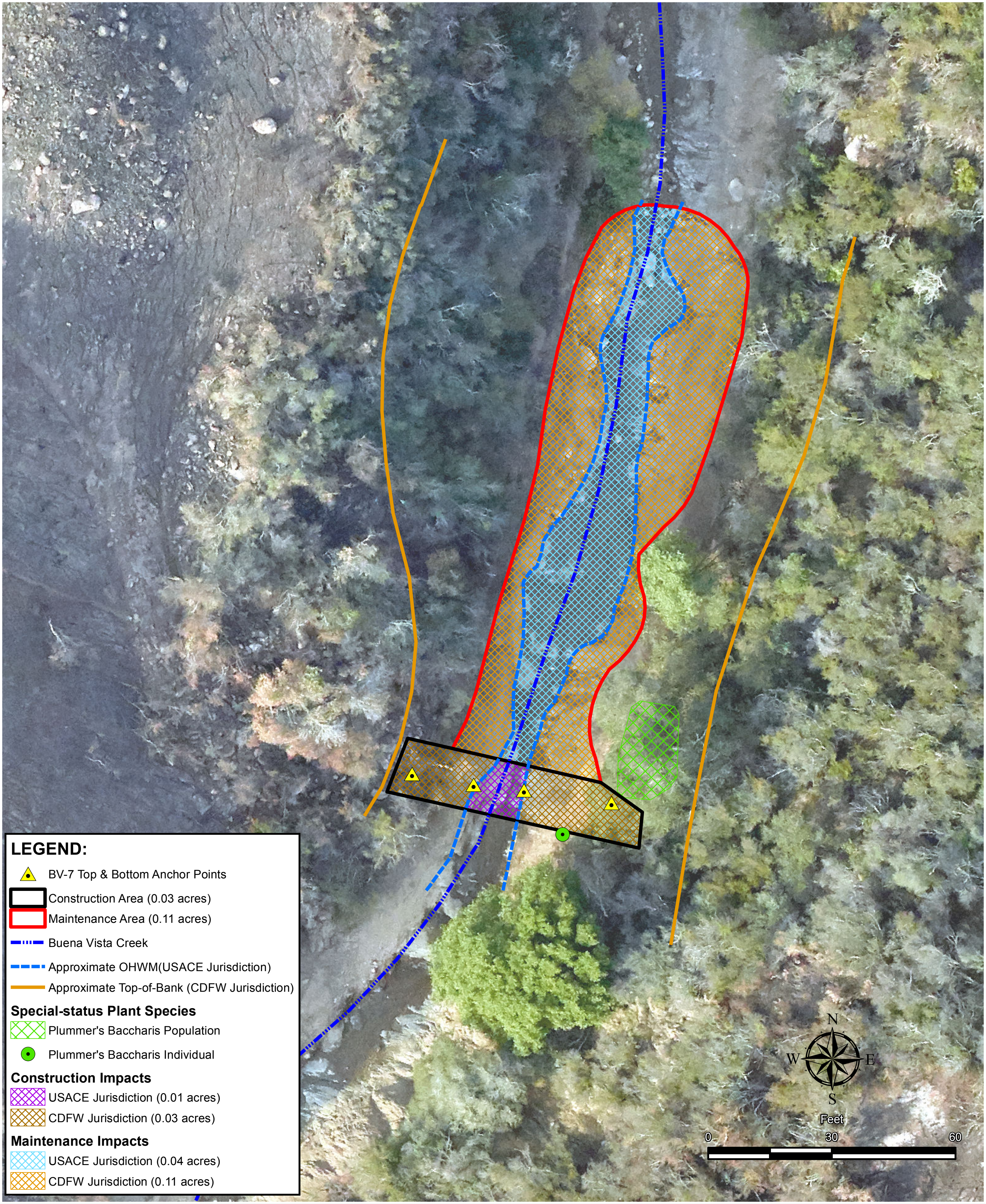

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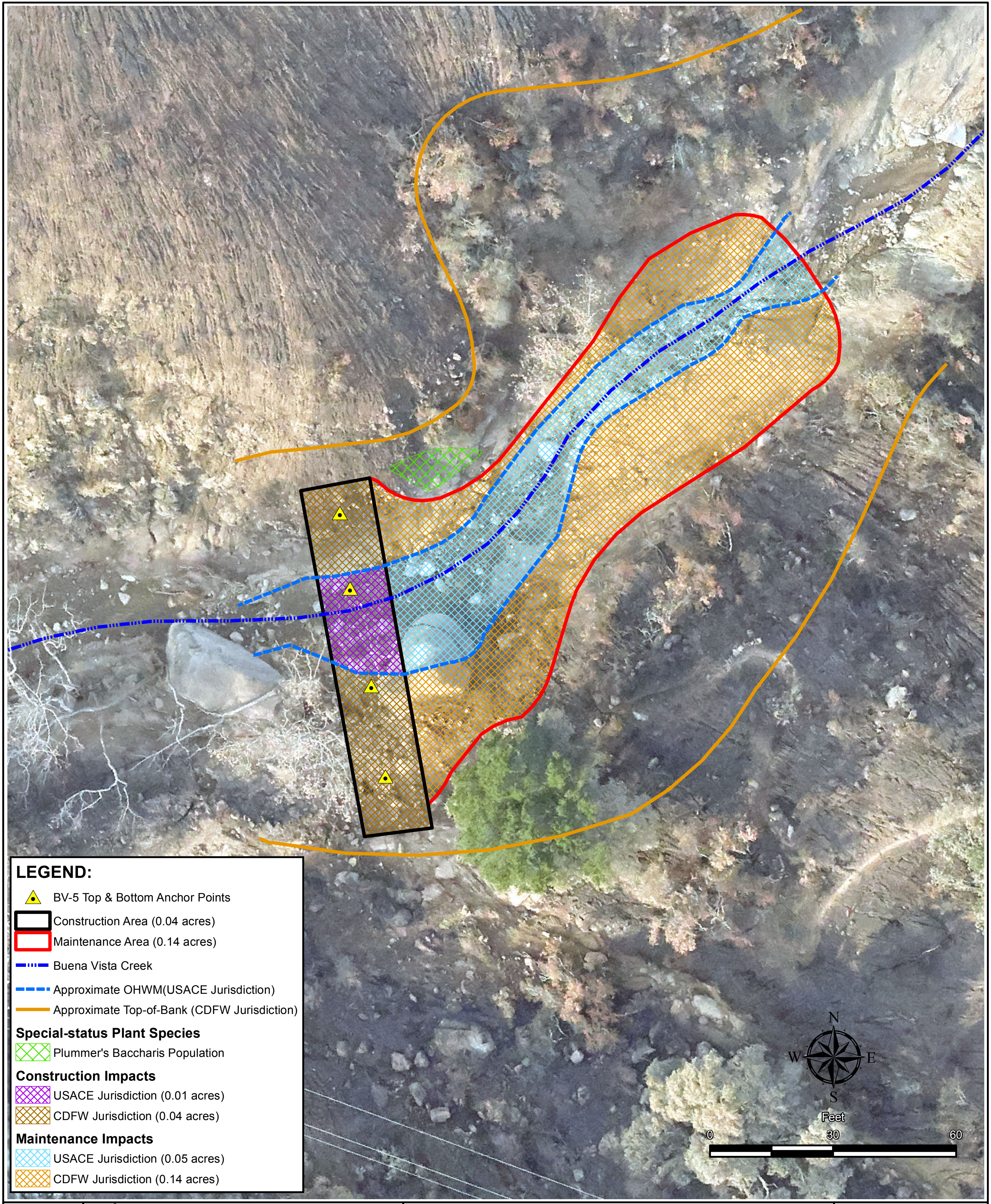
Figure 6f

October 11, 2018

R:\Projects\Storrer\Mary Rose\Montecito Debris Flow\Figures\a-montecito-debris-flow-proposed-nets-figure6i.mxd



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The Partnership for Resilient Communities (TPRC)
Santa Barbara County, CA

Figure 6g

October 11, 2018

R:\Projects\Storrer\Mary Rose\Montecito Debris Flow\Figures\a-montecito-debris-flow-proposed-nets-figure6j.mxd

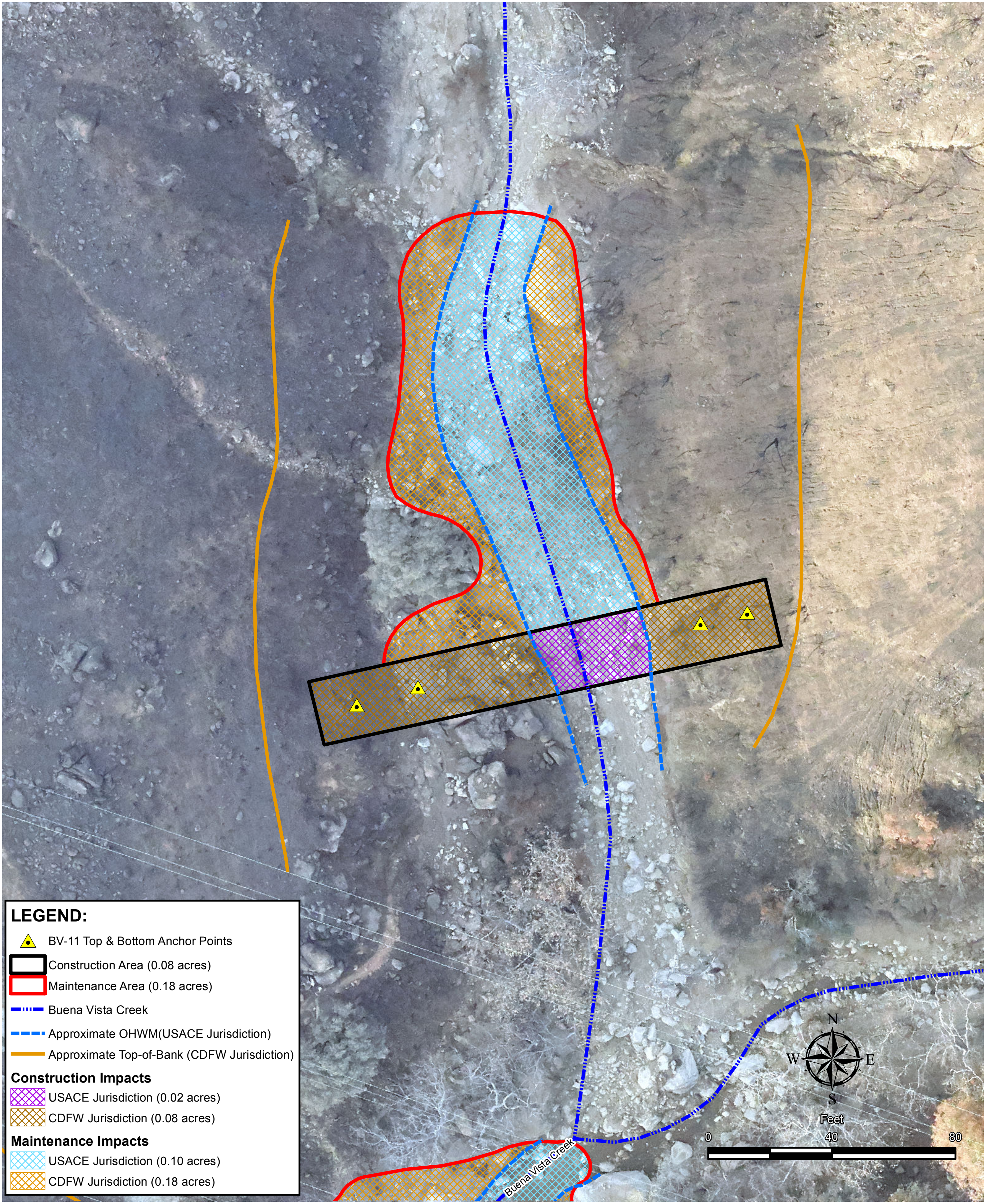

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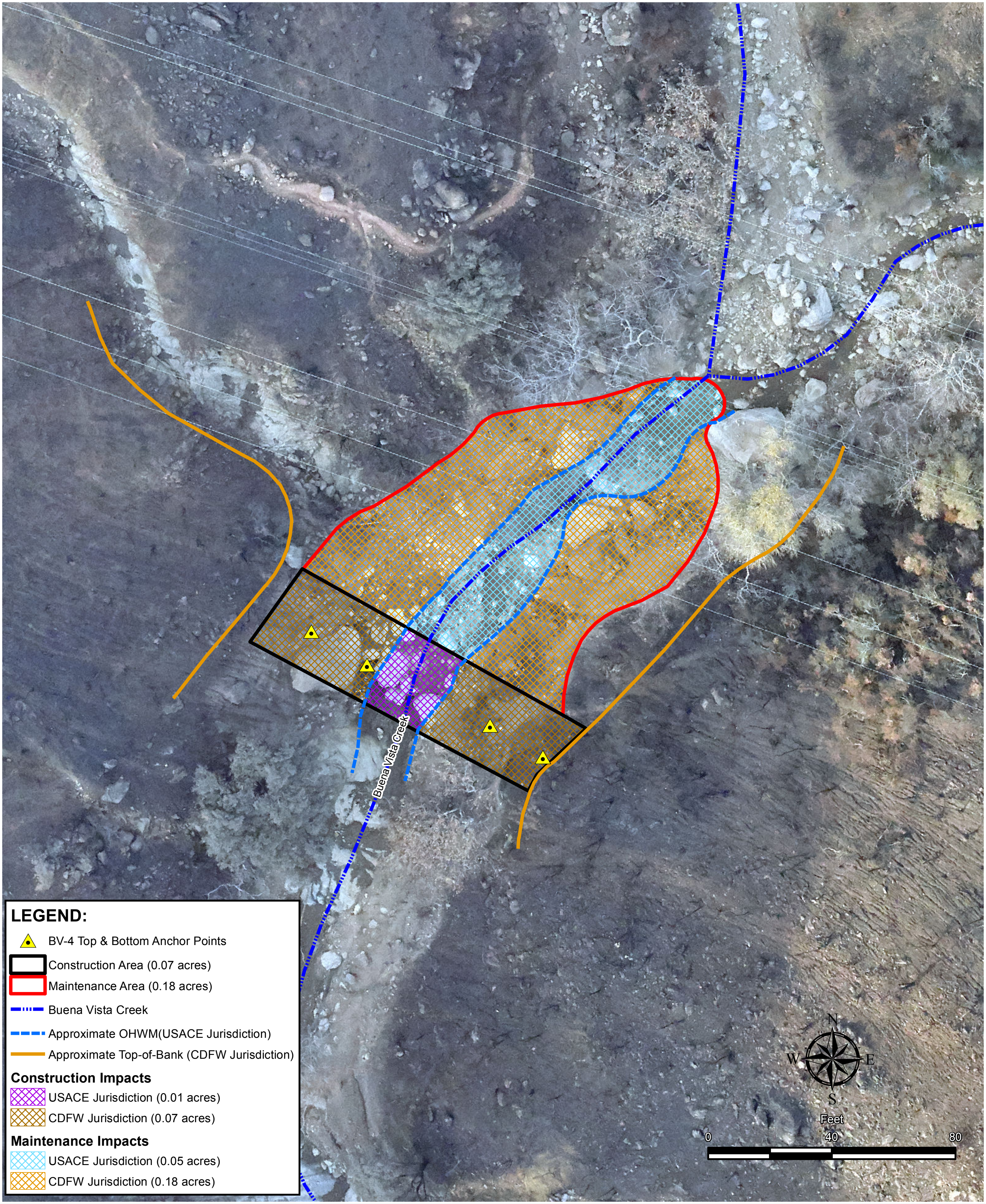
Figure 6h

October 11, 2018

R:\Projects\Storrer\Mary Rose\Montecito Debris Flow\Figures\a-montecito-debris-flow-proposed-nets-figure6k.mxd



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Santa Barbara County, CA**

Figure 6i

October 11, 2018

R:\Projects\Storrer\Mary Rose\Montecito Debris Flow\Figures\a-montecito-debris-flow-proposed-nets-figure6l.mxd

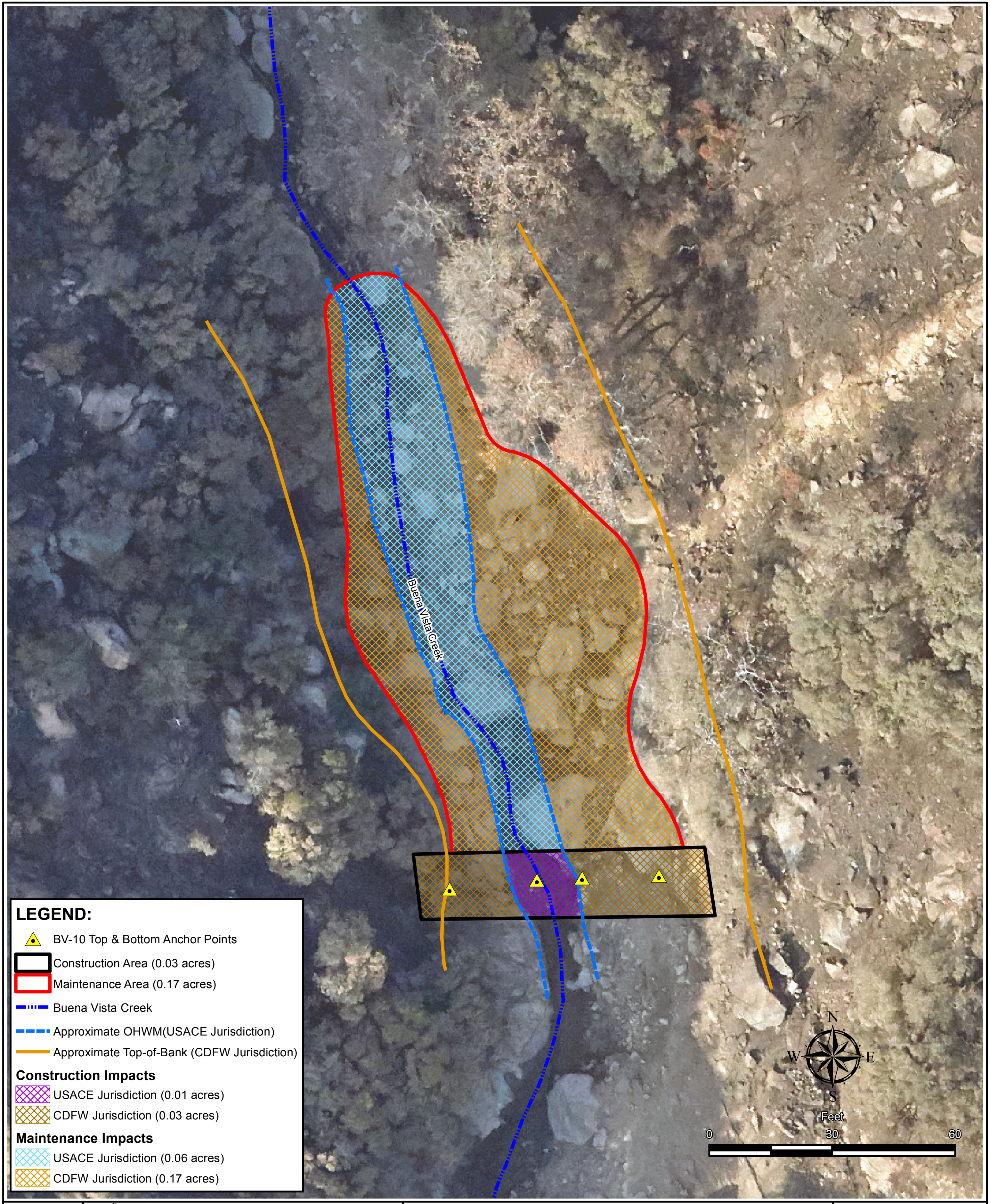

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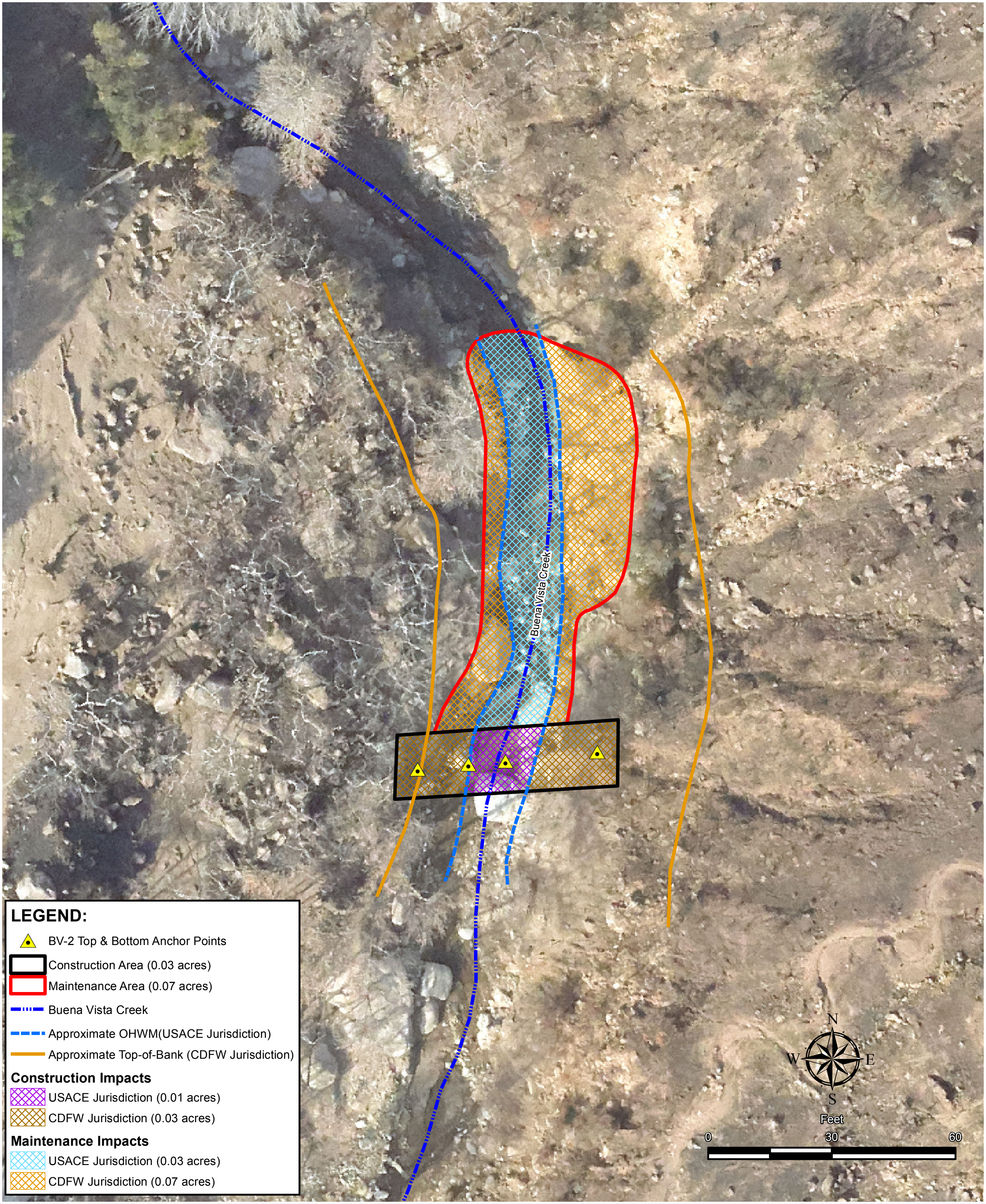
Figure 6j

October 11, 2018

R:\Projects\Storrer\Mary Rose\Montecito Debris Flow\Figures\a-montecito-debris-flow-proposed-nets-figure6m.mxd



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Santa Barbara County, CA

Figure 6k

October 11, 2018

R:\Projects\Storrer\Mary Rose\Montecito Debris Flow\Figures\a-montecito-debris-flow-proposed-nets-figure6n.mxd

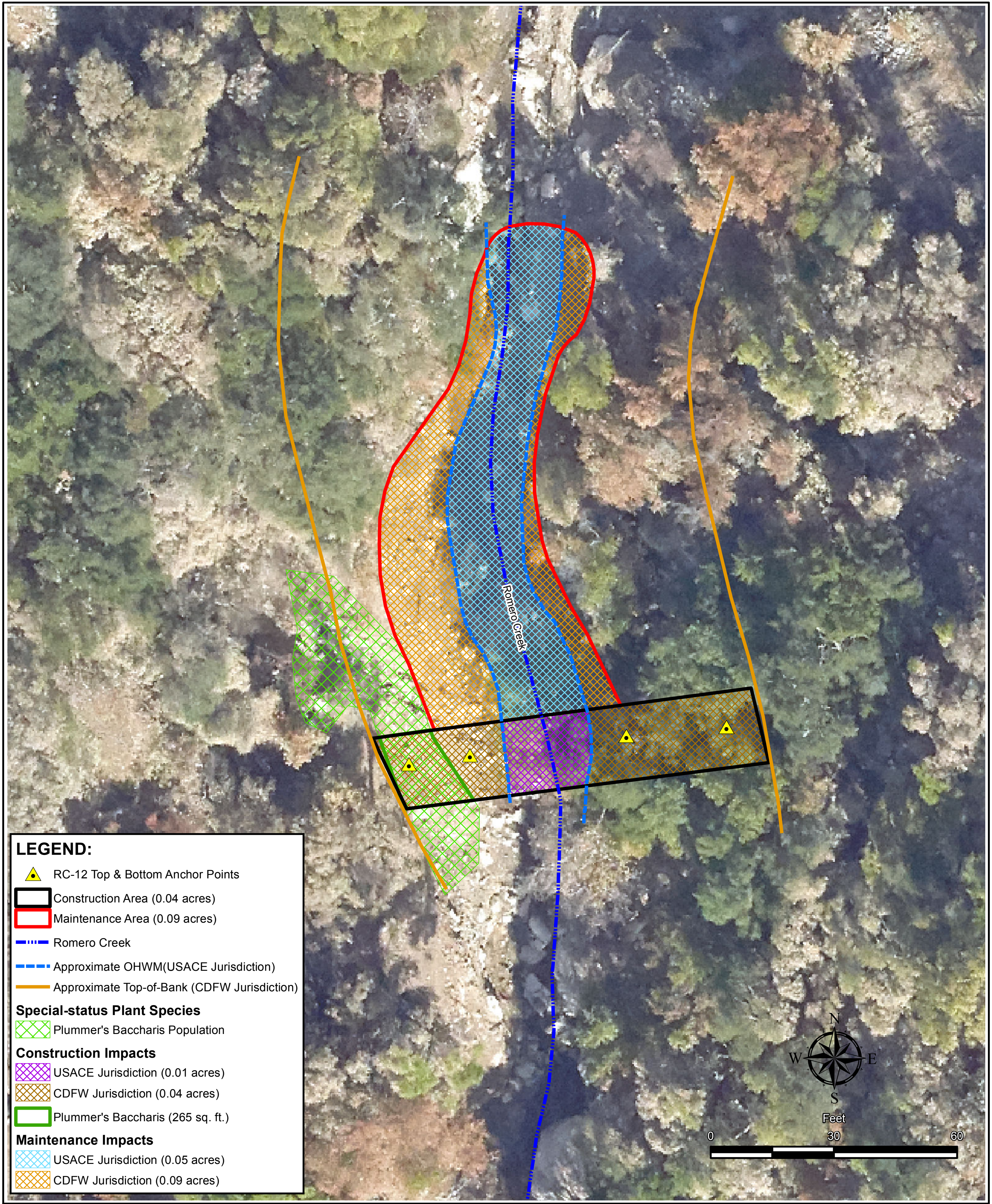

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Figure 6l

October 22, 2018

R:\Projects\Storrer\Mary Rose\Montecito Debris Flow\Figures\a-montecito-debris-flow-proposed-nets-figure6o.mxd

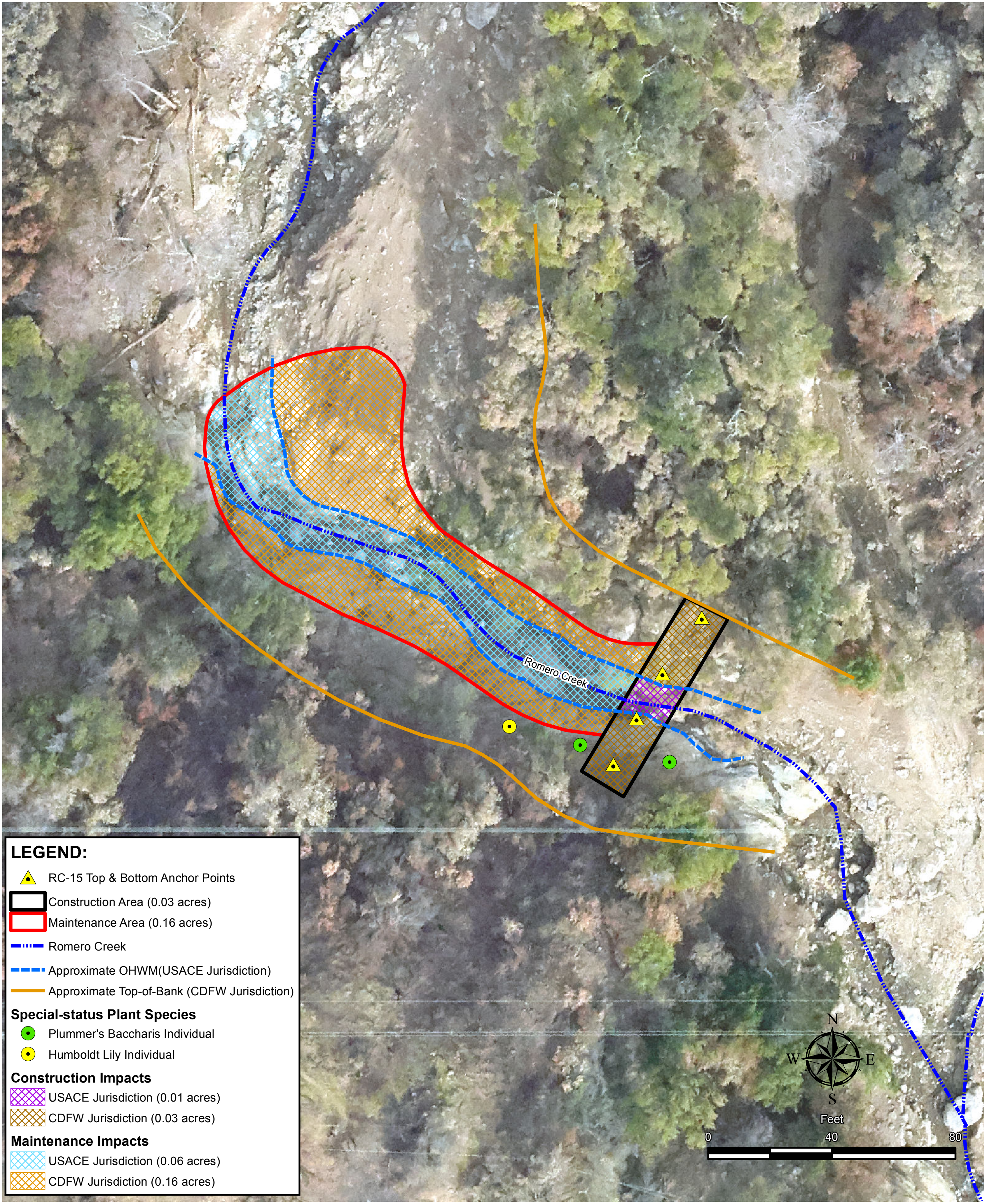

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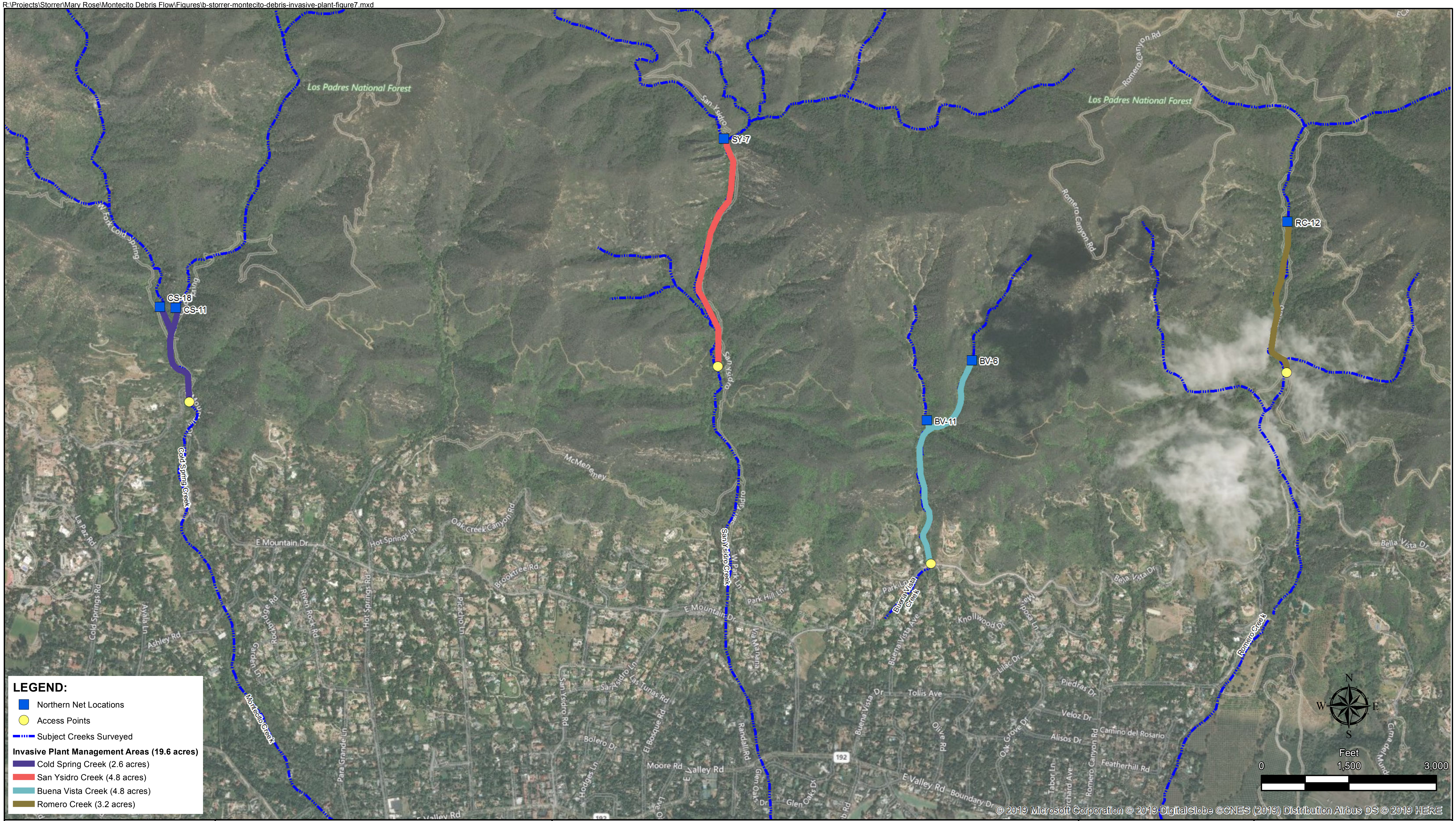
Figure 6m

October 22, 2018

R:\Projects\Storrer\Mary Rose\Montecito Debris Flow\Figures\b-storrer-montecito-debris-invasive-plant-figure7.mxd



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Invasive Plant Management Areas
Montecito Debris Flow Mitigation Project
The Partnership for Resilient Communities (TPRC)
Santa Barbara County, CA

Figure 7

January 18, 2019

APPENDIX A

SITE PHOTOGRAPHS

Net Location:	**Date of Photo:**
CS-11	09/05/2018

Description:

View looking upstream at the CS-11 net location.

Net Location:	**Date of Photo:**
CS-18	09/18/2018

Description:

View looking upstream at the CS-18 net location.

Net location is downstream of existing PVC waterline.

Four common fig (*Ficus carica*) saplings and tree tobacco (*Nicotiana glauca*) are becoming established in the channel.

Net Location:	Date of Photo:
SY-7a	12/07/2018

Description:

View looking upstream at the SY-7a net location.

Net Location:	Date of Photo:
SY-18	09/06/2018

Description:

View looking upstream at the SY-18 net location.

Net Location:	**Date of Photo:**	
BV-2	09/17/2018	
Description: View looking upstream at the BV-2 net location.		

Net Location:	**Date of Photo:**	
BV-4	09/21/2018	
Description: View looking down at the BV-4 net location. The two western sycamore (*Platanus racemosa*) saplings in the channel will be trimmed for net installation.		

Net Location:
BV-5

Date of Photo:
09/20/2018

Description:

View looking downstream at the BV-5 net location.

The arroyo willow (*Salix lasiolepis*) in the middle of the channel will be trimmed for net installation.

Net Location:
BV-6

Date of Photo:
09/20/2018

Description:

View looking upstream at the BV-6 net location.

Net Location:	**Date of Photo:**
BV-7	09/20/2018

Description:

View looking upstream at the BV-7 net location.

Net Location:	**Date of Photo:**
BV-10	09/17/2018

Description:

View looking downstream at the BV-10 net location.

Net Location:	**Date of Photo:**	
BV-11	09/20/2018	
Description: View looking upstream at the BV-11 net location. Net is located in a western tributary to Buena Vista Creek.		
Net Location:	**Date of Photo:**	
RC-12	09/19/2018	
Description: View looking downstream at the RC-12 net location.		

Net Location:	**Date of Photo:**
RC-15	09/19/2018

Description:

View looking upstream at the RC-15 net location.

APPENDIX B

VEGETATION RAPID ASSESSMENT FIELD FORMS

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

For Office Use:	**Final database #:**	**Final vegetation type:**	**Alliance** **Association**

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION circle: **Relevé** or [✓ **RA**]

Database #: CS-11
Date: 9/18/18
Name of recorder: Jessica Peak
Other surveyors: Justine Cooper / John Storrer ☐
Location Name: Cold Springs Canyon ☐

GPS name: ipad / ArcCollector / Arrow 100 For Relevé only: **Bearing°**, left axis at ID point____ **of Long / Short** side ☐
UTME __ __ __ __ __ __ **UTMN** __ __ __ __ __ __ __ **Zone: 11** [✓ **NAD83**] GPS error: [✓ ft.] m./ **PDOP** 2.5
Decimal degrees: **LAT** 34.460212 **LONG** -119.693969

GPS within stand? [✓ **Yes**] / **No** If No, cite from GPS to stand: distance (m)____ bearing °____ inclination °____ ☐
and record: **Base point ID**________ **Projected UTMs: UTME** __ __ __ __ __ __ **UTMN** __ __ __ __ __ __ __ ☐
Camera Name: JC **Cardinal photos at ID point:** ☐
Other photos:

Stand Size (acres): [✓ <1,] 1-5, >5 | **Plot Size (m²): 100 /** ____ | **Plot Shape** ___ **x** ___ **m** | **RA Radius** 30 **m** ☐
Exposure, Actual °: 168 S **NE NW SE SW Flat Variable** | **Steepness, Actual °:** NA **0°** [✓ **1-5°**] **> 5-25° > 25** ☐

Topography: Macro: top upper mid [✓ **lower**] [✓ **bottom**] | **Micro: convex flat** [✓ **concave**] **undulating** ☐
Geology code: GRAL/SAND **Soil Texture code:** SAND/COLS | **Upland** or [✓ **Wetland/Riparian**] (circle one) ☐

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)
H₂0: 3 **BA Stems:** 1 **Litter:** 1 **Bedrock:** 0 **Boulder:** 40 **Stone:** 10 **Cobble:** 10 **Gravel:** 15 **Fines:** 20 **=100%** ☐

% Current year bioturbation 0 **Past bioturbation present? Yes** / [✓ **No**] | **% Hoof punch** 0 ☐
Fire evidence: [✓ **Yes**] / **No** (circle one) If yes, describe in Site history section, including date of fire, if known. ☐

Site history, stand age, comments: Site burned in Thomas Fire (Dec. 2017) & scoured by debris flows on 1/9/2018. ☐

- flow in channel ~1-6 inches deep (intermittent pools); ~16 inches - 4 ft wide
- channel ~6-15 ft wide @ OHWM

- Populations of plummer's baccharis on both east & west banks. 1 Plummer's baccharis plant near top anchor west location - may be impacted by net installation.
- staging ~1000 sq ft. west side of channel below TOB

Disturbance code / Intensity (L,M,[✓ **H**]**):** 23 /___ ___/___ ___/___ ___/___ ___/___ **"Other"** fire / debris flow ☐

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), [✓ **T4** (11-24" dbh)], **T5** (>24" dbh), **T6** multi-layered (T3 or T4 layer under T5, >60% cover) ☐
Shrub: S1 seedling (<3 yr. old), **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead) ☐
Herbaceous: H1 (<12" plant ht.), **H2** (>12" ht.) ☐
Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)
Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Arroyo willow thicket / western sycamore woodland ☐
Field-assessed Association name (optional): Scarlet monkeyflower seep (channel) ☐
Adjacent Alliances/direction: Coast live oak woodland (upslope) / ☐

Confidence in Alliance identification: L M [✓ **H**] **Explain:** ☐
Phenology (E,P,L): Herb P/L **Shrub** P/L **Tree** L **Other identification or mapping information:** ☐

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

SPECIES SHEET

Database #: CS-11

IV. VEGETATION DESCRIPTION

% NonVasc cover: 85 **Total % Vasc Veg cover:** 15 ☐

% Cover - **Conifer tree / Hardwood tree:** 0 / 2 **Regenerating Tree:** 9 **Shrub:** 10 **Herbaceous:** 5 ☐

Height Class - **Conifer tree / Hardwood tree:** 0 / 1 **Regenerating Tree:** 4 **Shrub:** 3 **Herbaceous:** 1 ☐

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	Species Channel / Lower Banks	% cover	C	~~Final species determination~~ Upper Banks / TOB
T	Platanus racemosa	1-5		T Quercus agrifolia 5-15
S	Salix lasiolepis	1-5		T Platanus racemosa 1-5
H	Erythranthe cardinalis	1-5		T Umbellularia californica 1-5
S	Toxicodendron diversilobum	1-5		S Baccharis plummerae +
S	Malosma laurina	+		S Heteromeles arbutifolia 1-5
H	Acmispon grandiflorus	+		S Rhamnus crocea +
H	Sonchus oleraceus	+		S Sambucus nigra ssp. caerulea +
S	Venegasia carpesioides	1-5		H Elymus condensatus 1-5
H	Eschscholzia californica	+		S Toxicodendron diversilobum 1-5
H	Erythranthe gutatta	+		H Athyrium felix-femina +
S	Acmispon glaber	+		S Keckiella cordifolia 1-5
S	Baccharis pilularis	+		H Artemisia douglasiana +
H	Oxalis pescaprae	+		H Stephanomeria cichoriaceae +
H	Stipa miliacea	1-5		S Ceanothus megacarpus +
H	Solanum douglasii	1-5		H Phacelia cicutaria +
S	Dendromecon rigida	+		
H	Brassica nigra	+		
S	Eriodictyon californica	+		
H	Phacelia cicutaria	+		
H	Elymus condensatus	+		
H	Calystegia macrostegia ssp. cyclo.	+		
H	Epilobium ciliatum	+		
S	Vinca major	+		
T	Tamarix ramosissima (pulled)	+		
H	Bromus madritensis	+		
S	Adenostoma fasciculata	+		
S	Salix laevigata	+		

Unusual species: 5 Plummer's baccharis along TOB on east slope (60% fl / 40% fruit)

27 Plummer's baccharis on west slope (80% fl / 20% fruit); 1 Plummer's baccharis plant near top arche west slope

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

For Office Use: | **Final database #:** | **Final vegetation type:** **Alliance**___ **Association**

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

circle: **Relevé** or [✓ **RA**]

Database #: CS-18

Date: 9/18/18

Name of recorder: Jessica Peak

Other surveyors: Justine Cooper / John Storrer ☐

Location Name: Cold Springs Canyon ☐

GPS name: ipad / ArcCollector / Arrow 100 For Relevé only: **Bearing°**, left axis at ID point____ **of Long / Short** side ☐

UTME __ __ __ __ __ __ **UTMN** __ __ __ __ __ __ __ **Zone: 11** [✓ **NAD83**] GPS error: [✓ **ft.**]/ **m./ PDOP** 4.1

Decimal degrees: **LAT** 34.460253 **LONG** -119.655049

GPS within stand? [✓ **Yes**] / **No** If No, cite from GPS to stand: distance (m)____ bearing °____ inclination °____ ☐

and record: **Base point ID**______ **Projected UTMs: UTME** __ __ __ __ __ __ **UTMN** __ __ __ __ __ __ __ ☐

Camera Name: JC **Cardinal photos at ID point:** ☐

Other photos:

Stand Size (acres): [✓ **<1,**] **1-5, >5** | **Plot Size (m²): 100 /** ____ | **Plot Shape** ___ **x** ___ **m** | **RA Radius** 30 **m** ☐

Exposure, Actual °: 126 **NE NW** [✓ **SE**] **SW Flat Variable** | **Steepness, Actual °:** NA **0°** [✓ **1-5°**] **> 5-25° > 25** ☐

Topography: Macro: top upper mid [✓ **lower**] [✓ **bottom**] | **Micro: convex flat** [✓ **concave**] **undulating** ☐

Geology code: GRAL/SAND **Soil Texture code:** SAND/COLS | **Upland** or [✓ **Wetland/Riparian**] (circle one) ☐

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

H₂0: 2 **BA Stems:** 1 **Litter:** 2 **Bedrock:** **Boulder:** **Stone:** **Cobble:** **Gravel:** **Fines:** **=100%** ☐

% Current year bioturbation 0 **Past bioturbation present? Yes** / [✓ **No**] | **% Hoof punch** 0 ☐

Fire evidence: [✓ **Yes**] / **No** (circle one) If yes, describe in Site history section, including date of fire, if known. ☐

Site history, stand age, comments: site burned in Thomas Fire (Dec. 2017) & scoured by debris flows on 1/9/2018. ☐

- flow in channel ~8 inches - 2ft wide; ~1-2 inches deep
- channel @ OHWM ~6-12 ft wide

- staging ~1000 sq ft west side of channel, below TOB

Disturbance code / Intensity (L,M,[✓ **H**]**):** 23 / ___/___ ___/___ ___/___ ___/___ **"Other"** fire / debris flow ☐

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), [✓ **T4** (11-24" dbh)], **T5** (>24" dbh), **T6 multi-layered** (T3 or T4 layer under T5, >60% cover) ☐

Shrub: [✓ **S1** seedling (<3 yr. old)], **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead) ☐

Herbaceous: [✓ **H1** (<12" plant ht.)], **H2** (>12" ht.) ☐

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Arroyo willow thicket / canyon sunflower scrub (channel) ☐

Field-assessed Association name (optional): California bay / western sycamore woodland (banks) ☐

Adjacent Alliances/direction: Coast live oak woodland (upslope) / ____ ☐

Confidence in Alliance identification: L M [✓ **H**] **Explain:** ______ ☐

Phenology (E,P,L): Herb P/L **Shrub** P/L **Tree** L **Other identification or mapping information:** ☐

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

SPECIES SHEET

Database #: CS-18

IV. VEGETATION DESCRIPTION

% NonVasc cover: 65 **Total % Vasc Veg cover:** 35 ☐

% Cover - **Conifer tree / Hardwood tree:** 0 / 5 **Regenerating Tree:** 15 **Shrub:** 15 **Herbaceous:** 5 ☐

Height Class - **Conifer tree / Hardwood tree:** 0 / 7 **Regenerating Tree:** 4 **Shrub:** 3 **Herbaceous:** 1 ☐

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	**Species** Channel / Lower Banks	**% cover**	**C**	~~**Final species determination**~~ Upper Banks / TOB
T	Platanus Racemosa	1-5		T Umbellularia californica 5-15
T	Umbellularia californica	5-15		T Quercus agrifolia 1-5
S	Salix lasiolepis	5-15		T Platanus Racemosa 5-15
H	Solanum douglasii	1-5		S Malosma laurina 1-5
S	Salix exigua	+		H Elymus condensatus 1-5
S	Nicotiana glauca	+		S Toxicodendrom diversilobum 1-5
T	Ficus carica	1-5		S Venegasia carpesioides 1-5
S	Eriodictyon californicum	+		
H	Phacelia grandiflora	1-5		
S	Venegasia carpesioides	1-5		
H	Stipa miliacea	1-5		
H	Sonchus oleraceus	+		
H	Pseudo gnaphalium californicum	+		
S	Diplacus aurantiacus	1-5		
H	Pseudognaphalium luteoalbum	+		
H	Brassica nigra	1-5		
H	Erythranthe cardinalis	1-5		
S	Rubus ursinus	5-15		
H	Calystegia macrostegia ssp. cyclostegia	1-5		
S	Baccharis pilularis	+		
H	Erigeron canadinsis	+		
S	Acmispon glaber	+		
S	Sambucus nigra ssp. caerula	+		
H	Acmispon grandiflorus	+		
S	Toxicodendrm diversilobum	1-5		
H	Eschscholzia californica	+		
H	Solanum umbelliferum	+		
H	Phacelia cicutaria	+		
S	Malosma laurina	+		
S	Baccharis salicifolia	+		
S	Ribes sp.	+		
S	Salix laevigata	1-5		

Unusual species: Four ficus saplings becoming established in channel.

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

For Office Use: | **Final database #:** | **Final vegetation type:** **Alliance** ____ **Association** ____

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

circle: **Relevé** or [✓ **RA**]

Database #: [✓ New site] SY-7a **Date:** 12/7/18 **Name of recorder:** Jessica Peak

Other surveyors: Justine Cooper ☐

Location Name: ☐

GPS name: ipad/ArcCollector/Arrow 100 **For Relevé only:** **Bearing°**, left axis at ID point ____ **of** **Long / Short** side ☐

UTME ____ **UTMN** ____ **Zone: 11 NAD83** GPS error: [✓ ft.]/m./ PDOP 7.7ft

Decimal degrees: **LAT** 34.468114 **LONG** -119.622978

GPS within stand? [✓ **Yes**] / **No** If No, cite from GPS to stand: distance (m) ____ bearing ° ____ inclination ° ____ ☐

and record: **Base point ID** ____ **Projected UTMs: UTME** ____ **UTMN** ____ ☐

Camera Name: JC **Cardinal photos at ID point:** ☐

Other photos:

Stand Size (acres): [✓ **<1,**] **1-5, >5** | **Plot Size (m²): 100 /** ____ | **Plot Shape** ____ **x** ____ **m** | **RA Radius** 30 **m** ☐

Exposure, Actual °: 130 **NE NW** [✓ **SE**] **SW Flat Variable** | **Steepness, Actual °:** NA **0°** [✓ **1-5°**] **> 5-25° > 25** ☐

Topography: Macro: top upper mid [✓ **lower**] [✓ **bottom**] | **Micro: convex flat** [✓ **concave**] **undulating** ☐

Geology code: GRLA/SAND **Soil Texture code:** sand/COLS | **Upland** or [✓ **Wetland/Riparian**] (circle one) ☐

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

H₂0: 4 **BA Stems:** 1 **Litter:** 1 **Bedrock:** 25 **Boulder:** 20 **Stone:** 5 **Cobble:** 9 **Gravel:** 15 **Fines:** 20 **=100%** ☐

% Current year bioturbation 0 **Past bioturbation present? Yes /** [✓ **No**] | **% Hoof punch** 0 ☐

Fire evidence: [✓ **Yes**] / **No** (circle one) If yes, describe in Site history section, including date of fire, if known. ☐

Site history, stand age, comments: site burned in Thomas Fire (Dec. 2017) then scoured by debris flow on 1/9/2018. ☐

- Recent scour from rain events on Nov 27-29 & Dec 4-5, 2018 removed most herbaceous vegetation from channel.
- flow in channel ~14"-4ft wide; ~2-6 inches deep
- channel ~10-25ft wide @ OHWM

Disturbance code / Intensity (L,M,[✓ H]): 23 / ____ ____ / ____ ____ / ____ ____ / ____ ____ / ____ **"Other"** fire/debris flows ☐

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), [✓ **T3** (6-11" dbh)], **T4** (11-24" dbh), **T5** (>24" dbh), **T6** multi-layered (T3 or T4 layer under T5, >60% cover) ☐

Shrub: [✓ **S1** seedling (<3 yr. old)], **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead) ☐

Herbaceous: [✓ **H1** (<12" plant ht.)], **H2** (>12" ht.) ☐

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Canyon sunflower scrub ☐

Field-assessed Association name (optional): California Bay forest ☐

Adjacent Alliances/direction: Coast live oak woodland (upslope) / ☐

Confidence in Alliance identification: L M [✓ **H**] **Explain:** ☐

Phenology (E,P,L): Herb L **Shrub** L **Tree** L **Other identification or mapping information:** ☐

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

SPECIES SHEET

Database #: SY-7a New site

IV. VEGETATION DESCRIPTION

% NonVasc cover: 95 **Total % Vasc Veg cover:** 5 ☐

% Cover - **Conifer tree / Hardwood tree:** 0 / 1 **Regenerating Tree:** 3 **Shrub:** 2 **Herbaceous:** <1 ☐

Height Class - **Conifer tree / Hardwood tree:** 0 / 5 **Regenerating Tree:** 4 **Shrub:** 2 **Herbaceous:** 1 ☐

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	**Species** (channel/lower banks)	**% cover**	**C**	**Final species determination** (upper banks/TOB)
S	Venegasia carpesioides	1-5		T umbellularia californica 1-5
T	Umbellularia californica	1-5		T Quercus agrifolia +
S	Eriodictyon	+		S Baccharis pilularis +
H	Solananum douglasii	+		S Toxicodendron diversilobum +
H	Stipa miliacea	+		H Solanum umbelliferum +
H	Foeniculum vulgare	+		S Ceanothus megacarpus +
S	Salix lasiolepis	+		S Ribes sp +
S	Baccharis pilularis	+		S Galium sp. +
H	Eriophyllum confertiflorum	+		H Scropularia californica +
S	Toxicodendron diversilobum	+		S Acmispon glaber +
				H Calystegia macrostegia ssp. cyclo +
				S Rubus ursinus +
				S Artemisia douglasiana +
				S Artemisia californica +
				S Baccharis plummerae +
				H Pteridium aquilinum +

Unusual species: Four Plummer's baccharis near top of slope/trail above net site

4x4 area (16sqft); fruiting

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

For Office Use: | **Final database #:** | **Final vegetation type:** **Alliance** ______ **Association** ______

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION circle: **Relevé** or [✓ **RA**]

Database #: SY-18 **Date:** 9/21/18 **Name of recorder:** Jessica Peak

Other surveyors: Justine Cooper/John Storrer ☐

Location Name: San Ysidro Canyon ☐

GPS name: ipad/ARCCollector/ARRow100 For Relevé only: **Bearing°**, left axis at ID point____ **of Long / Short** side ☐

UTME __ __ __ __ __ __ **UTMN** __ __ __ __ __ __ __ **Zone: 11** [✓ **NAD83**] GPS error: [✓ ft.]/ m./ **PDOP** 4.6

Decimal degrees: **LAT** 34.459500 **LONG** -119.623273

GPS within stand? [✓ **Yes**] / **No** If No, cite from GPS to stand: distance (m)____ bearing °____ inclination °____ ☐

and record: **Base point ID** ____________ **Projected UTMs: UTME** __ __ __ __ __ __ **UTMN** __ __ __ __ __ __ __ ☐

Camera Name: **Cardinal photos at ID point:** ☐

Other photos:

Stand Size (acres): [✓ <1] 1-5, >5 | **Plot Size (m²): 100 /** ____ | **Plot Shape** ___ **x** ___ **m** | **RA Radius** 30 **m** ☐

Exposure, Actual °: 165S **NE NW SE SW Flat Variable** | **Steepness, Actual °:** NA **0°** [✓ **1-5°**] **> 5-25° > 25** ☐

Topography: Macro: top upper mid [✓ **lower**] [✓ **bottom**] | **Micro: convex flat** [✓ **concave**] **undulating** ☐

Geology code: GRAL/SAND **Soil Texture code:** sand/COLS | **Upland** or [✓ **Wetland/Riparian**] (circle one) ☐

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

$H_2$0: 3 **BA Stems:** 1 **Litter:** 1 **Bedrock:** 5 **Boulder:** 40 **Stone:** 20 **Cobble:** 15 **Gravel:** 10 **Fines:** 5 **=100%** ☐

% Current year bioturbation 0 **Past bioturbation present? Yes /** [✓ **No**] | **% Hoof punch** 0 ☐

Fire evidence: [✓ **Yes**] / **No** (circle one) If yes, describe in Site history section, including date of fire, if known. ☐

Site history, stand age, comments: site burned in Thomas Fire (Dec. 2017) & scoured by debris flows on 1/9/2018. ☐

- flow in channel ~2-6ft wide; 1-6 inches deep (intermittent pools)
- channel ~12-20ft wide @ OHWM

- staging ~700sq ft on east side of channel below TOB or on trail above TOB

Disturbance code / Intensity (L,M,[✓ **H**]**):** 23/___ ___/___ ___/___ ___/___ ___/___ **"Other"** fire/debris flows ☐

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), [✓ **T4** (11-24" dbh)], **T5** (>24" dbh), **T6** multi-layered (T3 or T4 layer under T5, >60% cover) ☐

Shrub: [✓ **S1** seedling (<3 yr)] old), **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead) ☐

Herbaceous: [✓ **H1** (<12" plant ht.)], **H2** (>12" ht.) ☐

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Arroyo willow thicket ☐

Field-assessed Association name (optional): California bay forest ☐

Adjacent Alliances/direction: coast live oak woodland (upslope east/west) / ☐

Confidence in Alliance identification: L M [✓ **H**] **Explain:** ____________ ☐

Phenology (E,P,L): Herb P/L **Shrub** P/L **Tree** L **Other identification or mapping information:** ☐

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

SPECIES SHEET

Database #: SY-18

IV. VEGETATION DESCRIPTION

% NonVasc cover: 89 **Total % Vasc Veg cover:** 15 ☐

% Cover - **Conifer tree / Hardwood tree:** 0 / 2 **Regenerating Tree:** 3 **Shrub:** 7 **Herbaceous:** 3 ☐

Height Class - **Conifer tree / Hardwood tree:** 0 / 6 **Regenerating Tree:** 4 **Shrub:** 3 **Herbaceous:** 1 ☐

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	**Species** Channel / Lower Banks	**% cover**	**C**	~~**Final species determination**~~ Upper Banks / TOB
T	Platanus racemosa	1-5		T Quercus agrifolia 1-5
S	Salix lasiolepis	1-5		t Platanus racemosa 1-5
T	Alnus rhombifolia	+		T Umbellularia californica 5-15
T	Salix laevigata	+		S Heteromeles arbutifolia 1-5
S	Venegasia carpesioides	1-5		H Elymus condensatus 1-5
H	Solanum douglasii	1-5		S Artemisia douglasiana 1-5
H	Stipa millacea	1-5		H Solidago velutina ssp. californica +
H	Sonchus oleraceus	+		
T	Tamarix ramosissima (pulled)	+		
H	Eriophyllum confertiflorum	+		
S	Toxicodendron diversilobum	1-5		
H	Erythranthe cardinalis	1-5		
S	Acmispon glaber	+		
H	Calystegia macrostegia ssp. cyclo.	+		
H	Oxalis pes-caprae	+		
S	Baccharis pilularis	+		
H	Scrophularia californica	+		
H	Juncus sp.	+		
S	Salix exigua	+		
S	Baccharis salicifolia	+		
H	Phacelia grandiflora	+		
H	Epilobium ciliatum	+		
S	Eriodictyon sp	+		
H	Antirrhinum multiflorum	+		
H	Phacelia brachyloba	+		
H	Solanum umbelliferum	+		
H	Erigeron canadensis	+		
H	Pseudognaphalium luteoalbum	+		
H	Typha latifolia	+		
S	Diplacus aurantiacus	+		

Unusual species: ______

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

For Office Use:	**Final database #:**	**Final vegetation type:**	**Alliance** ____ **Association**

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

circle: **Relevé** or [✓ **RA**]

Database #: BV-2

Date: 9/17/18

Name of recorder: Jessica Peak

Other surveyors: Justine Cooper / John Storrer ☐

Location Name: Buena Vista Canyon ☐

GPS name: ipad / ARC Collector / ARROW 100 For Relevé only: **Bearing°**, left axis at ID point____ **of Long / Short** side ☐

UTME ______ **UTMN** ______ **Zone: 11** [✓ **NAD83**] GPS error: [✓ **ft.**] / **m.** / **PDOP** 2.5

Decimal degrees: **LAT** 34.450823 **LONG** -119.611076

GPS within stand? [✓ **Yes**] / **No** If No, cite from GPS to stand: distance (m) ____ bearing ° ____ inclination ° ____ ☐

and record: **Base point ID** ______ **Projected UTMs: UTME** ______ **UTMN** ______ ☐

Camera Name: JC **Cardinal photos at ID point:** ☐

Other photos:

Stand Size (acres): [✓ **<1,**] **1-5, >5** | **Plot Size (m²): 100 /** ____ | **Plot Shape** ___ **x** ___ **m** | **RA Radius** 30 **m** ☐

Exposure, Actual °: 168S **NE NW SE SW Flat Variable** | **Steepness, Actual °:** NA **0°** [✓ **1-5°**] **> 5-25° > 25** ☐

Topography: Macro: top upper mid [✓ **lower**] [✓ **bottom**] | **Micro: convex flat** [✓ **concave**] **undulating** ☐

Geology code: GRAL/SAND **Soil Texture code:** sand/cols | **Upland** or **Wetland/**[✓ **Riparian**] (circle one) ☐

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

H₂0: 5 **BA Stems:** 1 **Litter:** 1 **Bedrock:** 10 **Boulder:** 35 **Stone:** 20 **Cobble:** 7 **Gravel:** 10 **Fines:** 10 **=100%** ☐

% Current year bioturbation 0 **Past bioturbation present? Yes** / [✓ **No**] | **% Hoof punch** 0 ☐

Fire evidence: [✓ **Yes**] / **No** (circle one) If yes, describe in Site history section, including date of fire, if known. ☐

Site history, stand age, comments: site burned in thomas fire (Dec. 2017) & scoured by debris flows on 1/9/2018. ☐

· flow in channel ~1-3ft wide; 1" to 8" deep (intermittent pools)
· channel @ OHWM ~4-15ft wide

· limited to no staging area near net location that is outside of the creek channel.

Disturbance code / Intensity (L,M,[✓ **H**]**):** 231 / ___ / ___ / ___ / ___ / ___ **"Other"** fire/debris flow ☐

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), [✓ **T4** (11-24" dbh)], **T5** (>24" dbh), **T6** multi-layered (T3 or T4 layer under T5, >60% cover) ☐

Shrub: [✓ **S1** seedling] (<3 yr. old), **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead) ☐

Herbaceous: [✓ **H1** (<12" plant ht.)], **H2** (>12" ht.) ☐

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: white alder grove / western sycamore woodland ☐

Field-assessed Association name (optional): western sycamore woodland ☐

Adjacent Alliances/direction: Big pod ceanothus / laurel sumac chaparral / ☐

Confidence in Alliance identification: L M [✓ **H**] **Explain:** ______ ☐

Phenology (E,P,L): Herb P/L **Shrub** P/L **Tree** L **Other identification or mapping information:** ☐

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

SPECIES SHEET

Database #: BV-2

IV. VEGETATION DESCRIPTION

% NonVasc cover: 50 **Total % Vasc Veg cover:** 49 ☐

% Cover - **Conifer tree / Hardwood tree:** 0 / 1 **Regenerating Tree:** 30 **Shrub:** 10 **Herbaceous:** 9 ☐

Height Class - **Conifer tree / Hardwood tree:** 0 / 9 **Regenerating Tree:** 4 **Shrub:** 3 **Herbaceous:** 1 ☐

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	**Species** Channel / Lower banks	**% cover**	**C**	~~**Final species determination**~~ Upper banks | TOB
T	Alnus Rhombifolia	5-15		T Platanus Racemosa 5-15
T	Platanus Racemosa	5-15		T Quercus agrifolia 1-5
S	Venegasia carpesioides	1-5		H Elymus condensatus 5-15
S	Salix lasiolepis	1-5		S Heteromeles arbutifolia 5-15
S	Rubus ursinus	1-5		S Ceanothus megacarpus 5-15
S	Toxicodendron diversilobum	1-5		H Stephanomeria cichoriacea 1-5
H	Artemisia douglasiana	1-5		H Melica imperfecta 1-5
S	Acmispon glaber			S Ceanothus cuneatus 1-5
H	Solidago velutina ssp. californica	1-5		S Baccharis pilularis 1-5
H	Sonchus oleraceus	+		S Toxicodendron diversilobum 1-5
H	Pseudognaphalium luteoalbum	+		H Pteridium aquilinum +
H	Equisetum arvense			H Artemisia douglasiana +
H	Erigeron canadensis	+		
S	Baccharis salicifolia	1-5		
H	Erythranthe cardinalis	1-5		
S	Salix exigua	+		
H	Elymus condensatus	1-5		
S	Adenostoma fasciculata	+		
H	Calystegia macrostegia ssp. cyclostegia	+		
T	Tamarix ramossisima (pulled)	+		
H	Brassica nigra	1-5		
H	Stipa miliacea	1-5		
H	Scrophularia californica	+		
S	Nicotiana glauca	+		
H	Hordeum brachyantherum	+		
H	Typha latifolia	+		
H	Bidens pilosa	+		

Unusual species: ______

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

For Office Use: | **Final database #:** | **Final vegetation type:** **Alliance** ______ **Association**

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

circle: **Relevé** or [✓ **RA**]

Database #: BV-4

Date: 9/20/18

Name of recorder: Jessica Peak

Other surveyors: Justine Cooper / John Storrer ☐

Location Name: Buena Vista Canyon ☐

GPS name: ipad / ARC Collector / ARROW 100 For Relevé only: **Bearing°**, left axis at ID point____ **of Long / Short** side ☐

UTME ______ **UTMN** ______ **Zone: 11** [✓ **NAD83**] GPS error: [✓ **ft.**] / **m.** / **PDOP** 1.9

Decimal degrees: **LAT** 34.454768 **LONG** -119.611699

GPS within stand? [✓ **Yes**] / **No** If No, cite from GPS to stand: distance (m)____ bearing °____ inclination °____ ☐

and record: **Base point ID** ______ **Projected UTMs: UTME** ______ **UTMN** ______ ☐

Camera Name: JC **Cardinal photos at ID point:** ☐

Other photos:

Stand Size (acres): [✓ **<1,**] **1-5, >5** | **Plot Size (m²): 100 /** ____ | **Plot Shape** ___ **x** ___ **m** | **RA Radius** 30 **m** ☐

Exposure, Actual °: 185S **NE NW SE SW Flat Variable** | **Steepness, Actual °:** NA **0° 1-5°** [✓ **>5-25°**] **>25** ☐

Topography: Macro: top upper mid [✓ **lower**] [✓ **bottom**] | **Micro: convex flat** [✓ **concave**] **undulating** ☐

Geology code: GRAV/SAND **Soil Texture code:** Sand/COBS | **Upland** or [✓ **Wetland/Riparian**] (circle one) ☐

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

H₂0: 2 **BA Stems:** 1 **Litter:** 1 **Bedrock:** 5 **Boulder:** 15 **Stone:** 10 **Cobble:** 20 **Gravel:** 20 **Fines:** 26 **=100%** ☐

% Current year bioturbation 0 **Past bioturbation present? Yes /** [✓ **No**] | **% Hoof punch** 0 ☐

Fire evidence: [✓ **Yes**] / **No** (circle one) If yes, describe in Site history section, including date of fire, if known. ☐

Site history, stand age, comments: site burned in Thomas Fire (Dec. 2017) & scoured by debris flows 1/9/2018. ☐

- net location below confluence of side channel (west bank) & Buena vista creek
- flow in channel ~6 inches - 3ft wide; ~1-5 inches deep (small pools)
- channel ~10-20ft wide @ OHWM
- trim 2 sycamore saplings in channel for net installation; staging on trail above channel

Disturbance code / Intensity (L,M,[✓ **H**]**):** 23 / ___ ___ / ___ ___ / ___ ___ / ___ ___ / ___ **"Other"** fire/debris flow ☐

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), [✓ **T4** (11-24" dbh)], **T5** (>24" dbh), **T6** multi-layered (T3 or T4 layer under T5, >60% cover) ☐

Shrub: [✓ **S1** seedling (<3 yr. old)], **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead) ☐

Herbaceous: [✓ **H1** (<12" plant ht.)], **H2** (>12" ht.) ☐

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Arroyo willow thicket / western sycamore woodland ☐

Field-assessed Association name (optional): Canyon sunflower scrub ☐

Adjacent Alliances/direction: Big pod ceanothus chaparral (upslope east / west), ☐

Confidence in Alliance identification: L M [✓ **H**] **Explain:** ______ ☐

Phenology (E,P,L): Herb P/L **Shrub** P/L **Tree** ___ **Other identification or mapping information:** ☐

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

SPECIES SHEET

Database #: BV-4

IV. VEGETATION DESCRIPTION

% NonVasc cover: 10 **Total % Vasc Veg cover:** 30 ☐

% Cover - **Conifer tree / Hardwood tree:** 0 / 1 **Regenerating Tree:** 10 **Shrub:** 15 **Herbaceous:** 5 ☐

Height Class - **Conifer tree / Hardwood tree:** 0 / 6 **Regenerating Tree:** 4 **Shrub:** 3 **Herbaceous:** 1 ☐

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	**Species** Channel / Lower Banks	**% cover**	**C**	~~**Final species determination**~~ Upper Banks / Top
T	Platanus racemosa	5-15		T Quercus agrifolia 1-5
S	Salix lasiolepis	1-5		S Ceanothus megacarpus .5-15
S	Salix exigua	1-5		S Prunus ilicifolia 1-5
S	Venegasia carpesioides	1-5		S Eriodictyon sp. 1-5
H	Artemisia douglasiana	1-5		S Heteromeles arbutifolia 1-5
H	Solanum douglasii	1-5		H Elymus condensatus 1-5
H	Calystegia macrostegia ssp. cyclo.	1-5		S Toxicodendron diversilobum 1-5
H	Erythranthe cardinalis	1-5		H Pteridium aquilinum +
H	Stipa miliacea	1-5		H Calystegia macrostegia ssp cyclo. 1-5
T	Populus fremontii	+		
H	Phacelia grandiflora	+		
S	Rubus ursinus	1-5		
S	Toxicodendron diversilobum	1-5		
S	Acmispon glaber	+		
H	Equisetum arvense	1-5		
H	Phacelia cicutaria	+		
H	Emmenanthe penduliflora	+		
H	Melica imperfecta	+		
S	Diplacus aurantiacus	+		
H	Brassica nigra	+		
H	Solanum umbelliferum	+		
S	Ceanothus megacarpus	+		
H	Eriophyllum confertiflorum	+		

Unusual species:

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

For Office Use: **Final database #:** **Final vegetation type:** **Alliance** ____ **Association**

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

circle: **Relevé** or [✓ **RA**]

Database #: BV-5
Date: 9/20/18
Name of recorder: Jessica Peak
Other surveyors: Justine Cooper / John Storrer ☐
Location Name: Buena Vista Canyon ☐

GPS name: ipad / ArcCollector / Arrow 100 For Relevé only: **Bearing°**, left axis at ID point ____ **of Long / Short** side ☐
UTME ____ **UTMN** ____ **Zone: 11** [✓ **NAD83**] GPS error [✓ **ft.**] / **m./ PDOP** 2.2
Decimal degrees: **LAT** 34.455275 **LONG** -119.610365

GPS within stand? [✓ **Yes**] / **No** If No, cite from GPS to stand: distance (m) ____ bearing ° ____ inclination ° ____ ☐
and record: **Base point ID** ____ **Projected UTMs: UTME** ____ **UTMN** ____ ☐
Camera Name: JC **Cardinal photos at ID point:** ☐
Other photos:

Stand Size (acres): [✓ <1,] 1-5, >5 | **Plot Size (m²): 100 /** ____ | **Plot Shape** ____ x ____ **m** | **RA Radius** 30 **m** ☐
Exposure, Actual °: 242 **NE NW SE** [✓ **SW**] **Flat Variable** | **Steepness, Actual °:** NA **0°** [✓ **1-5°**] **> 5-25° > 25** ☐

Topography: Macro: top upper mid [✓ lower] [✓ bottom] | **Micro:** convex flat [✓ concave] undulating ☐
Geology code: GRAL/SAND **Soil Texture code:** Sand/COLS | **Upland** or [✓ **Wetland/Riparian**] (circle one) ☐

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)
H₂0: 2 **BA Stems:** 1 **Litter:** 2 **Bedrock:** 30 **Boulder:** 5 **Stone:** 10 **Cobble:** 15 **Gravel:** 5 **Fines:** 10 **=100%** ☐

% Current year bioturbation 0 **Past bioturbation present? Yes /** [✓ **No**] | **% Hoof punch** 0 ☐
Fire evidence: [✓ **Yes**] / **No** (circle one) If yes, describe in Site history section, including date of fire, if known. ☐

Site history, stand age, comments: site burned in Thomas Fire (Dec 2017) & scoured by debris flow on 1/9/2018. ☐

- flow in channel ~8in-3ft wide (1-3" deep) @ center/north end of plot; no flow under net location
- channel ~15-20ft wide @ OHWM
- one Salix lasiolepis in channel may need to be trimmed for net installation.
- staging on trail above channel/TOB

Disturbance code / Intensity (L,M,[✓ **H**]**):** 23 / ____ / ____ / ____ / ____ / ____ **"Other"** fire/debris flow ☐

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), **T4** (11-24" dbh), [✓ **T5** (>24" dbh)] **T6** multi-layered (T3 or T4 layer under T5, >60% cover) ☐
Shrub: [✓ **S1** seedling (<3 yr. old)], **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead) ☐
Herbaceous: [✓ **H1** (<12" plant ht.)], **H2** (>12" ht.) ☐
Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)
Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Arroyo willow thicket ☐
Field-assessed Association name (optional): Western sycamore woodland ☐
Adjacent Alliances/direction: Big pod ceanothus/ Laurel sumac chaparral (upslope west) coast live oak woodland (upslope east) ☐
Confidence in Alliance identification: L M [✓ **H**] **Explain:** ☐
Phenology (E,P,L): Herb P/L **Shrub** P/L **Tree** L **Other identification or mapping information:** ☐

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

SPECIES SHEET

Database #: BV-5

IV. VEGETATION DESCRIPTION

% NonVasc cover: 70 **Total % Vasc Veg cover:** 30 ☐

% Cover - **Conifer tree / Hardwood tree:** 0 / 1 **Regenerating Tree:** 10 **Shrub:** 15 **Herbaceous:** 5 ☐

Height Class - **Conifer tree / Hardwood tree:** 0 / 7 **Regenerating Tree:** 4 **Shrub:** 3 **Herbaceous:** 1 ☐

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	**Species** Channel / Lower Banks	**% cover**	**C**	~~**Final species determination**~~ upper Banks / TOB
S	Salix lasiolepis	1-5		T Quercus agrifolia 1-5
T	Platanus racemosa	1-5		S Malosma laurina 1-5
S	venegasia carpesioides	1-5		S Prunus ilicifolia 1-5
H	Erythranthe cardinalis	1-5		S Eriogonum fasciculatum +
S	Rubus ursinus	1-5		H Elymus condensatus 1-5
S	Toxicodendron diversilobum	+		S Toxicodendron diversilobum 1-5
S	Clematis ligusticifolia	+		S Hesperoyucca whipplei +
H	Stipa miliacea	1-5		H Calystegia macrostegia ssp. cyclo. 1-5
S	salix exigua	+		S Baccharis plummerae +
H	Plantago lanceolata	+		S Brickellia californica 1-5
H	Silene laciniata	+		H Solidago velutina ssp. californica +
T	Tamarix ramosissima (pulled)	+		H Phacelia cicutaria +
H	Typha latifolia	+		H Phacelia grandiflora +
H	Sonchus oleracens	+		
H	Calystegia macrostegia ssp. cyclo.	+		
H	Lysimachia arvensis	+		
H	Solanum douglasii	1-5		
H	Vicia sp.	+		
S	Acmispon glaber	+		
H	Phacelia grandiflora	+		
S	Lupinus hirsutissimus	+		
S	Malosma laurina	+		
H	Delairea odorata	+		
H	Logfia filaginades	+		
H	Pseudognaphalium californica	+		
S	Diplacus aurantiacus	+		
S	Baccharis salicifolia	+		
H	Scrophularia californica	+		
S	Baccharis pilularis	+		
H	Stachys bullata	+		
H	Artemisia douglasiana	+		
H	Pseudognaphalium luteoalbum	+		
H	Solanum umbelliferum	+		

Unusual species: 3 Plummer's baccharis on west slope (30-40 ft above channel)

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

For Office Use: | **Final database #:** | **Final vegetation type:** **Alliance** ______ **Association**

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

circle: **Relevé** or [✓ **RA**]

Database #: BV-6

Date: 9/20/18

Name of recorder: Jessica Peak

Other surveyors: Justine Cooper / John Storrer ☐

Location Name: Buena Vista Canyon ☐

GPS name: ipad/ARC Collector/Arrow 100 For Relevé only: **Bearing°**, left axis at ID point____ **of Long / Short** side ☐

UTME __ __ __ __ __ __ **UTMN** __ __ __ __ __ __ __ **Zone: 11** [✓ **NAD83**] GPS error: [✓ **ft.**] **m./ PDOP** 5.7

Decimal degrees: **LAT** 34.458348 **LONG** -119.608772

GPS within stand? [✓ **Yes**] / **No** If No, cite from GPS to stand: distance (m)____ bearing °____ inclination °____ ☐

and record: **Base point ID**__________ **Projected UTMs: UTME** __ __ __ __ __ __ **UTMN** __ __ __ __ __ __ __ ☐

Camera Name: JC **Cardinal photos at ID point:** ☐

Other photos:

Stand Size (acres): [✓ **<1,**] **1-5, >5** | **Plot Size (m²): 100 /** _____ | **Plot Shape** ___ **x** ___ **m** | **RA Radius** 30 **m** ☐

Exposure, Actual °: 162S **NE NW SE SW Flat Variable** | **Steepness, Actual °:** NA **0°** [✓ **1-5°**] **> 5-25° > 25** ☐

Topography: Macro: top upper mid [✓ **lower**] [✓ **bottom**] | **Micro: convex flat** [✓ **concave**] **undulating** ☐

Geology code: GRAL/SAND **Soil Texture code:** sand/cols | **Upland** or [✓ **Wetland/Riparian**] (circle one) ☐

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

H₂0: 2 **BA Stems:** | **Litter:** 2 **Bedrock:** 30 **Boulder:** 15 **Stone:** 15 **Cobble:** 10 **Gravel:** 15 **Fines:** 10 **=100%** ☐

% Current year bioturbation 0 **Past bioturbation present? Yes** / [✓ **No**] | **% Hoof punch** 0 ☐

Fire evidence: [✓ **Yes**] / **No** (circle one) If yes, describe in Site history section, including date of fire, if known. ☐

Site history, stand age, comments: Site burned in Thomas fire (Dec. 2017) & scoured by debris flows 1/9/2018. ☐

- flow in channel ~8" - 3ft wide; ~1-3 inches deep; one pool 5ft wide & 3" deep.
- channel ~10-18ft wide @ OHWM
- moderately dense canopy cover over net location (~30-35%); small staging area in channel - staging area is limited outside of channel
- sparse vegetation cover in channel (~10%)

Disturbance code / Intensity (L,M,H): 23 /___ ___/___ ___/___ ___/___ ___/___ **"Other"** fire/debris flows ☐

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), **T4** (11-24" dbh), [✓ **T5** (>24" dbh)], **T6 multi-layered** (T3 or T4 layer under T5, >60% cover) ☐

Shrub: [✓ **S1** seedling (<3 yr old)], **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead) ☐

Herbaceous: [✓ **H1** (<12" plant ht.)], **H2** (>12" ht.) ☐

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Canyon sunflower scrub ☐

Field-assessed Association name (optional): Arroyo willow thicket ☐

Adjacent Alliances/direction: Coast live oak woodland/California bay forest (upslope) ☐

Confidence in Alliance identification: L M [✓ **H**] **Explain:** __________ ☐

Phenology (E,P,L): Herb P/L **Shrub** P/L **Tree** ✓ **Other identification or mapping information:** ☐

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

SPECIES SHEET

Database #: BV-6

IV. VEGETATION DESCRIPTION

% NonVasc cover: 60 **Total % Vasc Veg cover:** 40 ☐

% Cover - Conifer tree / Hardwood tree: 0 , 20 **Regenerating Tree:** 1 **Shrub:** 7 **Herbaceous:** 3 ☐

Height Class - Conifer tree / Hardwood tree: 0 / 7 **Regenerating Tree:** 2 **Shrub:** 3 **Herbaceous:** 1 ☐

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	**Species** channel / Lower Banks	**% cover**	**C**	~~**Final species determination**~~ Upper Banks / Top
S	Venegasia carpesioides	1-5		T Quercus agrifolia 5-15
S	Salix lasiolepis	1-5		T Umbellularia californica 5-15
H	Erythranthe cardinalis	+		S Heteromeles arbutifolia 1-5
H	Stipa miliacea	+		S Toxicodendron diversilobum 1-5
H	Delairea odorata	1-5		H Pteridium aquilinum +
H	Solanum douglasii	+		H Delairea odorata 1-5
S	Toxicodendron diversilobum	+		S Baccharis plummerae 1-5
H	Stachys bullata	+		S Frangula californica 1-5
S	Rubus ursinus	+		S Venegasia carpesioides 1-5
H	Sonchus oleraceus	+		S Prunus ilicifolia +
H	Pseudognaphalium californicum	+		H Solidago velutina ssp. californica +
H	Scrophularia californica	+		H Stephanomeria cichoriacea +
S	Ribes sp.	+		
T	Alnus rhombifolia	+		
T	Platanus racemosa	+		
H	Equisetum arvense	+		

Unusual species: 12 Plummer's baccharis on east bank; 10 Plummer's baccharis on west bank

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

For Office Use:	**Final database #:**	**Final vegetation type:**	**Alliance** ____ **Association**

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION circle: Relevé or [✓ RA]

Database #: BV-7

Date: 9/20/18

Name of recorder: Jessica Peak

Other surveyors: Justine Cooper / John Storrer ☐

Location Name: Buena Vista Canyon ☐

GPS name: ipad / ArcCollector / Arrow 100 For Relevé only: **Bearing°**, left axis at ID point____ **of Long / Short** side ☐

UTME __ __ __ __ __ __ **UTMN** __ __ __ __ __ __ __ **Zone: 11** [✓ **NAD83**] GPS error: [✓ **ft.**]/ **m./ PDOP** 2.4

Decimal degrees: **LAT** 34.456103 **LONG** -119.609459

GPS within stand? [✓ **Yes**] / **No** If No, cite from GPS to stand: distance (m)____ bearing °____ inclination °____ ☐

and record: **Base point ID**____ **Projected UTMs: UTME** __ __ __ __ __ __ **UTMN** __ __ __ __ __ __ __ ☐

Camera Name: JC **Cardinal photos at ID point:** ☐

Other photos:

Stand Size (acres): [✓ <1,] 1-5, >5 | **Plot Size (m²): 100 /** ____ | **Plot Shape** ___ **x** ___ **m** | **RA Radius** 30 **m** ☐

Exposure, Actual °: 208 **NE NW SE** [✓ **SW**] **Flat Variable** | **Steepness, Actual °:** NA **0° 1-5°** [✓ **>5-25°**] **>25** ☐

Topography: Macro: top upper mid [✓ **lower**] [✓ **bottom**] | **Micro: convex flat** [✓ **concave**] **undulating** ☐

Geology code: GRLA/SAND **Soil Texture code:** sand/COLS | **Upland** or [✓ **Wetland/Riparian**] (circle one) ☐

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

H₂0: 2 **BA Stems:** 1 **Litter:** 2 **Bedrock:** 40 **Boulder:** 5 **Stone:** 5 **Cobble:** 20 **Gravel:** 15 **Fines:** 15 **=100%** ☐

% Current year bioturbation 0 **Past bioturbation present? Yes /** [✓ **No**] | **% Hoof punch** 0 ☐

Fire evidence: [✓ **Yes**] **/ No** (circle one) If yes, describe in Site history section, including date of fire, if known. ☐

Site history, stand age, comments: Site burned in Thomas Fire (Dec. 2017) & scoured by debris flows 1/9/2018. ☐

- flow in channel ~12-24 inches wide; ~1-2 inches deep w/ one pool ~4ft; 6 inches deep
- channel ~8-15 ft wide @ OHWM

- Narrow net location; very sparse vegetation cover in channel (~5% cover) w/ ~25% cover of vegetation on upper banks
- limited to no staging outside creek channel

Disturbance code / Intensity (L,M,[✓ **H**]**):** 23 / ___ / ___ / ___ / ___ / ___ / ___ **"Other"** fire/debris flow ☐

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), [✓ **T4** (11-24" dbh)], **T5** (>24" dbh), **T6** multi-layered (T3 or T4 layer under T5, >60% cover) ☐

Shrub: S1 seedling (<3 yr. old), **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead) ☐

Herbaceous: H1 (<12" plant ht.), **H2** (>12" ht.) ☐

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Arroyo willow thicket ☐

Field-assessed Association name (optional): Poison oak scrub ☐

Adjacent Alliances/direction: coast live oak woodland (upslope east/west) / ☐

Confidence in Alliance identification: L M [✓ **H**] **Explain:** ☐

Phenology (E,P,L): Herb P/L **Shrub** P/L **Tree** L **Other identification or mapping information:** ☐

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

SPECIES SHEET

Database #: BV-7

IV. VEGETATION DESCRIPTION

% NonVasc cover: 70 **Total % Vasc Veg cover:** 30 ☐

% Cover - **Conifer tree / Hardwood tree:** 0 / 15 **Regenerating Tree:** 0 **Shrub:** 10 **Herbaceous:** 5 ☐

Height Class - **Conifer tree / Hardwood tree:** 0 / 5 **Regenerating Tree:** 0 **Shrub:** 3 **Herbaceous:** 1 ☐

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	**Species** Channel / Lower Banks	**% cover**	**C**	~~**Final species determination**~~ Upper Banks / TOB
S	Salix lasiolepis	1-5		T Quercus agrifolia 5-15
S	Venegasia carpesioides	1-5		T Umbellularia californica 1-5
S	Toxicodendron diversilobum	1-5		S Heteromeles arbutifolia 1-5
H	Bromus diandrus	+		S Elymus condensatus 1-5
H	Equisetum arvense	+		H Artemisia douglasiana +
H	Vicia sp.	+		S Baccharis plummerae 1-5
H	Eriophyllum confertiflorum	+		S Prunus ilicifolia 1-5
H	Stachys bullata	+		S Malosma laurina 1-5
H	Delairea odorata	+		H Calystegia macrostegia ssp. cyclo. 1-5
S	Adenostoma fasciculata	+		S Ceanothus megacarpus 1-5
H	Erythranthe cardinalis	+		H Phacelia grandiflora +
H	Sonchus oleraceus	+		H Melica imperfecta +
S	Rubus ursinus	1-5		S Rhamnus crocea +
H	Solanum douglasii	1-5		H Delairea odorata 1-5
S	Acmispon glaber	+		H Symphyotrichum sp. +
H	Stipa miliacea	+		H Dudleya cymosa +
H	Artemisia douglasiana	+		H Pteridium aquilinum +

Unusual species: 8 Plummer's baccharis on east slope (20% fr/80% fl.)

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

For Office Use:	**Final database #:**	**Final vegetation type:**	**Alliance** **Association**

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION circle: **Relevé** or [✓ **RA**]

Database #: BV-10 **Date:** 9/17/18 **Name of recorder:** Jessica Peak

Other surveyors: Justine Cooper / John Storrer ☐

Location Name: Buena Vista Canyon ☐

GPS name: ipad / ARC Collector / ARROW 100 For Relevé only: **Bearing°**, left axis at ID point____ **of Long / Short** side ☐

UTME __ __ __ __ __ __ **UTMN** __ __ __ __ __ __ __ **Zone: 11** [✓ **NAD83**] GPS error: **ft./ m./ PDOP** ____

Decimal degrees: **LAT** 34.452384 **LONG** -119.611480

GPS within stand? [✓ **Yes**] / **No** If No, cite from GPS to stand: distance (m) ____ bearing ° ____ inclination ° ____ ☐

and record: **Base point ID** ____________ **Projected UTMs: UTME** __ __ __ __ __ __ **UTMN** __ __ __ __ __ __ __ ☐

Camera Name: JC **Cardinal photos at ID point:** ☐

Other photos:

Stand Size (acres): [✓ <1,] 1-5, >5 | **Plot Size (m²): 100 /** ____ | **Plot Shape** ___ **x** ___ **m** | **RA Radius** 30 **m** ☐

Exposure, Actual °: 585 **NE NW SE SW Flat Variable** | **Steepness, Actual °:** NA **0°** [✓ **1-5°**] **> 5-25° > 25** ☐

Topography: Macro: top upper mid lower bottom | **Micro: convex flat** [✓ **concave**] **undulating** ☐

Geology code: GRAL/SAND **Soil Texture code:** Sand/COLS | **Upland** or [✓ **Wetland/Riparian**] (circle one) ☐

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

H₂0: 3 **BA Stems:** | **Litter:** | **Bedrock:** 40 **Boulder:** 15 **Stone:** 10 **Cobble:** 10 **Gravel:** 10 **Fines:** 10 **=100%** ☐

% Current year bioturbation 0 **Past bioturbation present? Yes /** [✓ **No**] | **% Hoof punch** 0 ☐

Fire evidence: [✓ **Yes**] / **No** (circle one) If yes, describe in Site history section, including date of fire, if known. ☐

Site history, stand age, comments: Site burned in Thomas fire (Dec 2017) & scoured by debris flows 1/9/2018. ☐

- flow in channel ~1-5ft wide; 2-10 inches deep (intermittent pools)
- channel @ OHWM ~5-16 ft wide

- staging ~5650 sqft on east side of channel, below TOB

Disturbance code / Intensity (L,M,[✓ **H**]**):** 23 / ___ / ___ / ___ / ___ / ___ / **"Other"** fire / debris flow ☐

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), [✓ **T3** (6-11" dbh)] **T4** (11-24" dbh), **T5** (>24" dbh), **T6** multi-layered (T3 or T4 layer under T5, >60% cover) ☐

Shrub: [✓ **S1** seedling (<3 yr old)], **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead) ☐

Herbaceous: [✓ **H1** (<12" plant ht.)] **H2** (>12" ht.) ☐

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: White alder grove ☐

Field-assessed Association name (optional): Western sycamore woodland ☐

Adjacent Alliances/direction: Coast live oak woodland (upslope) / ☐

Confidence in Alliance identification: L M [✓ **H**] **Explain:** ☐

Phenology (E,P,L): Herb P/L **Shrub** P/L **Tree** L **Other identification or mapping information:** ☐

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

SPECIES SHEET

Database #: BV-10

IV. VEGETATION DESCRIPTION

% NonVasc cover: 60 **Total % Vasc Veg cover:** 40 ☐

% Cover - **Conifer tree / Hardwood tree:** 0 / 1 **Regenerating Tree:** 20 **Shrub:** 15 **Herbaceous:** 5 ☐

Height Class - **Conifer tree / Hardwood tree:** 0 / **Regenerating Tree:** 4 **Shrub:** 3 **Herbaceous:** 1 ☐

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	**Species** Channel / Lower banks	**% cover**	**C**	**F~~inal species determination~~** upper banks / TOB
T	Alnus rhombifolia	5-15		T Platanus racemosa 1-5
T	Platanus racemosa	1-5		T Quercus agrifolia 5-15
S	Venegasia carpesioides	1-5		H Elymus condensatus 1-5
H	Equisetum arvense	1-5		H Artemisia douglasiana 5-15
S	Salix lasiolepis	1-5		S Malosma laurina 1-5
S	Acmispon glaber	1-5		S Venegasia carpesioides 1-5
H	Stipa miliacea	1-5		S Heteromeles arbutifolia 5-15
T	Quercus agrifolia	+		H Solidago velutina ssp. cal. +
H	Calystegia macrostegia ssp. cyclostegia	1-5		S Toxicodendron diversilobum 1-5
S	Toxicodendron diversilobum	1-5		H Stephanomeria cichoriacea +
S	Rubus ursinus	1-5		S Solanum umbelliferum +
T	Populus fremontii	+		H Phacelia grandiflora +
H	Solanum douglasii	1-5		H Pteridium aquilinum +
H	Sonchus oleraceus	+		S Eriodictyon sp. +
S	Salix laevigata	1-5		
H	Erythranthe cardinalis	1-5		
H	Pseudognaphalium californicum	+		
S	Baccharis pilularis	+		
S	Eriophyllum confertiflorum	+		
H	Pseudognaphalium luteoalbum	+		
S	Ceanothus megacarpus	+		

Unusual species: ______

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

For Office Use: | **Final database #:** | **Final vegetation type:** **Alliance** ____ **Association** ____

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

circle: **Relevé** or [✓ **RA**]

Database #: BV-11

Date: 9/20/18

Name of recorder: Jessica Peak

Other surveyors: Justine Cooper / John Storrer ☐

Location Name: Buena Vista Canyon ☐

GPS name: ipad / ArcCollector / Arrow 100 For Relevé only: **Bearing°**, left axis at ID point____ **of Long / Short** side ☐

UTME ______ **UTMN** ______ **Zone: 11** [✓ **NAD83**] GPS error [✓ **ft.**]/ **m./ PDOP** 1.9

Decimal degrees: **LAT** 34.455539 **LONG** -119.611211

GPS within stand? [✓ **Yes**] / **No** If No, cite from GPS to stand: distance (m) ____ bearing ° ____ inclination ° ____ ☐

and record: **Base point ID** ______ **Projected UTMs: UTME** ______ **UTMN** ______ ☐

Camera Name: JC **Cardinal photos at ID point:** ☐

Other photos:

Stand Size (acres): [✓ **<1,**] **1-5, >5** | **Plot Size (m²): 100 /** ____ | **Plot Shape** ___ **x** ___ **m** | **RA Radius** 30 **m** ☐

Exposure, Actual °: 150 **NE NW** [✓ **SE**] **SW Flat Variable** | **Steepness, Actual °:** NA **0°** [✓ **1-5°**] **> 5-25° > 25** ☐

Topography: Macro: top upper mid [✓ **lower**] [✓ **bottom**] | **Micro: convex flat** [✓ **concave**] **undulating** ☐

Geology code: GRAL/SAND **Soil Texture code:** sand/cols | **Upland** or [✓ **Wetland/Riparian**] (circle one) ☐

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

H₂0: 0 **BA Stems:** | **Litter:** | **Bedrock:** 0 **Boulder:** 30 **Stone:** 10 **Cobble:** 20 **Gravel:** 15 **Fines:** 15 **=100%** ☐

% Current year bioturbation 0 **Past bioturbation present? Yes /** [✓ **No**] | **% Hoof punch** 0 ☐

Fire evidence: [✓ **Yes**] **/ No** (circle one) If yes, describe in Site history section, including date of fire, if known. ☐

Site history, stand age, comments: site burned in Thomas Fire (Dec. 2017) & scoured in debris flows on 1/9/2018. ☐

- net location in side channel to Buena Vista Creek
- no flow in channel
- channel ~10-25ft wide @ OHWM

- staging area limited; ~100 sq ft on east side of channel below TOB

Disturbance code / Intensity (L,M,H): 23 / ___ / ___ / ___ / ___ / ___ **"Other"** fire/debris flows ☐

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), [✓ **T4** (11-24" dbh)], **T5** (>24" dbh), **T6** multi-layered (T3 or T4 layer under T5, >60% cover) ☐

Shrub: [✓ **S1** seedling (<3 yr. old)], **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead) ☐

Herbaceous: [✓ **H1** (<12" plant ht.)], **H2** (>12" ht.) ☐

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Canyon sunflower scrub ☐

Field-assessed Association name (optional): Western sycamore woodland ☐

Adjacent Alliances/direction: Big pod Ceanothus chaparral (upslope) / ☐

Confidence in Alliance identification: L M [✓ **H**] **Explain:** ☐

Phenology (E,P,L): Herb P/L **Shrub** P/L **Tree** L **Other identification or mapping information:** ☐

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

SPECIES SHEET

Database #: BV-11

IV. VEGETATION DESCRIPTION

% NonVasc cover: 90 **Total % Vasc Veg cover:** 20 ☐

% Cover - **Conifer tree / Hardwood tree:** 0 / 2 **Regenerating Tree:** 2 **Shrub:** 10 **Herbaceous:** 5 ☐

Height Class - **Conifer tree / Hardwood tree:** 0 / **Regenerating Tree:** 3 **Shrub:** 2 **Herbaceous:** 1 ☐

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular
% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	**Species** Channel / Lower Banks	**% cover**	**C**	~~**Final species determination**~~ Upper Banks / TOB
H	Artemisia douglasiana	1-5		S Malosma laurina 5-15
T	Platanus racemosa	1-5		S Ceanothus megacarpus 5-15
S	Rubus ursinus	1-5		H Elymus condensatus 1-5
H	Stipa miliacea	1-5		T Quercus agrifolia 1-5
H	Calystegia macrostegia ssp. cyclo.	1-5		S Heteromeles arbutifolia 1-5
H	Foeniculum vulgare	+		S Toxicodendron diversilobum 1-5
S	Venegasia carpesioides	1-5		S Hesperoyucca whipplei +
H	Elymus condensatus	1-5		H Calystegia macrostegia ssp. cyclo. 1-5
S	Toxicodendron diversilobum	1-5		H Phacelia grandiflora +
H	Brassica nigra	+		H Stachys bullata +
S	Diplacus aurantiacus	+		H Cryptantha sp. +
H	Phacelia cicutaria	+		S Symphoricarpos albus 1-5
H	Solanum douglasii	+		S Baccharis pilularis +
S	Ceanothus megacarpus	1-5		H Phacelia cicutaria +
S	Baccharis pilularis	+		H Eriophyllum confertiflorum +
S	Acmispon glaber	+		
H	Sonchus oleraceus	+		
H	Solanum umbelliferum	+		

Unusual species: ____________________

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

For Office Use: | **Final database #:** | **Final vegetation type:** **Alliance** ____ **Association** ____

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION circle: **Relevé** or [✓ **RA**]

Database #: RC-12
Date: 9/19/18
Name of recorder: Jessica Peak
Other surveyors: Justine Cooper / John Storrer ☐
Location Name: Romero Canyon ☐

GPS name: ipad / ArcCollector / Arrow 100 For Relevé only: **Bearing°**, left axis at ID point____ **of Long / Short** side ☐
UTME ____ **UTMN** ____ **Zone: 11** [✓ **NAD83**] GPS error: [✓ **ft.**] / **m./ PDOP** 2.5
Decimal degrees: **LAT** 34.465176 **LONG** -119.590903

GPS within stand? [✓ **Yes**] / **No** If No, cite from GPS to stand: distance (m)____ bearing °____ inclination °____ ☐
and record: **Base point ID** ____ **Projected UTMs: UTME** ____ **UTMN** ____ ☐
Camera Name: JC **Cardinal photos at ID point:** ☐
Other photos:

Stand Size (acres): [✓ **<1,**] **1-5, >5** | **Plot Size (m²): 100 /** ____ | **Plot Shape** ___ **x** ___ **m** | **RA Radius** 30 **m** ☐
Exposure, Actual °: 154 **NE NW** [✓ **SE**] **SW Flat Variable** | **Steepness, Actual °:** NA **0° 1-5°** [✓ **> 5-25°**] **> 25** ☐

Topography: Macro: top upper mid [✓ **lower**] [✓ **bottom**] | **Micro: convex flat** [✓ **concave**] **undulating** ☐
Geology code: GRAV/SAND **Soil Texture code:** sand/cobs | **Upland** or [✓ **Wetland/Riparian**] (circle one) ☐

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)
H₂0: 5 **BA Stems:** | **Litter:** | **Bedrock:** 0 **Boulder:** 30 **Stone:** 25 **Cobble:** 20 **Gravel:** 15 **Fines:** 5 **=100%** ☐
% Current year bioturbation 0 **Past bioturbation present? Yes** / [✓ **No**] | **% Hoof punch** 0 ☐
Fire evidence: [✓ **Yes**] / **No** (circle one) If yes, describe in Site history section, including date of fire, if known. ☐

Site history, stand age, comments: site burned in Thomas Fire (Dec. 2017) & scoured by debris flows on 1/9/2018. ☐

· flow in channel ~14"–4 ft wide; ~1–5 inches deep
· channel ~6–12 ft wide @ OHWM

· Net location below confluence of side channel (west slope) & Romero Crk.
· staging ~700 sq ft on west side of channel, below TOB.

Disturbance code / Intensity (L,M,[✓ **H**]**):** 13 / ___ / ___ / ___ / ___ / ___ **"Other"** fire/debris flow ☐

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), [✓ **T4** (11-24" dbh)], **T5** (>24" dbh), **T6** multi-layered (T3 or T4 layer under T5, >60% cover) ☐
Shrub: [✓ **S1** seedling (<3 yr. old)], **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead) ☐
Herbaceous: [✓ **H1** (<12" plant ht.)], **H2** (>12" ht.) ☐
Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)
Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Western sycamore / California bay woodland ☐
Field-assessed Association name (optional): Scarlet monkey flower seep (channel) ☐
Adjacent Alliances/direction: coast live oak woodland (upslope) / ____ ☐

Confidence in Alliance identification: L M [✓ **H**] **Explain:** ____ ☐
Phenology (E,P,L): Herb P/L **Shrub** P/L **Tree** L **Other identification or mapping information:** ☐

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

SPECIES SHEET

Database #: RC-12

IV. VEGETATION DESCRIPTION

% NonVasc cover: 80 **Total % Vasc Veg cover:** 20 ☐

% Cover - **Conifer tree / Hardwood tree:** 0 / 3 **Regenerating Tree:** 10 **Shrub:** 5 **Herbaceous:** 2 ☐

Height Class - **Conifer tree / Hardwood tree:** 0 / 6 **Regenerating Tree:** 4 **Shrub:** 2 **Herbaceous:** 1 ☐

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular
% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	**Species** Channel / Lower Banks	**% cover**	**C**	~~**Final species determination**~~ - Upper Banks / TOB
H	Erythranthe cardinalis	1-5		S Baccharis plummerae 1-5
S	Salix lasilepis	1-5		T Platanus racemosa 1-5
S	Venegasia carpesioides	1-5		T Umbellularia californica 1-5
S	Baccharis pilularis	+		T Quercus agrifolia 5-15
H	Stipa miliacea	1-5		H Elymus condensatus 1-5
S	Eriodictyon sp.	+		S Venegasia carpesioides 1-5
S	Nicotiana glauca	+		S Toxicodendron diversilobum 1-5
H	Equisetum arvense	+		S Frangula californica +
T	Platanus racemosa	1-5		H Eriophyllum confertiflorum +
T	Populus fremontii	+		S Diplacus aurantiacus +
H	Athyrium felix-femina	+		S Brickellia californica +
H	Stachys bullata	+		
S	Acmispon glaber	+		
S	Keckiella cordifolia	+		
S	Rubus ursinus	1-5		
H	Solanum douglasii	1-5		
H	Calystegia macrostegia ssp. cyclo.	1-5		
H	Phacelia cicutaria	+		
H	Verbena lasiostachys	+		
H	Phacelia grandiflora	+		
H	Centaurea melitensis	+		
S	Toxicodendron diversilobum	1-5		
H	Sonchus oleraceus	+		
S	Baccharis salicifolia	+		

Unusual species: v 55 Plummer's baccharis along west bank / TOB (60% Fl / 40% Fr.)

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

For Office Use:	**Final database #:**	**Final vegetation type:**	**Alliance** **Association**

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

circle: **Relevé** or [✓ **RA**]

Database #: RC-15

Date: 9/19/2018

Name of recorder: Jessica Peak

Other surveyors: Justine Cooper / John Storrer ☐

Location Name: Romero Canyon ☐

GPS name: iPad / ArcCollector / Arrow 100 For Relevé only: **Bearing°**, left axis at ID point____ **of Long / Short** side ☐

UTME ___ **UTMN** ___ **Zone: 11** [✓ **NAD83**] GPS error: [✓ **ft.**] **m./ PDOP** 6.6

Decimal degrees: **LAT** 34.458710 **LONG** -119.591526

GPS within stand? [✓ **Yes**] / **No** If No, cite from GPS to stand: distance (m)____ bearing °____ inclination °____ ☐

and record: **Base point ID** ____ **Projected UTMs: UTME** ___ **UTMN** ___ ☐

Camera Name: JC **Cardinal photos at ID point:** ☐

Other photos:

Stand Size (acres): [✓ **<1**], **1-5, >5** | **Plot Size (m²): 100 /** ____ | **Plot Shape** ___ **x** ___ **m** | **RA Radius** 30 **m** ☐

Exposure, Actual °: 115 **NE NW** [✓ **SE**] **SW Flat Variable** | **Steepness, Actual °:** NA **0°** [✓ **1-5°**] **> 5-25° > 25** ☐

Topography: Macro: top upper mid [✓ **lower**] [✓ **bottom**] | **Micro: convex flat** [✓ **concave**] **undulating** ☐

Geology code: GRAL/SAND **Soil Texture code:** sand/COLS | **Upland** or [✓ **Wetland/Riparian**] (circle one) ☐

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

H₂0: 3 **BA Stems:** | **Litter:** | **Bedrock:** 40 **Boulder:** 10 **Stone:** 10 **Cobble:** 10 **Gravel:** 15 **Fines:** 10 **=100%** ☐

% Current year bioturbation 0 **Past bioturbation present? Yes /** [✓ **No**] | **% Hoof punch** 0 ☐

Fire evidence: [✓ **Yes**] / **No** (circle one) If yes, describe in Site history section, including date of fire, if known. ☐

Site history, stand age, comments: Site burned in Thomas Fire (Dec. 2017) & scoured by debris flows on 1/9/2018. ☐

- flow in channel ~10 inches - 3ft wide; ~1-6 inches deep (intermittent pools)
- channel ~8 - 15ft wide @ OHWM

- access via Romero Creek channel from SCE road crossing
- staging ~230 sq ft, south of net location

Disturbance code / Intensity (L,M,[✓ **H**]**):** 13 / ___ ___/___ ___/___ ___/___ ___/___ **"Other"** fire/debris flow ☐

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), **T4** (11-24" dbh), [✓ **T5** (>24" dbh)], **T6** multi-layered (T3 or T4 layer under T5, >60% cover) ☐

Shrub: [✓ **S1** seedling (<3 yr. old)], **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead) ☐

Herbaceous: [✓ **H1** (<12" plant ht.), **H2**] (>12" ht.) ☐

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Arroyo willow thicket / western sycamore woodland ☐

Field-assessed Association name (optional): canyon sunflower scrub ☐

Adjacent Alliances/direction: coast live oak woodland (upslope) / ☐

Confidence in Alliance identification: L M [✓ **H**] **Explain:** ☐

Phenology (E,P,L): Herb P/L **Shrub** P/L **Tree** L **Other identification or mapping information:** ☐

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised April 28, 2016)

SPECIES SHEET

Database #: RC-15

IV. VEGETATION DESCRIPTION

% NonVasc cover: 85 **Total % Vasc Veg cover:** 15 ☐

% Cover - **Conifer tree / Hardwood tree:** 0 / 3 **Regenerating Tree:** 2 **Shrub:** 5 **Herbaceous:** 5 ☐

Height Class - **Conifer tree / Hardwood tree:** 0 / 6 **Regenerating Tree:** 3 **Shrub:** 2 **Herbaceous:** 1 ☐

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	Species Channel / Lower Banks	% cover	C	~~Final species determination~~ Upper Banks / TOB
H	Erythranthe cardinalis	1-5		T Quercus agrifolia 1-5
S	Venegasia carpesioides	1-5		T Umbellularia californica 1-5
H	Stipa miliacea	1-5		S Venegasia carpesioides 1-5
H	Sonchus oleraceus	+		H Lilium humboldtii ssp. ocellatum +
S	Salix lasiolepis	1-5		H Solanum douglasii +
T	Alnus rhombifolia	1-5		S Ceanothus megacarpus 1-5
H	Galium sp.	+		S Prunus ilicifolia +
S	Acmispon glaber	+		S Heteromeles arbutifolia 1-5
S	Nicotiana glauca	1-5		H Pteridium aquilinum +
T	Populus fremontii	+		S Baccharis plummerae 1-5
H	Erythranthe guttata	+		H Stachys albens +
H	Pseudognaphalium luteoalbum	+		H Elymus condensatus 1-5
S	Salix laevigata	+		H Athyrium felix-femina 1-5
H	Vicia sp	+		
H	Solanum douglasii	1-5		
S	Toxicodendron diversilobum	1-5		
H	Trifolium microcephalum	+		
S	Baccharis salicifolia	+		
S	Diplacus aurantiacus	+		
H	Artemisia douglasiana	1-5		
H	Stachys bullata	+		
T	Tamarix ramosissima (pulled)	+		
T	Platanus racemosa	1-5		
H	Eriophyllum confertiflorum	+		
T	Umbellularia californica	1-5		
H	Calystegia macrostegia ssp. cyclo.	1-5		
S	Salix exigua	+		

Unusual species: 1 Humboldt lily on west bank in fruit; 3 Plummer's baccharis on west bank in flower.

APPENDIX C

VASCULAR PLANT INVENTORY

Vascular Plant Species Observed within Proposed Net Locations
Montecito Debris Flow Mitigation Project
Montecito, Santa Barbara County, California

Family	*Scientific Name*	Common Name	Origin	Cal-IPC Rating	CNPS Rare Plant Rank
	GYMNOSPERMS				
Athyriaceae					
	Athyrium filix-femins ssp. *cyclosorum*	western lady fern	N		
Dennstaedtiaceae					
	Pteridium aquilinum var. *pubescens*	bracken fern	N		
Equisetaceae					
	Equisetum arvense	common horsetail	N		
	ANGIOSPERMS - Dicots				
Adoxaceae					
	Sambucus nigrs ssp. *caerulea*	blue elderberry	N		
Agavaceae					
	Hesperoyucca whipplei	chaparral yucca	N		
Anacardiaceae					
	Malosma laurina	laurel sumac	N		
	Toxicodendron diversilobum	poison oak	N		
Apiaceae					
	Foeniculum vulgare	sweet fennel	I	Moderate	
Apocynaceae					
	Vinca major	greater periwinkle	I	Moderate	
Asteraceae					
	Artemisia californica	California sagebrush	N		
	Artemisia douglasiana	mugwort			
	Baccharis pilularis ssp. *consanguinea*	coyote brush	N		
	Baccharis plummerae* ssp. *plummerae	**Plummer's baccharis**	**N**		**4.3**
	Baccharis salicifolia	mulefat	N		
	Bidens pilosa	common beggar-ticks	I		
	Brickeillia californica	California brickellbush	N		
	Centaurea melitensis	tocalote	I	Moderate	
	Delairea odorata	cape ivy	I	High	
	Erigeron canadensis	horseweed	N		
	Eriophyllum confertiflorum	goden yarrow	N		
	Logfia filaginoides	California cottonrose	N		
	Pseudognaphalium californicum	California cudweed	N		
	Pseudognaphalium canescens	Wright's cudweed	N		
	Pseudognaphalium luteoalbum	Jersy cudweed	I		
	Pseudognaphalium stramineum	cottonbatting plant	N		
	Sonchus oleraceus	common sowthistle	I		
	Solidago velutina ssp. California	California golenrod	N		
	Stephanomeria cichoriacea	silver rock-lettuce	N		
	Symphyotrichum sp.	aster	N		
	Venegasia carpesioides	canyon sunflower	N		
Betulaceae					
	Alnus rhombifolia	white alder	N		
Boraginaceae					
	Cryptantha sp.	cryptantha	N		
	Emmenanthe penduliflor var.*pendulifora*	whispering bells	N		
	Eriodictyon californicum	yerba santa	N		
	Eriodictyon sp.	yerba santa	N		
	Phacelia brachyloba	short-lobed phacelia	N		
	Phacelia cicutaria	caterpillar phacelia	N		
	Phacelia grandiflora	giant flowered phacelia	N		
Brassicaceae					
	Brassica nigra	black mustard	I	Limited	
Campanulaceae					
	Lobelia dunnii	Dunn's lobelia	N		
Caprifoliaceae					
	Symphoricarpos albus var. *laevigatus*	snowberry	N		
Caryophyllaceae					
	Silene laciniata	cardinal catchfly	N		
Cistaceae					
	Crocanthemum scoparium	peak rush-rose	N		
Convolvulaceae					
	Calystegia macrostegia ssp. *cyclostegia*	coast morning glory	N		
Crassulaceae					
	Dudleya cymosa	rock lettuce	N		
Euphorbiaceae					
	Ricinus communis	castor bean	I	Limited	
Fabaceae					
	Acmispon glaber	deerweed	N		
	Acmispon grandiflorus	large-leaved lotus	N		
	Lupinus hirsutissimus	stinging lupine	N		
	Trifolium microcephalum	smaill-head clover	N		
	Vicia sp.	vetch	N		

Vascular Plant Species Observed within Proposed Net Locations
Montecito Debris Flow Mitigation Project
Montecito, Santa Barbara County, California

Fagaceae					
	Quercus agrifolia	coast live oak			
Grossulariaceae					
	Ribes sp.	gooseberrry	N		
Lamiaceae					
	Stachys albens	cobwebby hedge nettle	N		
	Stachys bullata	southern hedge nettle	N		
Lauraceae					
	Umbellularia californica	California bay	N		
Moraceae					
	Ficus carica	common fig	I	Moderate	
Myrsinaceae					
	Lysimachia arvensis	scarlet pimpernel	I		
Onagraceae					
	Epilobium ciliatum	slender willowherb	N		
Oxalidaceae					
	Oxalis pes-caprae	Bermuda buttercup	I	Moderate	
Papaveraceae					
	Eschscholzia californica	California poppy	N		
Phyrmaceae					
	Diplacus aurauntiacus	sticky monkey flower	N		
	Erythranthe cardinalis	scarlet monkeyflower	N		
	Erythranthe floribunda	many flowered monkeyflower	N		
	Erythranthe guttata	common seep monkeyflower	N		
Platanaceae					
	Platanus racemosa	western sycamore	N		
Plantaginaceae					
	Antirrhinum multiflorum	sticky snapdragon	N		
	Keckiella cordifolia	heart-leaved keckiella	N		
	Plantago lanceolata	English plantain	I	Limited	
Polemoniaceae					
	Navarretia sp.	naverretia	N		
Polygonaceae					
	Eriogonum fasciculatum	coastal California buckwheat	N		
Ranunculaceae					
	Clematis ligusticifolia	creek clematis	N		
Rhamnaceae					
	Ceanothus cuneatus	buck brush	N		
	Ceanothus megacarpus ssp. megacarpus	big pod ceanothus	N		
	Frangula californica	California coffee berry	N		
	Rhamnus crocea	spiny redberry	N		
Rosaceae					
	Adenostoma fasciculata	chamise	N		
	Heteromeles arbutifolia	toyon	N		
	Prunus ilicifolia	holly-leaf cherry	N		
	Rubus ursinus	California blackberry	N		
Rubiaceae					
	Galium sp.	bedstraw	N		
Salicaceae					
	Populus fremontii ssp. *Fremontii*	Fremont cottonwood	N		
	Salix exigua	sandbar willow			
	Salix laevigata	red willow			
	Salix lasiolepis	arroyo willow	N		
Scrophulariaceae					
	Scrophularia californica	California figwort	N		
Solanaceae					
	Nicotiana glauca	tree tobacco	I	Moderate	
	Solanum dougalsii	Douglas' nightshade	N		
	Solanum umbelliferum	bluewitch nightshade	N		
Tamariaceae					
	Tamarix ramosissima	saltcedar	I	High	
Verbenaceae					
	Verbena lasiostachys	common vervain	N		
	ANGIOSPERMS- Monocots				
Cyperaceae					
	Cyperus sp.	nutsedge	N		
Juncaceae					
	Juncus sp.	rush	N		
Liliaceae					
	Lilium humboldtii* ssp. *ocellatum	**ocellated Humboldt lily**	**N**		**4.2**
Poaceae					
	Arundo donax	giant reed	I	High	
	Bromus diandrus	ripgut brome	I	Moderate	
	Bromus madritensis ssp. *rubens*	red brome	I	High	
	Elymus condensatus	giant wild rye	N		
	Hordeum brachyantherum ssp. *Californicum*	California barley	N		

	Melica imperfecta	little California melic	N	
	Polypogon monspeliensis	rabbitsfoot grass	I	Limited
	Stipa miliacea var. *miliacea*	smilo grass	I	Limited
Typhaceae				
	Typha latifolia	broad-leaved cattail	N	

NOTES

Scientific nomenclature follows: The Jepson Manual: Vascular Plants of California, Second Edition, Baldwin et al. (2012); Jepson Online Interchange (2018).

Origin Codes:

N = Native to Region
I = Introduced to Region (Non-native species which have become naturalized or persist without cultivation).
O = Ornamental/Landscaping (Non-native species that have been planted or are escaped cultivars).

California Rare Plant Ranking System:

Species in bold type are listed as rare, threatened, or endangered by the California Native Plant Society (CNPS 2018).

CRPR 1A - Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
CRPR 1B - Plants Rare, Threatened, or Endangered in California and Elsewhere
CRPR 2A - Plants Presumed Extirpated in California, But Common Elsewhere
CRPR 2B - Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
CRPR 3 - Plants About Which More Information is Needed - A Review List
CRPR 4 - Plants of Limited Distribution - A Watch List

CRPR Threat Ranks:

0.1 - Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2 - Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
0.3 - Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

California Invasive Plant Council (Cal-IPC) Rating System:

High – Species that have severe ecological impacts. Moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate – Species that have substantial and apparent-but generally not severe-ecological impacts. Moderate to high rates of dispersal, generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited – Species that are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Low to moderate rates of invasiveness. Distribution is generally limited, but species may be locally persistent and problematic.

Alert – Species with High or Moderate impacts that have limited distribution in California, but may have the potential to spread much further.

Watch – These species have been assessed as posing a high risk of becoming invasive in the future in California

Listing Status:

FE - Federally listed Endangered
FT – Federally listed Threatened
FC – Federal Candidate Species
SE – State listed Endangered
ST – State listed Threatened
SC – State Candidate Species

APPENDIX D

WILDLIFE INVENTORY

Wildlife Observed in the Subject Creeks Surveyed for the Montecito Debris Flow Mitigation Project
Montecito, Santa Barbara County, California

Common Name	Scientific Name	Regulatory Status
Amphibians		
California Treefrog	*Pseudacris cadaverina*	N/A
Baja California Treefrog	*Pseudacris hypochondriaca*	N/A
Califoria Treefrog	*Pseudacris regilla*	N/A
Reptiles		
California Striped Racer	*Coluber lateralis lateralis*	N/A
Southern Alligator Lizard	*Elgaria multicarinata*	N/A
Coast Mountain Kingsnake	*Lampropeltis multifasciata*	N/A
Western Fence Lizard	*Sceloporus occidentalis*	N/A
Birds		
California Quail	*Callipepla californica*	MTBA
Turkey Vulture	*Cathartes aura*	MTBA
Red-shoudlered Hawk	*Buteo lineatus*	MTBA
Red-tailed Hawk	*Buteo jamaicensis*	MTBA
Anna's Hummingbird	*Calypte anna*	MTBA
Acorn Woodpecker	*Melanerpes formicivorus*	MTBA
Northern Flicker	*Colaptes auratus*	MTBA
Black Phoebe	*Sayornis nigricans*	MTBA
Stellar's Jay	*Cyanocitta stelleri*	MTBA
Western Scrub-jay	*Aphelocoma californica*	MTBA
American Crow	*Corvus brachyrhynchos*	MTBA
Bushtit	*Psaltriparus minimus*	MTBA
Canyon Wren	*Catherpes mexicanus*	MTBA
Northern Mockingbird	*Mimus polyglottos*	MTBA
Wilson's Warbler	*Cardellina pusilla*	MTBA
Spotted Towhee	*Pipilo maculatus*	MTBA
California Towhee	*Pipilo crissalis*	MTBA
Song Sparrow	*Melospiza melodia*	MTBA
Dark-eyed Junco	*Junco hyemalis*	MTBA
House Finch	*Carpodacus mexicanus*	MTBA
Mammals		
California Ground Squirrel	*Otospermophilus beecheyi*	N/A
Grey Fox	*Urocyon cinereoargenteus*	N/A

Regulatory Status Codes:
FE – Federal endangered species
FT -- Federal threatened species
FC – Federal candidate species
MBTA – Migratory Bird Treaty Act
SE – State endangered species
ST – State threatened species
CSC – California Species of Special Concern
CFP – California Fully Protected Species
MMPA - Marine Mammal Protection Act

APPENDIX E

CNDDB FORMS

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

For Office Use Only
Source Code: ______ Quad Code: ______
Elm Code: ______ Occ No.: ______
EO Index: ______ Map Index: ______

Date of Field Work (mm/dd/yyyy): 09/20/2018

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Baccharis plummerae ssp. plummerae*

Common Name: Plummer's baccharis

Species Found? ● Yes ○ No ______ If not found, why?

Total No. Individuals: 3   Subsequent Visit? ○ Yes ● No

Is this an existing NDDB occurrence? ______ Yes, Occ. #   ☒ No ☐ Unk.

Collection? If yes: ______ Number ______ Museum / Herbarium

Reporter: Jessica Peak

Address: 2565 Puesta Del Sol Road #3
Santa Barbara, CA 93015

E-mail Address: jpeak@storrerenvironmental.com

Phone: (805)682-2065

Plant Information

Phenology:
______ % vegetative ______ % flowering ______ % fruiting

Animal Information

______ # adults ______ # juveniles ______ # larvae ______ # egg masses ______ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

3 plants on west slope; 30-40 feet above channel in Buena Vista Canyon

County: Santa Barbara   Landowner / Mgr: ______

Quad Name: Santa Barbara   Elevation: ______

T____ R____ Sec____, ____¼ of ____ ¼, Meridian: H○ M○ S○   Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec____, ____¼ of ____ ¼, Meridian: H○ M○ S○   GPS Make & Model: iPad w/ArcGIS and Arrow 100 receiver

DATUM: **NAD27** ○ **NAD83** ● **WGS84** ○   Horizontal Accuracy: 2.2 feet meters/feet

Coordinate System: UTM Zone 10 ○ UTM Zone 11 ○ ***OR*** Geographic (Latitude & Longitude) ●

Coordinates: 34.45539, -119.610297

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Arroyo willow thicket associated with western sycamore woodland. Coast live oak woodland upslope to the east and big pod ceanothus/laurel sumac chaparral upslope to the west. Soils are sandstone and coarse, loamy sand.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ○ Excellent ○ Good ● Fair ○ Poor

Immediate AND surrounding land use: Immediate: none/Surrounding: recreational hiking trails

Visible disturbances: burned by Thomas fire in Dec. 2017 and scoured by debris flow on 01/09/2018

Threats: subsequent debris flows

Comments:

Determination: *(check one or more, and fill in blanks)*
- ☒ Keyed (cite reference): Jepson Manual
- ☐ Compared with specimen housed at: ______
- ☐ Compared with photo / drawing in: ______
- ☐ By another person (name): ______
- ☐ Other: ______

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☒
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ● yes ○ no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

For Office Use Only

Source Code: ______ Quad Code: ______
Elm Code: ______ Occ No.: ______
EO Index: ______ Map Index: ______

Date of Field Work (mm/dd/yyyy): 09/20/2018

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Baccharis plummerae ssp. plummerae*

Common Name: Plummer's baccharis

Species Found? ● Yes ○ No ______ If not found, why?

Total No. Individuals: 22 Subsequent Visit? ○ Yes ● No

Is this an existing NDDB occurrence? ______ Yes, Occ. # ☒ No ☐ Unk.

Collection? If yes: ______ Number ______ Museum / Herbarium

Reporter: Jessica Peak

Address: 2565 Puesta Del Sol Road #3
Santa Barbara, CA 93015

E-mail Address: jpeak@storrerenvironmental.com

Phone: (805)682-2065

Plant Information

Phenology:

______ % vegetative ______ % flowering ______ % fruiting

Animal Information

______ # adults ______ # juveniles ______ # larvae ______ # egg masses ______ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

12 plants on east bank and 10 on west bank in Buena Vista Canyon

County: Santa Barbara Landowner / Mgr: ______

Quad Name: Santa Barbara Elevation: ______

T____ R____ Sec____, ____$^1/_4$ of ____ $^1/_4$, Meridian: H○ M○ S○ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec____, ____$^1/_4$ of ____ $^1/_4$, Meridian: H○ M○ S○ GPS Make & Model: iPad w/ArcGIS and Arrow 100 receiver

DATUM: **NAD27** ○ **NAD83** ● **WGS84** ○ Horizontal Accuracy: 2.2 feet meters/feet

Coordinate System: UTM Zone 10 ○ UTM Zone 11 ○ ***OR*** Geographic (Latitude & Longitude) ●

Coordinates: 12 plants east bank: 34.458358, -119.608668
10 plants west bank: 34.458405, -119.608906

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Canyon sunflower scrub associated with Arroyo willow thicket. Coast live oak woodland and California bay forest upslope. Soils are sandstone and coarse, loamy sand.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ○ Excellent ○ Good ● Fair ○ Poor

Immediate AND surrounding land use: Immediate: none/Surrounding: recreational hiking trails

Visible disturbances: burned by Thomas fire in Dec. 2017 and scoured by debris flow on 01/09/2018

Threats: subsequent debris flows

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☒ Keyed (cite reference): Jepson Manual
- ☐ Compared with specimen housed at: ______
- ☐ Compared with photo / drawing in: ______
- ☐ By another person (name): ______
- ☐ Other: ______

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☒
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ● yes ○ no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

Date of Field Work (mm/dd/yyyy): 09/20/2018

For Office Use Only
Source Code: ____ Quad Code: ____
Elm Code: ____ Occ No.: ____
EO Index: ____ Map Index: ____

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Baccharis plummerae ssp. plummerae*

Common Name: Plummer's baccharis

Species Found? ● Yes ○ No ____ If not found, why?

Total No. Individuals: 8 Subsequent Visit? ○ Yes ● No

Is this an existing NDDB occurrence? ____ Yes, Occ. # ☒ No ☐ Unk.

Collection? If yes: ____ Number ____ Museum / Herbarium

Reporter: Jessica Peak
Address: 2565 Puesta Del Sol Road #3
Santa Barbara, CA 93015
E-mail Address: jpeak@storrerenvironmental.com
Phone: (805)682-2065

Plant Information

Phenology:

% vegetative	% flowering	% fruiting
	80	20

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

8 plants on east bank in Buena Vista Canyon

County: Santa Barbara Landowner / Mgr: ____
Quad Name: Santa Barbara Elevation: ____
T____ R____ Sec____, ____¼ of ____ ¼, Meridian: H○ M○ S○ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec____, ____¼ of ____ ¼, Meridian: H○ M○ S○ GPS Make & Model: iPad w/ArcGIS and Arrow 100 receiver
DATUM: **NAD27** ○ **NAD83** ● **WGS84** ○ Horizontal Accuracy: 2.4 feet meters/feet
Coordinate System: UTM Zone 10 ○ UTM Zone 11 ○ ***OR*** Geographic (Latitude & Longitude) ●
Coordinates: 34.456101, -119.609351

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Arroyo willow thicket associated with poison oak scrub. Coast live oak woodland upslope. Soils are sandstone and coarse, loamy sand.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ○ Excellent ○ Good ● Fair ○ Poor
Immediate AND surrounding land use: Immediate: none/Surrounding: recreational hiking trails
Visible disturbances: burned by Thomas fire in Dec. 2017 and scoured by debris flow on 01/09/2018
Threats: subsequent debris flows
Comments:

Determination: *(check one or more, and fill in blanks)*
☒ Keyed (cite reference): Jepson Manual
☐ Compared with specimen housed at: ____
☐ Compared with photo / drawing in: ____
☐ By another person (name): ____
☐ Other: ____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☒
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ● yes ○ no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

For Office Use Only
Source Code: ____________ Quad Code: ____________
Elm Code: ____________ Occ No.: ____________
EO Index: ____________ Map Index: ____________

Date of Field Work (mm/dd/yyyy): 09/18/2018

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Baccharis plummerae ssp. plummerae*

Common Name: Plummer's baccharis

Species Found? ● Yes ○ No ____________ If not found, why?
Total No. Individuals: 32 Subsequent Visit? ○ Yes ● No
Is this an existing NDDB occurrence? ____________ Yes, Occ. # ☒ No ☐ Unk.
Collection? If yes: ____________ Number ____________ Museum / Herbarium

Reporter: Jessica Peak
Address: 2565 Puesta Del Sol Road #3
Santa Barbara, CA 93015
E-mail Address: jpeak@storrerenvironmental.com
Phone: (805)682-2065

Plant Information
Phenology:

	80	20
% vegetative	% flowering	% fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)
5 Plummer's baccharis along the top of bank on east slope and 27 on west slope in Cold Springs Canyon

County: Santa Barbara Landowner / Mgr: ____________
Quad Name: Santa Barbara Elevation: ____________
T____ R____ Sec____, ____1/4 of ____ 1/4, Meridian: H○ M○ S○ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec____, ____1/4 of ____ 1/4, Meridian: H○ M○ S○ GPS Make & Model: iPad w/ArcGIS and Arrow 100 receiver
DATUM: **NAD27** ○ **NAD83** ● **WGS84** ○ Horizontal Accuracy: 2.5 feet meters/feet
Coordinate System: UTM Zone 10 ○ UTM Zone 11 ○ ***OR*** Geographic (Latitude & Longitude) ●
Coordinates: 5 on east slope: 34.460414,-119.65411
27 on west slope: 34.460267,-119.653856

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Arryo willow thicket/western sycamore woodland alliance associated with scarlet monkeyflower seep in the channel. Coast live oak woodland upslope. Soils are sandstone and coarse, loamy sand.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ○ Excellent ○ Good ● Fair ○ Poor
Immediate AND surrounding land use: Immediate: none/Surrounding: recreational hiking trails
Visible disturbances: burned by Thomas fire in Dec. 2017 and scoured by debris flow on 01/09/2018
Threats: subsequent debris flows
Comments:

Determination: *(check one or more, and fill in blanks)*
☒ Keyed (cite reference): Jepson Manual
☐ Compared with specimen housed at: ____________
☐ Compared with photo / drawing in: ____________
☐ By another person (name): ____________
☐ Other: ____________

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☒
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ● yes ○ no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

For Office Use Only
Source Code: ______ Quad Code: ______
Elm Code: ______ Occ No.: ______
EO Index: ______ Map Index: ______

Date of Field Work (mm/dd/yyyy): 09/19/2018

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Baccharis plummerae ssp. plummerae*

Common Name: Plummer's baccharis

Species Found? ● Yes ○ No ______ If not found, why?

Total No. Individuals: 55 Subsequent Visit? ○ Yes ● No

Is this an existing NDDB occurrence? ______ Yes, Occ. # ☒ No ☐ Unk.

Collection? If yes: ______ Number ______ Museum / Herbarium

Reporter: Jessica Peak
Address: 2565 Puesta Del Sol Road #3
Santa Barbara, CA 93015
E-mail Address: jpeak@storrerenvironmental.com
Phone: (805)682-2065

Plant Information

Phenology:

	60	40
% vegetative	% flowering	% fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

55 plants along west bank/TOB in Romero Canyon

County: Santa Barbara Landowner / Mgr: ______

Quad Name: Santa Barbara Elevation: ______

T____ R____ Sec____, ____$^1/_4$ of ____ $^1/_4$, Meridian: H○ M○ S○ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec____, ____$^1/_4$ of ____ $^1/_4$, Meridian: H○ M○ S○ GPS Make & Model: iPad w/ArcGIS and Arrow 100 receiver

DATUM: **NAD27** ○ **NAD83** ● **WGS84** ○ Horizontal Accuracy: 2.5 feet meters/feet

Coordinate System: UTM Zone 10 ○ UTM Zone 11 ○ ***OR*** Geographic (Latitude & Longitude) ●

Coordinates: 34.465268, -119.591019

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Western sycamore/California bay woodland associated with scarlet monkey flower seep in the channel. Coast live oak woodland upslope. Soils are sandstone and coarse, loamy sand.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ○ Excellent ○ Good ● Fair ○ Poor

Immediate AND surrounding land use: Immediate: none/Surrounding: recreational hiking trails

Visible disturbances: burned by Thomas fire in Dec. 2017 and scoured by debris flow on 01/09/2018

Threats: subsequent debris flows

Comments:

Determination: *(check one or more, and fill in blanks)*

☒ Keyed (cite reference): Jepson Manual
☐ Compared with specimen housed at: ______
☐ Compared with photo / drawing in: ______
☐ By another person (name): ______
☐ Other: ______

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☒
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ● yes ○ no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

For Office Use Only
Source Code: ____ Quad Code: ____
Elm Code: ____ Occ No.: ____
EO Index: ____ Map Index: ____

Date of Field Work (mm/dd/yyyy): 09/19/2018

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: Baccharis plummerae ssp. plummerae

Common Name: Plummer's baccharis

Species Found? ● Yes ○ No ____ If not found, why?

Total No. Individuals: 4

Subsequent Visit? ○ Yes ● No

Is this an existing NDDB occurrence? ____ Yes, Occ. # ☒ No ☐ Unk.

Collection? If yes: ____ Number ____ Museum / Herbarium

Reporter: Jessica Peak

Address: 2565 Puesta Del Sol Road #3
Santa Barbara, CA 93015

E-mail Address: jpeak@storrerenvironmental.com

Phone: (805)682-2065

Plant Information

Phenology:

	100	
% vegetative	% flowering	% fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

4 plants on west bank in Romero Canyon

County: Santa Barbara

Landowner / Mgr: ____

Quad Name: Santa Barbara

Elevation: ____

T____ R____ Sec____, ____1/4 of ____ 1/4, Meridian: H○ M○ S○

T____ R____ Sec____, ____1/4 of ____ 1/4, Meridian: H○ M○ S○

Source of Coordinates (GPS, topo. map & type): GPS

GPS Make & Model: iPad w/ArcGIS and Arrow 100 receiver

DATUM: **NAD27** ○ **NAD83** ● **WGS84** ○

Horizontal Accuracy: 6.6 feet meters/feet

Coordinate System: UTM Zone 10 ○ UTM Zone 11 ○ ***OR*** Geographic (Latitude & Longitude) ●

Coordinates:
1 plant on west bank: 34.458732, -119.591580
3 plants on east bank: 34.458719, -119.591484

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Arroyo willow thicket/western sycamore woodland associated with canyon sunflower scrub. Coast live oak woodland upslope. Soils are sandstone and coarse, loamy sand.

Please fill out separate form for other rare taxa seen at this site. ocellated Humboldt lily

Site Information Overall site/occurrence quality/viability (site + population): ○ Excellent ○ Good ● Fair ○ Poor

Immediate AND surrounding land use: Immediate: none/Surrounding: recreational hiking trails

Visible disturbances: burned by Thomas fire in Dec. 2017 and scoured by debris flow on 01/09/2018

Threats: subsequent debris flows

Comments:

Determination: *(check one or more, and fill in blanks)*
☒ Keyed (cite reference): Jepson Manual
☐ Compared with specimen housed at: ____
☐ Compared with photo / drawing in: ____
☐ By another person (name): ____
☐ Other: ____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☒
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ● yes ○ no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

For Office Use Only

Source Code: ____ Quad Code: ____
Elm Code: ____ Occ No.: ____
EO Index: ____ Map Index: ____

Date of Field Work (mm/dd/yyyy): 12/07/2018

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Baccharis plummerae ssp. plummerae*

Common Name: Plummer's baccharis

Species Found? ● Yes ○ No ____ If not found, why?

Total No. Individuals: 4 Subsequent Visit? ○ Yes ● No

Is this an existing NDDB occurrence? ____ Yes, Occ. # ☒ No ☐ Unk.

Collection? If yes: ____ Number ____ Museum / Herbarium

Reporter: Jessica Peak
Address: 2565 Puesta Del Sol Road #3
Santa Barbara, CA 93015
E-mail Address: jpeak@storrerenvironmental.com
Phone: (805)682-2065

Plant Information

Phenology: ____ % vegetative 10 % flowering 90 % fruiting

Animal Information

____ # adults ____ # juveniles ____ # larvae ____ # egg masses ____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

4 Plummer's baccharis in 4x4 area (16 sqft) in San Ysidro Canyon

County: Santa Barbara Landowner / Mgr: Private

Quad Name: Santa Barbara Elevation: ____

T____ R____ Sec____, ____1/4 of ____ 1/4, Meridian: H○ M○ S○ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec____, ____1/4 of ____ 1/4, Meridian: H○ M○ S○ GPS Make & Model: iPad w/ArcGIS and Arrow 100 receiver

DATUM: **NAD27** ○ **NAD83** ● **WGS84** ○ Horizontal Accuracy: 6.6 feet meters/feet

Coordinate System: UTM Zone 10 ○ UTM Zone 11 ○ ***OR*** Geographic (Latitude & Longitude) ●

Coordinates: 34.46820, -119.62287

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Canyon sunflower scrub habitat associated with California bay forest habitat adjacent to coast live oak woodland

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ○ Excellent ● Good ○ Fair ○ Poor

Immediate AND surrounding land use: Recreational hiking trails

Visible disturbances: Site burned by Thomas fire in Dec. 2017 and scoured by debris flow on 01/09/2018

Threats: ____

Comments:

Determination: *(check one or more, and fill in blanks)*

☒ Keyed (cite reference): Jepson Manual
☐ Compared with specimen housed at: ____
☐ Compared with photo / drawing in: ____
☐ By another person (name): ____
☐ Other: ____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☒
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ● yes ○ no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

For Office Use Only

Source Code: ______ Quad Code: ______

Elm Code: ______ Occ No.: ______

EO Index: ______ Map Index: ______

Date of Field Work (mm/dd/yyyy): 09/19/2018

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: Lilium humboldtii ssp. ocellatum

Common Name: Ocellated Humboldt lily

Species Found? ● Yes ○ No ______ If not found, why?

Total No. Individuals: 1 Subsequent Visit? ○ Yes ● No

Is this an existing NDDB occurrence? ______ Yes, Occ. # ☒ No ☐ Unk.

Collection? If yes: ______ Number ______ Museum / Herbarium

Reporter: Jessica Peak

Address: 2565 Puesta Del Sol Road #3
Santa Barbara, CA 93015

E-mail Address: jpeak@storrerenvironmental.com

Phone: (805)682-2065

Plant Information

Phenology: ______ % vegetative ______ % flowering 100 % fruiting

Animal Information

______ # adults ______ # juveniles ______ # larvae ______ # egg masses ______ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

1 plant on west bank; 20 feet above channel in Romero Canyon

County: Santa Barbara Landowner / Mgr: ______

Quad Name: Santa Barbara Elevation: ______

T____ R____ Sec____, ____$^1/_4$ of ____ $^1/_4$, Meridian: H○ M○ S○ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec____, ____$^1/_4$ of ____ $^1/_4$, Meridian: H○ M○ S○ GPS Make & Model: iPad w/ArcGIS and Arrow 100 receiver

DATUM: **NAD27** ○ **NAD83** ● **WGS84** ○ Horizontal Accuracy: 6.6 feet meters/feet

Coordinate System: UTM Zone 10 ○ UTM Zone 11 ○ ***OR*** Geographic (Latitude & Longitude) ●

Coordinates: 34.458747, -119.591657

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Arroyo willow thicket/western sycamore woodland associated with canyon sunflower scrub. Coast live oak woodland upslope. Soils are sandsatone and coarse, loamy sand.

Please fill out separate form for other rare taxa seen at this site. Plummer's baccharis

Site Information Overall site/occurrence quality/viability (site + population): ○ Excellent ○ Good ● Fair ○ Poor

Immediate AND surrounding land use: Immediate: none/Surrounding: recreational hiking trails

Visible disturbances: burned by Thomas fire in Dec. 2017 and scoured by debris flow on 01/09/2018

Threats: subsequent debris flows

Comments:

Determination: *(check one or more, and fill in blanks)*

☒ Keyed (cite reference): Jepson Manual
☐ Compared with specimen housed at: ______
☐ Compared with photo / drawing in: ______
☐ By another person (name): ______
☐ Other: ______

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☒
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? ○ yes ○ no

Montecito Debris Nets

Santa Barbara-South of Santa Ynez Range County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Recreational	5.00	User Defined Unit	5.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	37
Climate Zone	8			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Total estimated acreage for debris net areas

Construction Phase - Construction schedule assuming four events each year, with construction over a 72-hour period, conservatively assuming maximum maintenance activity during each event

Off-road Equipment - Limited construction equipment. Remainder of equipment includes handtools

Off-road Equipment - Limited construction equipment. Remainder of equipment includes handtools

Off-road Equipment - Limited construction equipment. Remainder of equipment includes handtools

Off-road Equipment - Limited construction equipment. Remainder of equipment includes handtools

Trips and VMT - Assumes all personel and equipment to be shuttled to each site

Grading - Maximum total estimated acres graded each monitoring/maintenance event.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	8.00	3.00
tblConstructionPhase	NumDays	8.00	3.00
tblConstructionPhase	NumDays	8.00	3.00
tblConstructionPhase	NumDays	8.00	3.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblLandUse	LotAcreage	0.00	5.00
tblOffRoadEquipment	UsageHours	8.00	10.00
tblOffRoadEquipment	UsageHours	8.00	10.00
tblOffRoadEquipment	UsageHours	8.00	10.00
tblOffRoadEquipment	UsageHours	8.00	10.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	8.00	4.00
tblTripsAndVMT	WorkerTripNumber	8.00	4.00
tblTripsAndVMT	WorkerTripNumber	8.00	4.00
tblTripsAndVMT	WorkerTripNumber	8.00	4.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	2.0200e-003	0.0177	0.0203	3.0000e-005	2.6900e-003	9.8000e-004	3.6600e-003	3.0000e-004	9.6000e-004	1.2500e-003	0.0000	3.0005	3.0005	4.0000e-004	0.0000	3.0105
2021	5.4900e-003	0.0480	0.0606	1.0000e-004	8.0600e-003	2.5300e-003	0.0106	8.9000e-004	2.4800e-003	3.3700e-003	0.0000	8.9987	8.9987	1.1600e-003	0.0000	9.0278
Maximum	**5.4900e-003**	**0.0480**	**0.0606**	**1.0000e-004**	**8.0600e-003**	**2.5300e-003**	**0.0106**	**8.9000e-004**	**2.4800e-003**	**3.3700e-003**	**0.0000**	**8.9987**	**8.9987**	**1.1600e-003**	**0.0000**	**9.0278**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	2.0200e-003	0.0177	0.0203	3.0000e-005	2.6900e-003	9.8000e-004	3.6600e-003	3.0000e-004	9.6000e-004	1.2500e-003	0.0000	3.0005	3.0005	4.0000e-004	0.0000	3.0105
2021	5.4900e-003	0.0480	0.0606	1.0000e-004	8.0600e-003	2.5300e-003	0.0106	8.9000e-004	2.4800e-003	3.3700e-003	0.0000	8.9987	8.9987	1.1600e-003	0.0000	9.0278
Maximum	**5.4900e-003**	**0.0480**	**0.0606**	**1.0000e-004**	**8.0600e-003**	**2.5300e-003**	**0.0106**	**8.9000e-004**	**2.4800e-003**	**3.3700e-003**	**0.0000**	**8.9987**	**8.9987**	**1.1600e-003**	**0.0000**	**9.0278**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**11-1-2020**	**1-31-2021**	0.0197	0.0197
2	**2-1-2021**	**4-30-2021**	0.0178	0.0178
3	**5-1-2021**	**7-31-2021**	0.0178	0.0178
4	**8-1-2021**	**9-30-2021**	0.0178	0.0178
		Highest	0.0197	0.0197

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**5.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**1.0000e-004**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**5.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**1.0000e-004**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Wet Season (First Event)	Grading	11/1/2020	11/3/2020	7	3	
2	Wet Season (Second Event)	Grading	2/1/2021	2/3/2021	7	3	
3	Dry Season (First Event)	Grading	6/1/2021	6/3/2021	7	3	
4	Dry Season (Second Event)	Grading	8/1/2021	8/3/2021	7	3	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Wet Season (First Event)	Excavators	1	10.00	158	0.38
Wet Season (First Event)	Generator Sets	1	10.00	84	0.74
Wet Season (First Event)	Pumps	1	10.00	84	0.74
Wet Season (Second Event)	Excavators	1	10.00	158	0.38
Wet Season (Second Event)	Generator Sets	1	10.00	84	0.74
Wet Season (Second Event)	Pumps	1	10.00	84	0.74
Dry Season (First Event)	Excavators	1	10.00	158	0.38
Dry Season (First Event)	Generator Sets	1	10.00	84	0.74
Dry Season (First Event)	Pumps	1	10.00	84	0.74
Dry Season (Second Event)	Excavators	1	10.00	158	0.38
Dry Season (Second Event)	Generator Sets	1	10.00	84	0.74
Dry Season (Second Event)	Pumps	1	10.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Wet Season (First Event)	3	4.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Wet Season (Second Event)	3	4.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Dry Season (First Event)	3	4.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Dry Season (Second Event)	3	4.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Wet Season (First Event) - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.6500e-003	0.0000	2.6500e-003	2.9000e-004	0.0000	2.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.0000e-003	0.0177	0.0201	3.0000e-005		9.8000e-004	9.8000e-004		9.6000e-004	9.6000e-004	0.0000	2.9702	2.9702	4.0000e-004	0.0000	2.9802
Total	**2.0000e-003**	**0.0177**	**0.0201**	**3.0000e-005**	**2.6500e-003**	**9.8000e-004**	**3.6300e-003**	**2.9000e-004**	**9.6000e-004**	**1.2500e-003**	**0.0000**	**2.9702**	**2.9702**	**4.0000e-004**	**0.0000**	**2.9802**

3.2 Wet Season (First Event) - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	2.0000e-005	1.4000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0303	0.0303	0.0000	0.0000	0.0303
Total	**2.0000e-005**	**2.0000e-005**	**1.4000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0303**	**0.0303**	**0.0000**	**0.0000**	**0.0303**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.6500e-003	0.0000	2.6500e-003	2.9000e-004	0.0000	2.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.0000e-003	0.0177	0.0201	3.0000e-005		9.8000e-004	9.8000e-004		9.6000e-004	9.6000e-004	0.0000	2.9702	2.9702	4.0000e-004	0.0000	2.9802
Total	**2.0000e-003**	**0.0177**	**0.0201**	**3.0000e-005**	**2.6500e-003**	**9.8000e-004**	**3.6300e-003**	**2.9000e-004**	**9.6000e-004**	**1.2500e-003**	**0.0000**	**2.9702**	**2.9702**	**4.0000e-004**	**0.0000**	**2.9802**

3.2 Wet Season (First Event) - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	2.0000e-005	1.4000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0303	0.0303	0.0000	0.0000	0.0303
Total	**2.0000e-005**	**2.0000e-005**	**1.4000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0303**	**0.0303**	**0.0000**	**0.0000**	**0.0303**

3.3 Wet Season (Second Event) - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.6500e-003	0.0000	2.6500e-003	2.9000e-004	0.0000	2.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8100e-003	0.0160	0.0201	3.0000e-005		8.4000e-004	8.4000e-004		8.3000e-004	8.3000e-004	0.0000	2.9703	2.9703	3.9000e-004	0.0000	2.9800
Total	**1.8100e-003**	**0.0160**	**0.0201**	**3.0000e-005**	**2.6500e-003**	**8.4000e-004**	**3.4900e-003**	**2.9000e-004**	**8.3000e-004**	**1.1200e-003**	**0.0000**	**2.9703**	**2.9703**	**3.9000e-004**	**0.0000**	**2.9800**

3.3 Wet Season (Second Event) - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	1.0000e-005	1.3000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0292	0.0292	0.0000	0.0000	0.0293
Total	**2.0000e-005**	**1.0000e-005**	**1.3000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0292**	**0.0292**	**0.0000**	**0.0000**	**0.0293**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.6500e-003	0.0000	2.6500e-003	2.9000e-004	0.0000	2.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8100e-003	0.0160	0.0201	3.0000e-005		8.4000e-004	8.4000e-004		8.3000e-004	8.3000e-004	0.0000	2.9703	2.9703	3.9000e-004	0.0000	2.9800
Total	**1.8100e-003**	**0.0160**	**0.0201**	**3.0000e-005**	**2.6500e-003**	**8.4000e-004**	**3.4900e-003**	**2.9000e-004**	**8.3000e-004**	**1.1200e-003**	**0.0000**	**2.9703**	**2.9703**	**3.9000e-004**	**0.0000**	**2.9800**

3.3 Wet Season (Second Event) - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	1.0000e-005	1.3000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0292	0.0292	0.0000	0.0000	0.0293
Total	**2.0000e-005**	**1.0000e-005**	**1.3000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0292**	**0.0292**	**0.0000**	**0.0000**	**0.0293**

3.4 Dry Season (First Event) - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.6500e-003	0.0000	2.6500e-003	2.9000e-004	0.0000	2.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8100e-003	0.0160	0.0201	3.0000e-005		8.4000e-004	8.4000e-004		8.3000e-004	8.3000e-004	0.0000	2.9703	2.9703	3.9000e-004	0.0000	2.9800
Total	**1.8100e-003**	**0.0160**	**0.0201**	**3.0000e-005**	**2.6500e-003**	**8.4000e-004**	**3.4900e-003**	**2.9000e-004**	**8.3000e-004**	**1.1200e-003**	**0.0000**	**2.9703**	**2.9703**	**3.9000e-004**	**0.0000**	**2.9800**

3.4 Dry Season (First Event) - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	1.0000e-005	1.3000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0292	0.0292	0.0000	0.0000	0.0293
Total	**2.0000e-005**	**1.0000e-005**	**1.3000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0292**	**0.0292**	**0.0000**	**0.0000**	**0.0293**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.6500e-003	0.0000	2.6500e-003	2.9000e-004	0.0000	2.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8100e-003	0.0160	0.0201	3.0000e-005		8.4000e-004	8.4000e-004		8.3000e-004	8.3000e-004	0.0000	2.9703	2.9703	3.9000e-004	0.0000	2.9800
Total	**1.8100e-003**	**0.0160**	**0.0201**	**3.0000e-005**	**2.6500e-003**	**8.4000e-004**	**3.4900e-003**	**2.9000e-004**	**8.3000e-004**	**1.1200e-003**	**0.0000**	**2.9703**	**2.9703**	**3.9000e-004**	**0.0000**	**2.9800**

3.4 Dry Season (First Event) - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	1.0000e-005	1.3000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0292	0.0292	0.0000	0.0000	0.0293
Total	**2.0000e-005**	**1.0000e-005**	**1.3000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0292**	**0.0292**	**0.0000**	**0.0000**	**0.0293**

3.5 Dry Season (Second Event) - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.6500e-003	0.0000	2.6500e-003	2.9000e-004	0.0000	2.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8100e-003	0.0160	0.0201	3.0000e-005		8.4000e-004	8.4000e-004		8.3000e-004	8.3000e-004	0.0000	2.9703	2.9703	3.9000e-004	0.0000	2.9800
Total	**1.8100e-003**	**0.0160**	**0.0201**	**3.0000e-005**	**2.6500e-003**	**8.4000e-004**	**3.4900e-003**	**2.9000e-004**	**8.3000e-004**	**1.1200e-003**	**0.0000**	**2.9703**	**2.9703**	**3.9000e-004**	**0.0000**	**2.9800**

3.5 Dry Season (Second Event) - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	1.0000e-005	1.3000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0292	0.0292	0.0000	0.0000	0.0293
Total	**2.0000e-005**	**1.0000e-005**	**1.3000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0292**	**0.0292**	**0.0000**	**0.0000**	**0.0293**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.6500e-003	0.0000	2.6500e-003	2.9000e-004	0.0000	2.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8100e-003	0.0160	0.0201	3.0000e-005		8.4000e-004	8.4000e-004		8.3000e-004	8.3000e-004	0.0000	2.9703	2.9703	3.9000e-004	0.0000	2.9800
Total	**1.8100e-003**	**0.0160**	**0.0201**	**3.0000e-005**	**2.6500e-003**	**8.4000e-004**	**3.4900e-003**	**2.9000e-004**	**8.3000e-004**	**1.1200e-003**	**0.0000**	**2.9703**	**2.9703**	**3.9000e-004**	**0.0000**	**2.9800**

3.5 Dry Season (Second Event) - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	1.0000e-005	1.3000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0292	0.0292	0.0000	0.0000	0.0293
Total	**2.0000e-005**	**1.0000e-005**	**1.3000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0292**	**0.0292**	**0.0000**	**0.0000**	**0.0293**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Recreational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Recreational	6.60	5.50	6.40	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Recreational	0.572071	0.027190	0.206810	0.117824	0.018361	0.005136	0.017629	0.020081	0.002790	0.002084	0.006580	0.002569	0.000873

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-004
Unmitigated	0.0000	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-004
Total	**0.0000**	**0.0000**	**5.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**1.0000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-004
Total	**0.0000**	**0.0000**	**5.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**1.0000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Recreational	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Recreational	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Montecito Debris Nets

Santa Barbara-South of Santa Ynez Range County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Recreational	5.00	User Defined Unit	5.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	37
Climate Zone	8			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Total estimated acreage for debris net areas

Construction Phase - Construction schedule assuming four events each year, with construction over a 72-hour period, conservatively assuming maximum maintenance activity during each event

Off-road Equipment - Limited construction equipment. Remainder of equipment includes handtools

Off-road Equipment - Limited construction equipment. Remainder of equipment includes handtools

Off-road Equipment - Limited construction equipment. Remainder of equipment includes handtools

Off-road Equipment - Limited construction equipment. Remainder of equipment includes handtools

Trips and VMT - Assumes all personel and equipment to be shuttled to each site

Grading - Maximum total estimated acres graded each monitoring/maintenance event.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	8.00	3.00
tblConstructionPhase	NumDays	8.00	3.00
tblConstructionPhase	NumDays	8.00	3.00
tblConstructionPhase	NumDays	8.00	3.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblLandUse	LotAcreage	0.00	5.00
tblOffRoadEquipment	UsageHours	8.00	10.00
tblOffRoadEquipment	UsageHours	8.00	10.00
tblOffRoadEquipment	UsageHours	8.00	10.00
tblOffRoadEquipment	UsageHours	8.00	10.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	8.00	4.00
tblTripsAndVMT	WorkerTripNumber	8.00	4.00
tblTripsAndVMT	WorkerTripNumber	8.00	4.00
tblTripsAndVMT	WorkerTripNumber	8.00	4.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	1.3465	11.7850	13.5136	0.0231	1.7928	0.6506	2.4433	0.1976	0.6389	0.8364	0.0000	2,205.4716	2,205.4716	0.2934	0.0000	2,212.8064
2021	1.2204	10.6706	13.4564	0.0231	1.7928	0.5624	2.3551	0.1976	0.5519	0.7495	0.0000	2,204.7927	2,204.7927	0.2851	0.0000	2,211.9206
Maximum	**1.3465**	**11.7850**	**13.5136**	**0.0231**	**1.7928**	**0.6506**	**2.4433**	**0.1976**	**0.6389**	**0.8364**	**0.0000**	**2,205.4716**	**2,205.4716**	**0.2934**	**0.0000**	**2,212.8064**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	1.3465	11.7850	13.5136	0.0231	1.7928	0.6506	2.4433	0.1976	0.6389	0.8364	0.0000	2,205.4716	2,205.4716	0.2934	0.0000	2,212.8064
2021	1.2204	10.6706	13.4564	0.0231	1.7928	0.5624	2.3551	0.1976	0.5519	0.7495	0.0000	2,204.7927	2,204.7927	0.2851	0.0000	2,211.9206
Maximum	**1.3465**	**11.7850**	**13.5136**	**0.0231**	**1.7928**	**0.6506**	**2.4433**	**0.1976**	**0.6389**	**0.8364**	**0.0000**	**2,205.4716**	**2,205.4716**	**0.2934**	**0.0000**	**2,212.8064**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.0000e-005**	**0.0000**	**5.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.0900e-003**	**1.0900e-003**	**0.0000**	**0.0000**	**1.1700e-003**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.0000e-005**	**0.0000**	**5.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.0900e-003**	**1.0900e-003**	**0.0000**	**0.0000**	**1.1700e-003**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Wet Season (First Event)	Grading	11/1/2020	11/3/2020	7	3	
2	Wet Season (Second Event)	Grading	2/1/2021	2/3/2021	7	3	
3	Dry Season (First Event)	Grading	6/1/2021	6/3/2021	7	3	
4	Dry Season (Second Event)	Grading	8/1/2021	8/3/2021	7	3	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Wet Season (First Event)	Excavators	1	10.00	158	0.38
Wet Season (First Event)	Generator Sets	1	10.00	84	0.74
Wet Season (First Event)	Pumps	1	10.00	84	0.74
Wet Season (Second Event)	Excavators	1	10.00	158	0.38
Wet Season (Second Event)	Generator Sets	1	10.00	84	0.74
Wet Season (Second Event)	Pumps	1	10.00	84	0.74
Dry Season (First Event)	Excavators	1	10.00	158	0.38
Dry Season (First Event)	Generator Sets	1	10.00	84	0.74
Dry Season (First Event)	Pumps	1	10.00	84	0.74
Dry Season (Second Event)	Excavators	1	10.00	158	0.38
Dry Season (Second Event)	Generator Sets	1	10.00	84	0.74
Dry Season (Second Event)	Pumps	1	10.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Wet Season (First Event)	3	4.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Wet Season (Second Event)	3	4.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Dry Season (First Event)	3	4.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Dry Season (Second Event)	3	4.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Wet Season (First Event) - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.3340	11.7754	13.4199	0.0229		0.6504	0.6504		0.6387	0.6387		2,182.7345	2,182.7345	0.2926		2,190.0502
Total	**1.3340**	**11.7754**	**13.4199**	**0.0229**	**1.7675**	**0.6504**	**2.4179**	**0.1909**	**0.6387**	**0.8296**		**2,182.7345**	**2,182.7345**	**0.2926**		**2,190.0502**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0125	9.6900e-003	0.0937	2.3000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.5000e-004	6.8500e-003		22.7372	22.7372	7.6000e-004		22.7562
Total	**0.0125**	**9.6900e-003**	**0.0937**	**2.3000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.5000e-004**	**6.8500e-003**		**22.7372**	**22.7372**	**7.6000e-004**		**22.7562**

3.2 Wet Season (First Event) - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.3340	11.7754	13.4199	0.0229		0.6504	0.6504		0.6387	0.6387	0.0000	2,182.7345	2,182.7345	0.2926		2,190.0502
Total	**1.3340**	**11.7754**	**13.4199**	**0.0229**	**1.7675**	**0.6504**	**2.4179**	**0.1909**	**0.6387**	**0.8296**	**0.0000**	**2,182.7345**	**2,182.7345**	**0.2926**		**2,190.0502**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0125	9.6900e-003	0.0937	2.3000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.5000e-004	6.8500e-003		22.7372	22.7372	7.6000e-004		22.7562
Total	**0.0125**	**9.6900e-003**	**0.0937**	**2.3000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.5000e-004**	**6.8500e-003**		**22.7372**	**22.7372**	**7.6000e-004**		**22.7562**

3.3 Wet Season (Second Event) - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.2088	10.6620	13.3714	0.0229		0.5622	0.5622		0.5518	0.5518		2,182.8278	2,182.8278	0.2844		2,189.9387
Total	**1.2088**	**10.6620**	**13.3714**	**0.0229**	**1.7675**	**0.5622**	**2.3297**	**0.1909**	**0.5518**	**0.7426**		**2,182.8278**	**2,182.8278**	**0.2844**		**2,189.9387**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0116	8.6300e-003	0.0849	2.2000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.4000e-004	6.8500e-003		21.9650	21.9650	6.8000e-004		21.9818
Total	**0.0116**	**8.6300e-003**	**0.0849**	**2.2000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.4000e-004**	**6.8500e-003**		**21.9650**	**21.9650**	**6.8000e-004**		**21.9818**

3.3 Wet Season (Second Event) - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.2088	10.6620	13.3714	0.0229		0.5622	0.5622		0.5518	0.5518	0.0000	2,182.8278	2,182.8278	0.2844		2,189.9387
Total	**1.2088**	**10.6620**	**13.3714**	**0.0229**	**1.7675**	**0.5622**	**2.3297**	**0.1909**	**0.5518**	**0.7426**	**0.0000**	**2,182.8278**	**2,182.8278**	**0.2844**		**2,189.9387**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0116	8.6300e-003	0.0849	2.2000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.4000e-004	6.8500e-003		21.9650	21.9650	6.8000e-004		21.9818
Total	**0.0116**	**8.6300e-003**	**0.0849**	**2.2000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.4000e-004**	**6.8500e-003**		**21.9650**	**21.9650**	**6.8000e-004**		**21.9818**

3.4 Dry Season (First Event) - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.2088	10.6620	13.3714	0.0229		0.5622	0.5622		0.5518	0.5518		2,182.8278	2,182.8278	0.2844		2,189.9387
Total	**1.2088**	**10.6620**	**13.3714**	**0.0229**	**1.7675**	**0.5622**	**2.3297**	**0.1909**	**0.5518**	**0.7426**		**2,182.8278**	**2,182.8278**	**0.2844**		**2,189.9387**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0116	8.6300e-003	0.0849	2.2000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.4000e-004	6.8500e-003		21.9650	21.9650	6.8000e-004		21.9818
Total	**0.0116**	**8.6300e-003**	**0.0849**	**2.2000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.4000e-004**	**6.8500e-003**		**21.9650**	**21.9650**	**6.8000e-004**		**21.9818**

3.4 Dry Season (First Event) - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.2088	10.6620	13.3714	0.0229		0.5622	0.5622		0.5518	0.5518	0.0000	2,182.8278	2,182.8278	0.2844		2,189.9387
Total	**1.2088**	**10.6620**	**13.3714**	**0.0229**	**1.7675**	**0.5622**	**2.3297**	**0.1909**	**0.5518**	**0.7426**	**0.0000**	**2,182.8278**	**2,182.8278**	**0.2844**		**2,189.9387**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0116	8.6300e-003	0.0849	2.2000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.4000e-004	6.8500e-003		21.9650	21.9650	6.8000e-004		21.9818
Total	**0.0116**	**8.6300e-003**	**0.0849**	**2.2000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.4000e-004**	**6.8500e-003**		**21.9650**	**21.9650**	**6.8000e-004**		**21.9818**

3.5 Dry Season (Second Event) - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.2088	10.6620	13.3714	0.0229		0.5622	0.5622		0.5518	0.5518		2,182.8278	2,182.8278	0.2844		2,189.9387
Total	**1.2088**	**10.6620**	**13.3714**	**0.0229**	**1.7675**	**0.5622**	**2.3297**	**0.1909**	**0.5518**	**0.7426**		**2,182.8278**	**2,182.8278**	**0.2844**		**2,189.9387**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0116	8.6300e-003	0.0849	2.2000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.4000e-004	6.8500e-003		21.9650	21.9650	6.8000e-004		21.9818
Total	**0.0116**	**8.6300e-003**	**0.0849**	**2.2000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.4000e-004**	**6.8500e-003**		**21.9650**	**21.9650**	**6.8000e-004**		**21.9818**

3.5 Dry Season (Second Event) - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.2088	10.6620	13.3714	0.0229		0.5622	0.5622		0.5518	0.5518	0.0000	2,182.8278	2,182.8278	0.2844		2,189.9387
Total	**1.2088**	**10.6620**	**13.3714**	**0.0229**	**1.7675**	**0.5622**	**2.3297**	**0.1909**	**0.5518**	**0.7426**	**0.0000**	**2,182.8278**	**2,182.8278**	**0.2844**		**2,189.9387**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0116	8.6300e-003	0.0849	2.2000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.4000e-004	6.8500e-003		21.9650	21.9650	6.8000e-004		21.9818
Total	**0.0116**	**8.6300e-003**	**0.0849**	**2.2000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.4000e-004**	**6.8500e-003**		**21.9650**	**21.9650**	**6.8000e-004**		**21.9818**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Recreational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Recreational	6.60	5.50	6.40	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Recreational	0.572071	0.027190	0.206810	0.117824	0.018361	0.005136	0.017629	0.020081	0.002790	0.002084	0.006580	0.002569	0.000873

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003
Unmitigated	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003
Total	**5.0000e-005**	**0.0000**	**5.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.0900e-003**	**1.0900e-003**	**0.0000**		**1.1700e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003
Total	**5.0000e-005**	**0.0000**	**5.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.0900e-003**	**1.0900e-003**	**0.0000**		**1.1700e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Montecito Debris Nets

Santa Barbara-South of Santa Ynez Range County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Recreational	5.00	User Defined Unit	5.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	37
Climate Zone	8			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Total estimated acreage for debris net areas

Construction Phase - Construction schedule assuming four events each year, with construction over a 72-hour period, conservatively assuming maximum maintenance activity during each event

Off-road Equipment - Limited construction equipment. Remainder of equipment includes handtools

Off-road Equipment - Limited construction equipment. Remainder of equipment includes handtools

Off-road Equipment - Limited construction equipment. Remainder of equipment includes handtools

Off-road Equipment - Limited construction equipment. Remainder of equipment includes handtools

Trips and VMT - Assumes all personel and equipment to be shuttled to each site

Grading - Maximum total estimated acres graded each monitoring/maintenance event.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	8.00	3.00
tblConstructionPhase	NumDays	8.00	3.00
tblConstructionPhase	NumDays	8.00	3.00
tblConstructionPhase	NumDays	8.00	3.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblLandUse	LotAcreage	0.00	5.00
tblOffRoadEquipment	UsageHours	8.00	10.00
tblOffRoadEquipment	UsageHours	8.00	10.00
tblOffRoadEquipment	UsageHours	8.00	10.00
tblOffRoadEquipment	UsageHours	8.00	10.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	8.00	4.00
tblTripsAndVMT	WorkerTripNumber	8.00	4.00
tblTripsAndVMT	WorkerTripNumber	8.00	4.00
tblTripsAndVMT	WorkerTripNumber	8.00	4.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	1.3481	11.7864	13.5172	0.0231	1.7928	0.6506	2.4433	0.1976	0.6389	0.8364	0.0000	2,204.9458	2,204.9458	0.2934	0.0000	2,212.2807
2021	1.2218	10.6718	13.4595	0.0231	1.7928	0.5624	2.3551	0.1976	0.5519	0.7495	0.0000	2,204.2848	2,204.2848	0.2851	0.0000	2,211.4127
Maximum	**1.3481**	**11.7864**	**13.5172**	**0.0231**	**1.7928**	**0.6506**	**2.4433**	**0.1976**	**0.6389**	**0.8364**	**0.0000**	**2,204.9458**	**2,204.9458**	**0.2934**	**0.0000**	**2,212.2807**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	1.3481	11.7864	13.5172	0.0231	1.7928	0.6506	2.4433	0.1976	0.6389	0.8364	0.0000	2,204.9458	2,204.9458	0.2934	0.0000	2,212.2807
2021	1.2218	10.6718	13.4595	0.0231	1.7928	0.5624	2.3551	0.1976	0.5519	0.7495	0.0000	2,204.2848	2,204.2848	0.2851	0.0000	2,211.4127
Maximum	**1.3481**	**11.7864**	**13.5172**	**0.0231**	**1.7928**	**0.6506**	**2.4433**	**0.1976**	**0.6389**	**0.8364**	**0.0000**	**2,204.9458**	**2,204.9458**	**0.2934**	**0.0000**	**2,212.2807**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.0000e-005**	**0.0000**	**5.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.0900e-003**	**1.0900e-003**	**0.0000**	**0.0000**	**1.1700e-003**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.0000e-005**	**0.0000**	**5.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.0900e-003**	**1.0900e-003**	**0.0000**	**0.0000**	**1.1700e-003**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Wet Season (First Event)	Grading	11/1/2020	11/3/2020	7	3	
2	Wet Season (Second Event)	Grading	2/1/2021	2/3/2021	7	3	
3	Dry Season (First Event)	Grading	6/1/2021	6/3/2021	7	3	
4	Dry Season (Second Event)	Grading	8/1/2021	8/3/2021	7	3	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Wet Season (First Event)	Excavators	1	10.00	158	0.38
Wet Season (First Event)	Generator Sets	1	10.00	84	0.74
Wet Season (First Event)	Pumps	1	10.00	84	0.74
Wet Season (Second Event)	Excavators	1	10.00	158	0.38
Wet Season (Second Event)	Generator Sets	1	10.00	84	0.74
Wet Season (Second Event)	Pumps	1	10.00	84	0.74
Dry Season (First Event)	Excavators	1	10.00	158	0.38
Dry Season (First Event)	Generator Sets	1	10.00	84	0.74
Dry Season (First Event)	Pumps	1	10.00	84	0.74
Dry Season (Second Event)	Excavators	1	10.00	158	0.38
Dry Season (Second Event)	Generator Sets	1	10.00	84	0.74
Dry Season (Second Event)	Pumps	1	10.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Wet Season (First Event)	3	4.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Wet Season (Second Event)	3	4.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Dry Season (First Event)	3	4.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Dry Season (Second Event)	3	4.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Wet Season (First Event) - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.3340	11.7754	13.4199	0.0229		0.6504	0.6504		0.6387	0.6387		2,182.7345	2,182.7345	0.2926		2,190.0502
Total	**1.3340**	**11.7754**	**13.4199**	**0.0229**	**1.7675**	**0.6504**	**2.4179**	**0.1909**	**0.6387**	**0.8296**		**2,182.7345**	**2,182.7345**	**0.2926**		**2,190.0502**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0141	0.0111	0.0974	2.2000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.5000e-004	6.8500e-003		22.2113	22.2113	7.6000e-004		22.2304
Total	**0.0141**	**0.0111**	**0.0974**	**2.2000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.5000e-004**	**6.8500e-003**		**22.2113**	**22.2113**	**7.6000e-004**		**22.2304**

3.2 Wet Season (First Event) - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.3340	11.7754	13.4199	0.0229		0.6504	0.6504		0.6387	0.6387	0.0000	2,182.7345	2,182.7345	0.2926		2,190.0502
Total	**1.3340**	**11.7754**	**13.4199**	**0.0229**	**1.7675**	**0.6504**	**2.4179**	**0.1909**	**0.6387**	**0.8296**	**0.0000**	**2,182.7345**	**2,182.7345**	**0.2926**		**2,190.0502**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0141	0.0111	0.0974	2.2000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.5000e-004	6.8500e-003		22.2113	22.2113	7.6000e-004		22.2304
Total	**0.0141**	**0.0111**	**0.0974**	**2.2000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.5000e-004**	**6.8500e-003**		**22.2113**	**22.2113**	**7.6000e-004**		**22.2304**

3.3 Wet Season (Second Event) - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.2088	10.6620	13.3714	0.0229		0.5622	0.5622		0.5518	0.5518		2,182.8278	2,182.8278	0.2844		2,189.9387
Total	**1.2088**	**10.6620**	**13.3714**	**0.0229**	**1.7675**	**0.5622**	**2.3297**	**0.1909**	**0.5518**	**0.7426**		**2,182.8278**	**2,182.8278**	**0.2844**		**2,189.9387**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0131	9.8800e-003	0.0880	2.2000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.4000e-004	6.8500e-003		21.4570	21.4570	6.8000e-004		21.4739
Total	**0.0131**	**9.8800e-003**	**0.0880**	**2.2000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.4000e-004**	**6.8500e-003**		**21.4570**	**21.4570**	**6.8000e-004**		**21.4739**

3.3 Wet Season (Second Event) - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.2088	10.6620	13.3714	0.0229		0.5622	0.5622		0.5518	0.5518	0.0000	2,182.8278	2,182.8278	0.2844		2,189.9387
Total	**1.2088**	**10.6620**	**13.3714**	**0.0229**	**1.7675**	**0.5622**	**2.3297**	**0.1909**	**0.5518**	**0.7426**	**0.0000**	**2,182.8278**	**2,182.8278**	**0.2844**		**2,189.9387**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0131	9.8800e-003	0.0880	2.2000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.4000e-004	6.8500e-003		21.4570	21.4570	6.8000e-004		21.4739
Total	**0.0131**	**9.8800e-003**	**0.0880**	**2.2000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.4000e-004**	**6.8500e-003**		**21.4570**	**21.4570**	**6.8000e-004**		**21.4739**

3.4 Dry Season (First Event) - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.2088	10.6620	13.3714	0.0229		0.5622	0.5622		0.5518	0.5518		2,182.8278	2,182.8278	0.2844		2,189.9387
Total	**1.2088**	**10.6620**	**13.3714**	**0.0229**	**1.7675**	**0.5622**	**2.3297**	**0.1909**	**0.5518**	**0.7426**		**2,182.8278**	**2,182.8278**	**0.2844**		**2,189.9387**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0131	9.8800e-003	0.0880	2.2000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.4000e-004	6.8500e-003		21.4570	21.4570	6.8000e-004		21.4739
Total	**0.0131**	**9.8800e-003**	**0.0880**	**2.2000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.4000e-004**	**6.8500e-003**		**21.4570**	**21.4570**	**6.8000e-004**		**21.4739**

3.4 Dry Season (First Event) - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.2088	10.6620	13.3714	0.0229		0.5622	0.5622		0.5518	0.5518	0.0000	2,182.8278	2,182.8278	0.2844		2,189.9387
Total	**1.2088**	**10.6620**	**13.3714**	**0.0229**	**1.7675**	**0.5622**	**2.3297**	**0.1909**	**0.5518**	**0.7426**	**0.0000**	**2,182.8278**	**2,182.8278**	**0.2844**		**2,189.9387**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0131	9.8800e-003	0.0880	2.2000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.4000e-004	6.8500e-003		21.4570	21.4570	6.8000e-004		21.4739
Total	**0.0131**	**9.8800e-003**	**0.0880**	**2.2000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.4000e-004**	**6.8500e-003**		**21.4570**	**21.4570**	**6.8000e-004**		**21.4739**

3.5 Dry Season (Second Event) - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.2088	10.6620	13.3714	0.0229		0.5622	0.5622		0.5518	0.5518		2,182.8278	2,182.8278	0.2844		2,189.9387
Total	**1.2088**	**10.6620**	**13.3714**	**0.0229**	**1.7675**	**0.5622**	**2.3297**	**0.1909**	**0.5518**	**0.7426**		**2,182.8278**	**2,182.8278**	**0.2844**		**2,189.9387**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0131	9.8800e-003	0.0880	2.2000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.4000e-004	6.8500e-003		21.4570	21.4570	6.8000e-004		21.4739
Total	**0.0131**	**9.8800e-003**	**0.0880**	**2.2000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.4000e-004**	**6.8500e-003**		**21.4570**	**21.4570**	**6.8000e-004**		**21.4739**

3.5 Dry Season (Second Event) - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7675	0.0000	1.7675	0.1909	0.0000	0.1909			0.0000			0.0000
Off-Road	1.2088	10.6620	13.3714	0.0229		0.5622	0.5622		0.5518	0.5518	0.0000	2,182.8278	2,182.8278	0.2844		2,189.9387
Total	**1.2088**	**10.6620**	**13.3714**	**0.0229**	**1.7675**	**0.5622**	**2.3297**	**0.1909**	**0.5518**	**0.7426**	**0.0000**	**2,182.8278**	**2,182.8278**	**0.2844**		**2,189.9387**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0131	9.8800e-003	0.0880	2.2000e-004	0.0253	1.6000e-004	0.0254	6.7000e-003	1.4000e-004	6.8500e-003		21.4570	21.4570	6.8000e-004		21.4739
Total	**0.0131**	**9.8800e-003**	**0.0880**	**2.2000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7000e-003**	**1.4000e-004**	**6.8500e-003**		**21.4570**	**21.4570**	**6.8000e-004**		**21.4739**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Recreational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Recreational	6.60	5.50	6.40	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Recreational	0.572071	0.027190	0.206810	0.117824	0.018361	0.005136	0.017629	0.020081	0.002790	0.002084	0.006580	0.002569	0.000873

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003
Unmitigated	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003
Total	**5.0000e-005**	**0.0000**	**5.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.0900e-003**	**1.0900e-003**	**0.0000**		**1.1700e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003
Total	**5.0000e-005**	**0.0000**	**5.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.0900e-003**	**1.0900e-003**	**0.0000**		**1.1700e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Estimated Emissions for the CH-47 Helicopter

Emissions for the CH-47 helicopter were estimated based on similar air emissions from the Sikorsky CH-53G, a representative aircraft. The air emissions from one LTO and one hour of operation of the CH-53G are provided in the FOCA Helicopter Emissions Table (2017).

Based on the CalEEMod Notes and Assumptions, there would be two LTOs per maintenance event. By multiplying the estimated emissions per LTO cycle by two, the total LTO emissions generated during each maintenance event are estimated (see Table 1).

Table 1. Estimated CH-53G Air Emissions for LTOs

Pollutant	Emissions per LTO Cycle (g)	LTOs per Maintenance Event	Total LTO Emissions per Maintenance Event (g)	Total LTO Emissions per Maintenance Event (lb)
NOx	1690	2	3,380	**7.45**
HC	351	2	702	**1.55**
CO	433	2	866	**1.91**
PM_{10}	41	2	82	**0.18**

Based on the CalEEMod Notes and Assumptions, the CH-47 helicopter would be operated for approximately four hours during each maintenance event. The FOCA Helicopter Emissions Table emissions table provides the estimated air emissions for one hour of operation of the CH-53G. By multiplying this value by four hours, the total air emissions for operation of the CH-47 during each maintenance event are estimated.

Table 2. Estimated CH-53G Air Emissions for Operations

Pollutant	Emissions per Hour of Operation (g)	Hours of Operation per Maintenance Event	Total Operations Emissions per Maintenance Event (g)	Total Operations Emissions per Maintenance Event (lb)
NOx	17.27	4	69.08	**0.15**
HC	0.82	4	3.28	**0.01**
CO	0.96	4	3.84	**0.01**
PM_{10}	0.388	4	1.55	**0.00**

By adding the estimated emissions from two LTO cycles and estimated emissions from four hours of operation, the total estimated emissions for one maintenance event are estimated (see Table 3).

Table 3. Estimated Total CH-53G Air Emissions per Maintenance Event

Pollutant	LTO Emissions per Maintenance Event (lb)	Operations Emissions per Maintenance Event (lb)	Total Emissions per Maintenance Event (lb)
NOx	7.45	0.15	**7.60**
HC	1.55	0.01	**1.56**
CO	1.91	0.01	**1.92**
PM_{10}	0.18	0.00	**0.18**
$PM_{2.5}$	0.16	0.00	**0.16**

Note: $PM_{2.5}$ is 90 percent of PM_{10}.

MONTECITO PLANNING COMMISSION

Staff Report for Montecito Debris Flow Protection Plan (Debris Nets)

Hearing Date: June 19, 2019
Staff Report Date: May 30, 2019
Case No.: 19DVP-00000-00005 (follow-up permit to Case No. 18EMP-00000-00007)
Environmental Document: Notice of Exemption pursuant to CEQA Section 15269(c)

Assistant Director: Jeff Wilson
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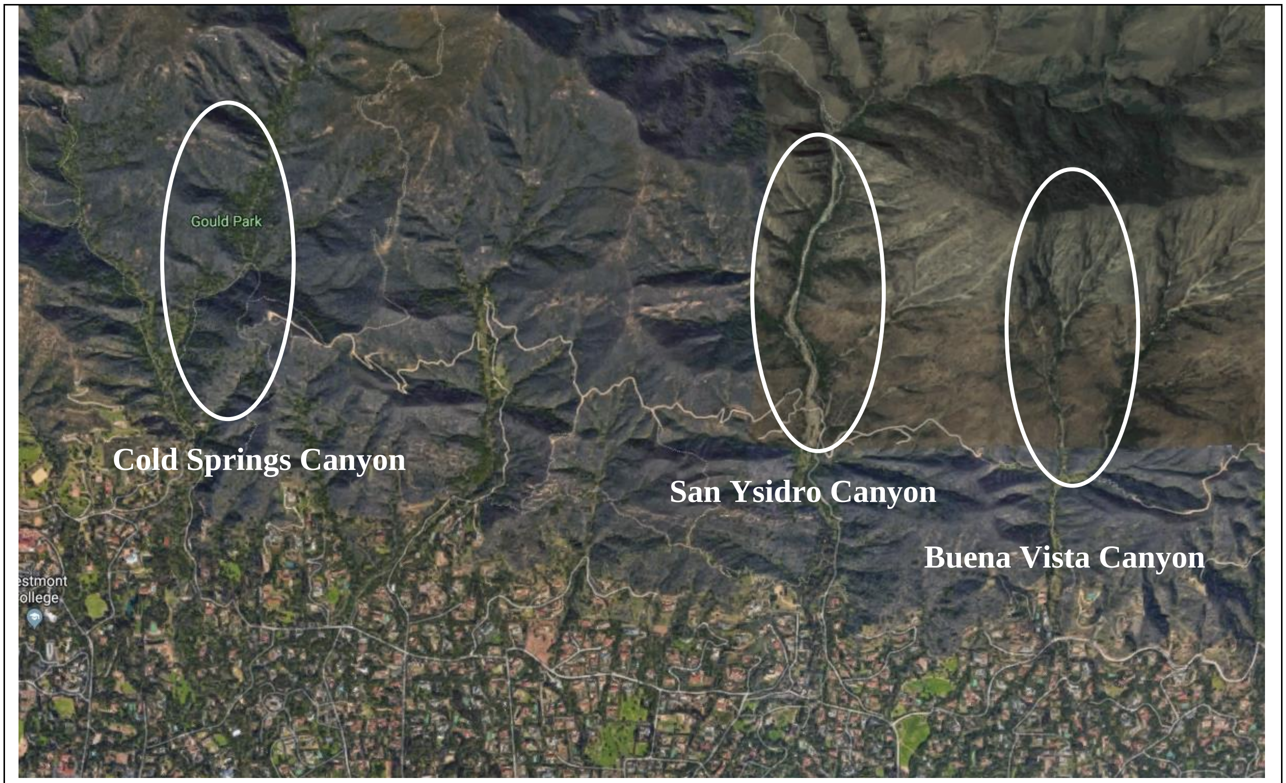

This site is identified as Assessor Parcel Numbers 011-010-027, 011-010-028, 007-020-003, 151-180-019, and 007-020-009 located in Cold Springs Canyon, San Ysidro Canyon, and Buena Vista Canyon in the Montecito Community Plan Area, First Supervisorial District.

1.0 REQUEST

Hearing on the request of Pat McElroy, Executive Director for The Partnership for Resilient Communities (TPRC), Applicant, to consider Case No. 19DVP-00000-00005 [application filed on January 18, 2019] for approval of a Development Plan in compliance with Section 35.472.080 of the Montecito Land Use and Development Code (MLUDC), on property zoned Resource Management (RMZ-40, RMZ-100, and RMZ-320), to develop a temporary debris flow prevention and mitigation system consisting of six debris nets that will be located in three canyons north of the community of Montecito, including Cold Spring Canyon, San Ysidro Canyon, and Buena Vista Canyon; and to determine the project is exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to State CEQA Guidelines Section 15269(c) [Emergency Projects], confirming that the project is within the scope of the emergency CEQA exemption approved on December 21, 2018, as stated in the Notice of Exemption included as Attachment C. The project is located along Cold Spring Creek (APN 011-010-027 and 011-010-028), San Ysidro Creek (APN 151-180-019 and 007-020-003), and Buena Vista Creek (APN007-020-009) in the Montecito Community Plan Area, First Supervisorial District.

2.0 RECOMMENDATION AND PROCEDURES

Follow the procedures outlined below and conditionally approve Case No. 19DVP-00000-00005 marked "Officially Accepted, County of Santa Barbara (June 19, 2019) Montecito Planning Commission Attachments A-G ", based upon the project's consistency with the Comprehensive Plan including the Montecito Community Plan and based on the ability to make the required findings.

Your Commission's motion should include the following:

1. Make the required findings for approval of the project specified in Attachment A of this staff report, including CEQA findings.

2. Determine the project is exempt from CEQA pursuant to CEQA Guidelines Section 15269(c), confirming that the project is within the scope of the emergency CEQA exemption approved on December 21, 2018, as stated in the Notice of Exemption included as Attachment C.

3. Approve the project (Case No. 19DVP-00000-0005) subject to the conditions included as Attachment B.

Refer back to staff if the Montecito Planning Commission takes other than the recommended action for appropriate findings and conditions.

3.0 JURISDICTION

Section 35.472.090 of the MLUDC authorizes the Director of the Planning and Development Department (P&D) to temporarily defer standard permit requirements of the MLUDC and issue an Emergency Permit when emergency action is warranted, and requires that the applicant subsequently obtain the planning permit(s) customarily required by this Development Code.

A Development Plan is required as the follow-up permit to Emergency Permit Case No. 18EMP-00000-00007 for construction of the debris nets. Pursuant to Section 35.422.030 of the MLUDC, final Development Plan approval is required prior to the approval of a Land Use Permit, issuance of an Exemption, or a Zoning Clearance for all development, including grading, in the RMZ zone.

Pursuant to Section 35.472.080 of the MLUDC, this project is being considered by the Montecito Planning Commission as the review authority for Development Plan applications.

4.0 ISSUE SUMMARY AND BACKGROUND INFORMATION

An Emergency Permit for 11 Geobrugg flexible debris control nets in three canyons north of the community of Montecito was approved by the Planning & Development Director on December 21, 2018 (Case No. 18EMP-00000-00007). The approval of the Emergency Permit authorized the installation, one year of maintenance, and the removal of the 11 nets after one year (i.e. December 21, 2019).

Pursuant to MLUDC Section 35-472.090(G), an Emergency Permit does not constitute an entitlement for the erection of permanent structures, and an application for the applicable planning permit shall be made within 30 days following the granting of the Emergency Permit. An application for this Development Plan was timely submitted on January 18, 2019.

The current Development Plan application is for six of the 11 approved nets, including CS-11, CS-18, SY-7a, SY-18, BV-4, and BV-10, located within Cold Springs Canyon, San Ysidro Canyon, and Buena Vista Canyon in the Montecito area. The applicant has chosen to not seek approval for the other five nets at this time. To date, four of the six nets have been installed under the original terms of the Emergency Permit, including two in Cold Springs Canyon, one in San Ysidro Canyon, and one in Buena Vista Canyon.

The Emergency Permit and follow-up Development Plan entitle the nets to be in place for one year from the approval date (i.e. December 21, 2019). It is anticipated that TPRC would file a subsequent application in 2019 for authorization to maintain the nets beyond one year until the nets are removed, and potentially for new net locations. This would either be in the form of a new Emergency Permit, if it can be demonstrated that an emergency continues to exist, or a new Development Plan.

5.0 PROJECT INFORMATION

5.1 Site Information

Site Information	
Comprehensive Plan Designation	CS-11 (APN 011-010-027): MA-100 (Mountainous Area, 100-acre minimum parcel size) CS-18 (APN 011-010-028): MA-100 (Mountainous Area, 100-acre minimum parcel size) SY-7a (APN 151-180-019): MA-320 (Mountainous Area, 320-acre minimum parcel size) SY-18 (APN 007-020-003): MA-40 (Mountainous Area, 40-acre minimum parcel size) BV-4 and BV-10 (APN 007-020-009): MA-320 (Mountainous Area, 320-acre minimum parcel size)
Ordinance, Zone	**Ordinance:** MLUDC **Zone:** CS-11 (APN 011-010-027): RMZ-100 (Resource Management, 100-acre minimum parcel size) CS-18 (APN 011-010-028): RMZ-100 (Resource Management, 100-acre minimum parcel size) SY-7a (APN 151-180-019): RMZ-320 (Resource Management, 320-acre minimum parcel size) SY-18 (APN 007-020-003): RMZ-40 (Resource Management, 40-acre minimum parcel size) BV-4 and BV-10 (APN 007-020-009): RMZ-320 (Resource Management, 320-acre minimum parcel size)
Site Size	CS-11 (APN 011-010-027): 43.24 acres CS-18 (APN 011-010-028): 77.57 acres SY-7a (APN 151-180-019): 358.25 acres SY-18 (APN 007-020-003): 79.43 acres BV-4 and BV-10 (APN 007-020-009): 239.50 acres
Present Use & Development	CS-11 (APN 011-010-027): Undeveloped, public trails

Site Information	
	CS-18 (APN 011-010-028): Undeveloped, public trails SY-7a (APN 151-180-019): Undeveloped, public trails SY-18 (APN 007-020-003): Undeveloped, public trails BV-4 and BV-10 (APN 007-020-009): Undeveloped, public trails
Surrounding Uses/Zone(s)	<u>CS-11 (APN 011-010-027)</u> **North:** Undeveloped; RMZ-40 (Resource Management, 40-acre minimum parcel size) **South:** Residential development; 3-E-1 (Single Family, 3-acre minimum parcel size) **East:** Undeveloped; RMZ-100 (Resource Management, 100-acre minimum parcel size) **West:** Undeveloped; RMZ-100 (Resource Management, 100-acre minimum parcel size) <u>CS-18 (APN 011-010-028)</u> **North:** Undeveloped; RMZ-320 (Resource Management, 320-acre minimum parcel size) and RMZ-40 (Resource Management, 40-acre minimum parcel size) **South:** Residential development; 3-E-1 (Single Family, 3-acre minimum parcel size) **East:** Undeveloped; RMZ-100 (Resource Management, 100-acre minimum parcel size) **West:** Undeveloped; RMZ-100 (Resource Management, 100-acre minimum parcel size) <u>SY-7a (APN 151-180-019)</u> **North:** Undeveloped; RMZ-320 (Resource Management, 320-acre minimum parcel size) **South:** Undeveloped; RMZ-40 (Resource Management, 40-acre minimum parcel size) **East:** Undeveloped; RMZ-320 (Resource Management, 320-acre minimum parcel size) **West:** Undeveloped; RMZ-320 (Resource Management, 320-acre minimum parcel size) <u>SY-18 (APN 007-020-003)</u> **North:** Undeveloped; RMZ-320 (Resource Management,

Site Information	
	320-acre minimum parcel size) **South:** Undeveloped; RMZ-40 (Resource Management, 40-acre minimum parcel size) **East:** Undeveloped; RMZ-100 (Resource Management, 100-acre minimum parcel size) **West:** Undeveloped; RMZ-40 (Resource Management, 40-acre minimum parcel size) <u>BV-4 and BV-10 (APN 007-020-009)</u> **North:** Undeveloped; RMZ-320 (Resource Management, 320-acre minimum parcel size) **South:** Residential development; RMZ-40 (Resource Management, 40-acre minimum parcel size) **East:** Undeveloped; RMZ-40 (Resource Management, 40-acre minimum parcel size) and RMZ-100 (Resource Management, 100-acre minimum parcel size) **West:** Undeveloped; RMZ-40 (Resource Management, 40-acre minimum parcel size) and RMZ-100 (Resource Management, 100-acre minimum parcel size)
Access	Public trails exist on all of the project sites. However, there are no paved roads to the debris net locations. Access to the debris nets would be limited to on-foot access via public trails or dropping supplies at the sites via helicopter.
Public Services	Water Supply: Not Applicable Sewage: Not Applicable Fire: Montecito Fire Protection District Police Services: County Sheriff

5.2 Description

The project consists of a temporary debris flow prevention and mitigation system located in three canyons north of the community of Montecito, including Cold Spring Canyon, San Ysidro Canyon, and Buena Vista Canyon. As requested by the Applicant, the follow-up Development Plan to the Emergency Permit involves the installation, one year of maintenance, and the removal of six of the 11 Geobrugg flexible debris control nets that were approved under the Emergency Permit Case No. 18EMP-00000-00007.

The basic debris flow protection system consists of a steel ring net engineered to resist the velocities, dynamic, and static pressures unique to debris flows. Support ropes are installed into channel banks and transfer debris impact and pressure loads from ring nets to the ground. Excessive energy is absorbed by net braking elements in the wire support ropes.

The nets are installed at a minimum elevation of three feet above the water surface of the low-flow channel to allow for natural stream processes and wildlife use. This space between the water surface and the bottom of the net will be maintained, such that debris will not restrict the low-flow channel, except during high-flow or debris flow events.

Net Location	Owner	APNs
BV-4, -10	Pollock Peggy L Trust; Pollock Thomas Philip Trust	007-020-009
CS-11, -18	Robinson Mary Kay Living Trust	011-010-027, 011-010-028
SY-7A, -18	Wilderness BB LLC	151-180-019, 007-020-003

Two nets are in Cold Spring Canyon (APNs 011-010-027, 011-010-028), two nets are in San Ysidro Canyon (APNs 151-180-019, 007-020-003), and two nets are in Buena Vista Canyon (APN 007-020-009). Four of the six nets (CS-11, CS-18, SY-18, and BV-10) have already been installed under the terms of the Emergency Permit.

The nets are pre-fabricated to specification for each location. The debris nets range in height from 12-20 feet. The bottom length of each net ranges from 13 – 98 feet wide, the middle length of each net ranges from 40 – 134 feet wide, and the top length of each net ranges from 60 – 150 feet wide.

Maintenance:

Intense and localized rainfall events, as occurred on January 9, 2018, have the potential to mobilize soil and debris. The timing of the need for removal of debris will depend on frequency, intensity and the amount of precipitation experienced in the surrounding watershed. The nets will be inspected routinely for repairs each year outside of the rainy season by Kane GeoTech, Inc., the applicant’s geotechnical engineer firm.

Annual and post-event inspections will be conducted. After a Storm Event[1] ends, each net will be inspected within 24 hours for repairs or debris removal. Should the nets accumulate sufficient

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[1] A “Storm Event” is an event consistent with the triggering thresholds developed by the United States Geological Survey and used by the National Weather Service for post-burn areas as guidance for issuing watches and warnings of possible flash floods and debris flows (http://www.scag.ca.gov/programs/Documents/Earthquake/RAFwebinar_NWSdebrisFlowWarningSystem.pdf). A Storm Event ends when no further precipitation is forecasted and entry is permitted by public safety officials.

material to block the channel, equipment will be mobilized to the location via aerial transport once stream flow has subsided sufficiently to allow safe access. If the inspection indicates that a repair is required and/or that there is debris in a net, repair and/or removal of debris shall commence as soon as possible, preferably within 48 hours but no later than 72 hours after the net inspection.

In addition, every two weeks year-round the applicant will informally inspect each net.
Minor repairs and debris removal may be done using tools and materials transported by hand. Major damage may require equipment and materials to be delivered in the same manner as installation (via helicopter).

A biologist will be onsite to conduct wildlife surveys, monitor for permit compliance, and provide oversight during construction and maintenance work. All measures identified in the Biological Resources Assessment, including Site Specific and Sensitive Habitat Avoidance and Minimization Measures, General Construction Avoidance and Minimization Measures, and the Invasive Plant Management Program will be implemented, incorporated herein as part of the project, see Attachment G).

<u>Major Debris Flow Maintenance:</u>
After a major debris flow, excavators and operators will be air-lifted via helicopter to the net locations. The crew size will average four personnel per net. The contractor will use heavy-lift helicopters and a Spyder excavator or a 10-ton class excavator depending on the specific characteristics of the debris flow.

The first action will be to restore the low-flow channel to pre-event elevation to permit fish passage.

Under the supervision of biologists, the contractor will immediately re-establish the low flow channel upstream of the net using an excavator once stream flows have subsided sufficiently to allow safe access and working conditions. Restoring the low-flow channel to pre-event elevation will begin from the back of the accumulated debris working towards the net. The excavators used will be as small as practical to perform the work. Any management of the stream flow and associated best management practices (BMPs) necessary to minimize turbidity from the debris management activities will be installed in coordination with biologists prior to and during the work activities.

Depending on the characteristics of the debris flow, the net may be disconnected from the top support ropes, laid on the ground, and the excavator could distribute the material down channel. Under the supervision of biologists, the material excavated during re-establishment of the low flow channel will be placed downstream in a manner that does not impede the low flow channel and maximizes the potential for habitat restoration. This would include assurance that flow conditions are maintained and creation of pools or eddies that mimic natural deposition of material. The distance downstream depends on the biologist's professional judgment given the amount of debris material and precise down channel topography.

If the nets are substantially full and are under tension, the biologist in consultation with the contractor may decide in their professional judgment to not disassemble the net. The debris will in such case be moved by the excavator over the net.

The materials will remain in the riparian area.

If large boulders are in the debris that cannot be lifted by the excavator, they will be broken in place using a hydraulic excavator mounted hammer or by using hydraulic splitters to enable management with the excavator. They will be placed outside the low-flow channel or as directed by the biological monitor.

If large organic (woody) debris is present and poses an issue to reestablishing the low-flow channel, a portable wood chipper can be mobilized to the work area to chip the organic debris and place outside of the stream channel or as directed by the biological monitor.

Minor Debris Maintenance:

After minor debris accumulation, the hand cleaning method may be used to allow immediate rectification of low flow channel fish passage. The hand cleaning will be performed with picks, shovels and small hydraulic splitters if necessary. Otherwise, the same methods and protocols used for full debris flow maintenance will apply to minor debris flow maintenance.

Grouting at Installation:

The grout plant is located in coordination with biologists away from surface water and inside of appropriate containment vessels. When an anchor hole is drilled and the anchor is inserted with a tremie tube, grout is pumped through a hose into the tremie tube. The grout flows from the bottom of the hole to the top without pressure.

This operation requires a crew member to operate the grout pump valve and a crew member to monitor the grout placement at the hole. The crew coordinates to send and shut off grout delivery. A valve on the hose end where it connects to the tremie tube prevents leaking between placement operations.

In addition to these safeguards, thick plastic sheeting was used around the anchor holes to prevent any errant placement of grout. The anchors are located a sufficient distance from the stream flows to allow ample distance for the containment measures.

This Development Plan, as a follow-up to Emergency Permit No. 18EMP-00000-00007, authorizes the installation of debris nets as well as the monitoring and maintenance of the nets for one year only, as detailed in the Site Plans, Master Work Plan, and Biological Resources Assessment (Attachments D, F, and G). This permit also authorizes and requires removal of the debris nets after one year from the Emergency Permit approval date (i.e. by December 21, 2019) if a subsequent permit or new Emergency Permit is not obtained. The net systems will be removed entirely, generally by helicopter, under the supervision of biologists.

The project occurs on parcels zoned RMZ-40, RMZ-100, and RMZ-320 (Resource Management Zone, 40-320 minimum acre parcel size), located in creeks and canyons in the Montecito Community Plan Area, First Supervisorial District.

6.0 PROJECT ANALYSIS

6.1 Environmental Review

The proposed project was found to be exempt from CEQA pursuant to CEQA Guidelines Section 15269(c) [Emergency Projects] on December 21, 2018 upon the Director's approval of the Emergency Permit for the project (Case No. 18EMP-00000-00007). Please refer to Attachment C of this staff report for a detailed discussion of this exemption. The Development Plan before your Commission is a follow-up to Emergency Permit No. 18EMP-00000-00007 required by the MLUDC Section 35.472.080. The proposed project under the Development Plan does not expand or otherwise alter the scope of the emergency project approved pursuant to 18EMP-00000-00007. As such, the proposed project is exempt from environmental review as stated in the previously filed Notice of Exemption, included as Attachment C of this staff report.

6.2 Comprehensive Plan Consistency

REQUIREMENT	DISCUSSION
Land Use	
Land Use Element Policy #4: *Prior to issuance of a development permit, the County shall make the finding, based on information provided by environmental documents, staff analysis, and the applicant, that adequate public or private services and resources (i.e., water, sewer, roads, etc.) are available to serve the proposed development. The applicant shall assume full responsibility for costs incurred in service extensions or improvements*	**Consistent:** The project consists of installing six of the 11 nets approved under Emergency Permit Case No. 18EMP-00000-00007, which would capture debris and reduce the volume and intensity of debris flows in the canyons located above the community of Montecito. Since the net locations cannot be accessed by roads, the applicant would use helicopters to drop supplies and would require monitors and construction crews to hike into the canyons

<table>
<tr><td><i>that are required as a result of the proposed project. Lack of available public or private services or resources shall be grounds for denial of the project or reduction in the density otherwise indicated in the land use plan. Affordable housing projects proposed pursuant to the Affordable Housing Overlay regulations, special needs housing projects or other affordable housing projects which include at least 50% of the total number of units for affordable housing or 30% of the total number of units affordable at the very low income level shall be presumed to be consistent with this policy if the project has, or is conditioned to obtain all necessary can and will serve letters at the time of final map recordation, or if no map, prior to issuance of land use permits.</i></td><td>using existing trails. The debris nets do not require water or sewer services to function. Therefore, public or private services (i.e. water, sewer, roads, etc.) are not proposed or required to serve the project site.

Costs associated with service extensions or improvements are not applicable since the project does not require any services to operate. Therefore, the proposed project is consistent with this policy.</td></tr>
<tr><td colspan="2">Hillside and Watershed Protection</td></tr>
<tr><td>Land Use Element Hillside and Watershed Protection Policy #2: <i>All developments shall be designed to fit the site topography, soils, geology, hydrology, and any other existing conditions and be oriented so that grading and other site preparation is kept to an absolute minimum. Natural features, landforms, and native vegetation, such as trees, shall be preserved to the maximum extent feasible. Areas of the site which are not suited to development because of known soil, geologic, flood, erosion or other hazards shall remain in open space.</i></td><td>Consistent: No grading is occurring as a result of this project. By bringing in equipment by helicopter, site preparation is kept to a minimum.

While native vegetation will be preserved to the maximum extent feasible, two sycamore saplings (BV-4) may need to be trimmed during net installation. To preserve natural features and native vegetation, TPRC is proposing avoidance and minimization measures to reduce impacts to special-status plant species and special status wildlife species include pre-construction surveys, worker environmental awareness training, and biological survey and monitoring.

The project also results in temporary disturbance to ESH, which will be compensated through an invasive plant management program. Temporary disturbance</td></tr>
</table>

	was estimated in the revised biological assessment (Attachment G) to be 0.32 acres of ESH during construction and 1.21 acres of ESH during maintenance and removal. The proposed invasive plant management program would include twice-annual removal of target invasive species until the nets are removed. Therefore, the proposed project is consistent with this policy.
Land Use Element Hillside and Watershed Protection Policy #4: *Sediment basins (including debris basins, desilting basins, or silt traps) shall be installed on the project site in conjunction with the initial grading operations and maintained through the development process to remove sediment from runoff waters. All sediment shall be retained on site unless removed to an appropriate dumping location.*	**Consistent:** No grading operations would occur, and as a result sediment basins are not required as part of the project. Therefore, the proposed project is consistent with this policy.
Flood Hazard	
Land Use Element Flood Hazard Area Policy #1: *All development, including construction, excavation, and grading, except for flood control projects and non-structural agricultural uses, shall be prohibited in the floodway unless off-setting improvements in accordance with federal regulations are provided. If the proposed development falls within the floodway fringe, development may be permitted, provided creek setback requirements are met and finished floor elevations are two feet above the projected 100-year flood elevation, and the other requirements regarding materials and utilities as specified in the Flood Plain Management Ordinance are in compliance.*	**Consistent:** The proposed net locations are not identified as being within the mapped floodway; however, the debris nets are located in Montecito canyons across creeks. The proposed project is temporary, and development would not result in a permanent structure. Further, the project is essentially a private flood control project in that it is intended to reduce the potential for debris flow events and associated flooding while the watershed recovers from the burn scar. The proposed nets would be removed within one year or within another specified timeframe if an additional permit is granted to extend the life of the nets. In addition, the County Flood Control District, Army Corps of Engineers, Regional Water Quality Control Board, and California Department of Fish and Wildlife reviewed the project and determined that the

	project did not require a permit or was considered emergency work under their jurisdiction. Therefore, the proposed project is consistent with this policy.
Land Use Element Flood Hazard Area Policy #2: *Permitted development shall not cause or contribute to flood hazards or lead to expenditure of public funds for flood control works, i.e., dams, stream channelizations, etc.* **Montecito Community Plan Policy FD-M-4.1:** *Flood control activities shall protect lives and property while being conducted according to the least environmentally damaging methods.* **Montecito Community Plan Policy FD-M-4.5:** *The County shall strive to ensure through public and private projects that adequate drainage is provided to minimize existing community-wide flooding and drainage problems.*	**Consistent:** The proposed project is privately funded. Pursuant to Condition 9 of the Emergency Permit (Attachment B-2), TPRC was required to post a performance security to cover the full costs of all obligations under the Emergency Permit, including one year of maintenance and removal of all of the nets. An escrow agreement was executed on April 4, 2019 between CDFW and the National Fish and Wildlife Foundation, as the escrow agent. Therefore, it would not lead to the expenditure of public funds for flood control works. Further, the intent of the proposed project is to prevent flood/debris flow hazards, not cause or contribute to them. The temporary nets would capture debris close to the source and then allow material after a storm event to be placed back in the channel in a more controlled manner without impeding surface flow. The nets are designed with an opening of three to five feet from the ground to allow water and fine sediment passage. Therefore, the proposed project is consistent with these policies.
Land Use Element Flood Hazard Area Policy #3: *All development shall be reviewed in accordance with the requirements of County Code Chapter 15A-Floodplain Management and 15B-Development Along Watercourses.*	**Consistent:** The County Flood Control District reviewed the project and determined that Chapter 15A-Floodplain Management and Chapter 15B-Development along Watercourses did not apply. On November 28, 2018, the Flood Control District stated “the threat of debris flow from the Thomas Burn area continues to represent a clear and imminent danger.” These nets would capture debris thereby reducing the energy impact of potential future debris flow threats. Therefore, the

	proposed project is consistent with this policy.
Montecito Community Plan Policy FD-M-2.1: *Development shall be designed to minimize the threat of on-site and downstream flood potential and to allow recharge of the groundwater basin to the maximum extent feasible.* **Montecito Community Plan Policy FD-M-4.2:** *Major brushing, desilting and shaping shall be justified by appropriate technical engineering analysis.*	**Consistent:** While major brushing, desilting, or shaping would not occur as a result of the project, collection of debris would result in redistribution of debris downstream. A backhoe or excavator would remove material and place it on the downstream side of the nets so that debris material can return to the natural system. By capturing debris, the nets would minimize the threat of an on-site and downstream flood potential and allow the groundwater basin to recharge to the maximum extent feasible. Therefore, the proposed project is consistent with these policies.
Cultural Resources	
Land Use Element Historical and Archaeological Sites Policy #1: *All available measures, including purchase, tax relief, purchase of development rights , etc., shall be explored to avoid development on significant historic, prehistoric, archaeological, and other classes of cultural sites.*	**Consistent:** No significant cultural resources are known to exist within the six debris net locations. Further, while anchors for the nets would be placed in bedrock along the creek banks, the nets themselves would not result in ground disturbance. Lastly, the project is temporary, and this Development Plan authorizes and requires removal of the debris nets after one year. A condition has also been imposed to require stop work if archaeological remains are encountered (Attachment B-1, Condition 8). Therefore, the proposed project is consistent with this policy.
Recreation	
Montecito Community Plan Policy PRT-M-1.2: *Bikeways, equestrian and walking paths within road rights-of-way and equestrian and walking paths along creek channels and through open spaces should be provided in Montecito for recreation as well as for an alternative means of transportation.* **Montecito Community Plan Policy PRT-M-1.6:** *New development shall not adversely*	**Consistent:** Public trails exist near locations of nets but would not be impacted or altered by net locations. Condition 6 (Attachment B-1) requires that if trails are temporarily closed during construction, maintenance, or removal activities, the applicant shall coordinate with the Montecito Trails Foundation and Parks Division. In an email from Pat McElroy, dated April 3, 2019, TPRC indicated that they will have

impact existing recreational facilities and uses. **Montecito Community Plan Policy PRT-M-1.6:** *New development shall not adversely impact existing recreational facilities and uses.* **Montecito Community Plan Development Standard PRT-M-1.5.1:** *Designated trail corridors shall be kept clear from encroachment by new uses or development to the extent reasonably feasible.*	monitors on trails near the net locations that will hold hikers for minutes at a time in order for helicopters to safely drop debris net equipment during construction. The monitors will have radios for communications to ensure hiker safety and to reduce the time of impacts on any recreational trail. The applicant has also stated that they intend to notify the Montecito Trails Foundation 72 hours before each instance of helicopter use. The proposed nets are temporary and would be required to be removed within one year, unless a subsequent permit is obtained to extend the life of the project. Therefore, the proposed project is consistent with these policies.
Biological Habitats	
Montecito Community Plan Policy BIO-M-1.3: *Environmentally Sensitive Habitat (ESH) areas within the Montecito Planning Area shall be protected, and where appropriate, enhanced.*	**Consistent:** No trees will be removed as part of the project. Two sycamore saplings may need to be trimmed during net installation in Buena Vista creek. Temporary disturbance to 0.32 acres of ESH during construction and 1.21 acres of ESH during maintenance and net removal will be compensated through an invasive plant management program. This is expected to enhance the quality of ESH within the project area. Any management of the stream flow and associated best management practices (BMPs) necessary to minimize turbidity from the debris management activities will be installed in coordination with biologists prior to and during the work activities. A biologist will be onsite to conduct wildlife surveys, monitor for permit compliance, and provide oversight during construction and maintenance work. All measures identified in the Biological Resources Assessment, including Site Specific

	and Sensitive Habitat Avoidance and Minimization Measures, General Construction Avoidance and Minimization Measures, and the Invasive Plant Management Program will be implemented (Attachment G). In addition, materials and construction equipment for the debris nets would be brought in by helicopter to minimize disturbance to ESH that could otherwise occur associated with temporary construction access. Further, since the nets would be required to be removed within one year unless a subsequent permit is obtained, any vegetation disturbed by the nets is expected to naturally recover, similar to the natural re-vegetation occurring in the burn areas. Therefore, the proposed project is consistent with this policy.
Montecito Community Plan Development Standard BIO-M-1.14.1: I*n rural areas and where major wildlife corridors are present in urban areas, new development shall not interrupt major wildlife travel corridors within the Community Plan Study Area (typical wildlife corridors are provided by drainage courses and similar undeveloped natural areas).*	**Consistent:** The nets will not impede dispersal or migration of aquatic wildlife species or small mammals unless filled with debris. Nets would be required to be cleared of debris within 48-72 hours of a significant storm event. The net designs include a freeboard of three to five feet between the low-flow water surface and the bottom of the net. Some large wildlife, such as mule deer, may not be able to pass under the net and would have to traverse the adjacent canyon slopes to move upstream and downstream. Two federally listed species – southern steelhead and California red-legged frog – occur in the subject creeks. P&D coordinated with the California Department of Fish and Wildlife (CDFW) in approving the terms of the Emergency Permit, including the requirement for a performance security to be held by CDFW that ensures the nets will be properly maintained and/or removed

	(Condition 9 of Attachment B-2). Potential for incidental injury or mortality of special status species would be reduced through minimization and avoidance measures during construction. As such, the project includes preconstruction nesting bird surveys, worker environmental awareness training, and biological surveys and monitoring to prevent inadvertent interruptions to wildlife moving through the corridor. Therefore, the proposed project is consistent with this policy.
Montecito Community Plan Policy BIO-M-1.7: *No structures shall be located within a riparian corridor except: public trails that would not adversely affect existing habitat; dams necessary for water supply projects; flood control projects where no other method for protecting existing structures in the floodplain is feasible and where such protection is necessary for public safety, other development where the primary function is for the improvement of fish and wildlife habitat and where this policy would preclude reasonable development of a parcel. Culverts, fences, pipelines, and bridges (when support structures are located outside the critical habitat) may be permitted when no alternative route/location is feasible. All development shall incorporate the best mitigation measures feasible to minimize the impact to the greatest extent.*	**Consistent:** Policy BIO-M-1.7 prohibits development within a riparian corridor, but makes exceptions for flood control projects and minor improvements such as fencing. This project consists of debris nets, which are similar in nature to fences. The nets would assist in minimizing the energy associated with potential future debris flows in Montecito canyons. Nets would be three to five feet above low-flow channels and would be raised above the creek bed. Net anchors would be located in rocks adjacent to creeks, and the nets would not block creek flow. The primary goal of the project is to reduce debris flow hazards and protect structures in the floodplain, similar to a flood control project. Further, the nets provide protection for the public since the nets have the potential to reduce the energy from a potential debris flow that could otherwise impact the Montecito community. The project includes preconstruction nesting bird surveys, worker environmental awareness training, and biological survey and monitoring in order to minimize the impact of development to the greatest extent feasible (Attachment B, Condition 1). Therefore, the proposed project

	is consistent with this policy.
Montecito Community Plan Policy BIO-M-1.8: *The minimum buffer strip for development near streams and creeks in Rural Areas shall be presumptively 100 feet from top of bank and for streams in Urban Areas, 50 feet. These minimum buffers may be adjusted upward or downward on a case-by-case basis but shall not preclude reasonable development of a parcel. The buffer shall be established based on an investigation of the following factors and after consultation with the Department of Fish and Game and Regional Water Quality Board in order to protect the biological productivity and water quality of streams:* *1. soil type and stability of stream corridors;* *2. how surface water filters into the ground;* *3. slope of the land on either side of the stream;* *4. location of the 100 year flood plain boundary; and* *5. consistency with adopted plans, particularly Biology/Habitat policies.* *The buffer area shall be indicated on all grading plans. All ground disturbance and vegetation removal shall be prohibited in the buffer area.*	**Consistent:** This project is in the Rural Area, which typically requires a 100-foot buffer for development near streams and creeks. However, as discussed above under Policy BIO-M-1.7, certain development is permitted within a stream corridor. Regardless, the 100-foot buffer can be adjusted downward to allow for the project. The California Department of Fish and Wildlife and Regional Water Quality Control Board were consulted and measures have been incorporated into the project design in order to protect the biological productivity and water quality of the streams. Rock and debris material would be dispersed downstream in a way that does not impede surface flow. Further, the nets would be temporary and completely removed from the sites within one year, unless the applicant obtains a subsequent permit to keep the nets in place for a longer period of time. Therefore, the proposed project is consistent with this policy.
Montecito Community Plan Policy BIO-M-1.1: *Designate and provide protection to important or sensitive environmental resources and habitats in the inland portion of the Montecito Planning Area.* **Montecito Community Plan Policy BIO-M-1.6:** *Riparian vegetation shall be protected as part of a stream or creek buffer. Where riparian vegetation has previously been removed, (except*	**Consistent:** Temporary disturbance to vegetation due to net installation may occur, and ground disturbance is limited to the area where anchors are drilled and grouted into the banks. No trees will be removed as part of the project, including oak trees, though two sycamore saplings may need to be trimmed during net installation in Buena Vista creek. The project proposes to flag all special status

for channel cleaning necessary for free-flowing conditions as determined by the County Flood Control District) the buffer shall allow the reestablishment of riparian vegetation to its prior extent to the greatest degree possible. Restoration of degraded riparian areas to their former state shall be encouraged. **Montecito Community Plan Policy BIO-M-1.10:** *All development, including dredging, filling and grading within stream corridors, shall be limited to activities necessary for the construction of uses specified in Policy B-1.7. When such activities would require removal of riparian plant species, revegetation with local native plants shall be required on both banks and extending outward 25 feet from each top of bank, except where it would preclude reasonable development of a parcel.*	plant populations for avoidance, and if plants cannot be avoided, they will be documented and replaced in accordance with the Biological Resources Assessment, including Site Specific and Sensitive Habitat Avoidance and Minimization Measures. A biologist will conduct pre-construction surveys for each of the net locations and will review access points for special status wildlife that have the potential to occur. Given the scope of disturbance, natural re-vegetation is expected to occur, similar to the natural re-vegetation occurring in the burn areas. This would be aided by an invasive plant management program proposed to be implemented to offset the temporary disturbance to ESH. Therefore, the proposed project is consistent with these policies.
Visual Resources	
Montecito Community Plan Policy VIS-M-1.1: *Development shall be subordinate to the natural open space characteristics of the mountains.* **Montecito Community Plan Policy VIS-M-1.3:** *Development of property should minimize impacts to open space views as seen from public roads and viewpoints.* **Montecito Community Plan Policy VIS-M-2.1:** *Lands which should be preserved in open space for scenic value include road-side turnouts, stream channels, equestrian and hiking trails, and mountainous areas.*	**Consistent:** Nets are temporary and would not be visible from any public road. Nets are not located on trails but would be visible from multiple trail locations and are estimated to be approximately 12-20 feet in height. However, while the nets will be visible to trail users, they will be subordinate to the natural open space characteristics of the surrounding mountains and canyons. The Development Plan requires removal of the nets after one year, unless a subsequent permit is obtained. As such, the proposed project would not result in a permanent change in the natural open space characteristics of the mountains, and the proposed project is consistent with these policies.
Geology, Hillsides, and Topography	
Montecito Community Plan Policy GEO-M-	**Consistent:** Nets would be located three to

1.1: *Mountainous watershed areas shall be protected to the maximum extent feasible from development which would interfere with their watershed function and would intensify fire and flood danger.*	five feet above low-flow channels in order to reduce interference with the function of the mountainous watersheds. The construction of temporary debris nets would not intensify fire and flood danger since the nets would capture debris that otherwise could flow downstream during a debris flow event. Therefore, the proposed project is consistent with this policy.
Montecito Community Plan Policy GEO-M-1.3: *New development on previously cleared slopes that show scarring or remaining significant disturbance shall be required to include plans for re-vegetation for those areas.*	**Consistent:** The debris nets are intended to capture debris that may normally be retained or slowed down by vegetation that was burned during the Thomas Fire. Due to the steep slopes, the ability to conduct hydro-seeding is limited; however, natural re-vegetation of the burn scar is anticipated to occur over the next several years. Therefore, the proposed project is consistent with this policy.
Noise	
Montecito Community Plan Noise Policy N-M-1.1: *Noise-sensitive uses (i.e., residential and lodging facilities, educational facilities, public meeting places and others specified in the Noise Element) shall be protected from significant noise impacts.*	**Consistent:** The debris net locations are approximately 1,000+ feet north of any residential development. Construction will take approximately one week at each net location with a crew of three people, and multiple nets may be worked on at once. Construction would be temporary and the distance of the nets from existing noise-sensitive uses would result in protection from significant noise impacts. Therefore, the proposed project is consistent with this policy.

6.3 Zoning: Land Use and Development Code Compliance

6.3.1 Compliance with the Montecito Land Use and Development Code Requirements

Pursuant to Section 35.430.070 of the MLUDC (Standards for All Development and Land Uses), the proposed project is most similar to a fence. Fences outside of a required setback that are more than six feet in height require a Land Use Permit.

The project sites are zoned RMZ (Resource Management Zone District). The RMZ zone is applied only within the Inland area to protect lands that are unsuited for intensive development and that have:

1. Slopes in excess of 40 percent; or
2. Valleys surrounded by slopes exceeding 40 percent; or
3. Isolated table land surrounded by slopes exceeding 40 percent; or
4. Areas with outstanding resource values, including environmentally sensitive habitats and/or watersheds.

Further, the intent of the RMZ zone district is to limit development because of extreme fire hazards, minimum services, and/or environmental constraints, and to encourage the preservation of these areas for uses including grazing, scientific and educational study, and limited residential uses.

Pursuant to Section 35.422.030.C, the RMZ Zone requires:

> *"final Development Plan approval in compliance with Section 35.472.080 (Development Plans) is required prior to the approval of a Land Use Permit in compliance with Section 35.472.110 (Land Use Permits) or the issuance of an Exemption in compliance with Section 35.420.040 (Exemptions from Planning Permit Requirements) or a Zoning Clearance in compliance with Section 35.472.190 (Zoning Clearances) for all development, including grading."*

Therefore, this Development Plan is required for the proposed debris nets prior to approval of a subsequent permit.

The project complies with the development standards for the RMZ zone district identified below:

Height: The maximum allowable height of structures allowed in the RMZ zone district is 25 feet. The six proposed debris nets range in height from 12-20 feet. Therefore, the six proposed nets comply with the height limit.

Setbacks: In the RMZ zone district, the front setback is 50 feet from the centerline and 20 feet from the edge of right-of-way. The side and rear setbacks are 20 feet. The proposed debris nets are located outside of all setbacks on each parcel.

7.0 APPEALS PROCEDURE

The action of the Montecito Planning Commission may be appealed to the Board of Supervisors within 10 calendar days of said action. The appeal fee to the Board of Supervisors is $668.06.

ATTACHMENTS

A. Findings
B. Conditions of Approval
    B-1. Development Plan Conditions of Approval
    B-2. Emergency Permit including Conditions of Approval
C. CEQA Exemption
D. Site Plans
E. Montecito Revised General Report of Findings, December 12, 2018
F. Montecito Debris Nets Master Work Plan and Attachments
G. Revised Biological Assessment, Montecito Debris Flow Mitigation, January 18, 2019

ATTACHMENT A: FINDINGS

1.0 CEQA FINDINGS

CEQA EXEMPTION

The Montecito Planning Commission finds that the proposed project is exempt from environmental review under the California Environmental Quality Act (CEQA) pursuant to CEQA Guidelines Section 15269(c) [Emergency Projects] and confirms that the project is within the scope of the emergency exemption approved on December 21, 2018, as stated in the Notice of Exemption included as Attachment C.

2.0 ADMINISTRATIVE FINDINGS

2.1.1 DEVELOPMENT PLAN FINDINGS (19DVP-00000-00005)

A. Findings required for all Preliminary or Final Development Plans. In compliance with Subsection 35.472.080.E.1 of the Montecito Land Use and Development Code, prior to the approval or conditional approval of an application for a Preliminary or Final Development Plan the review authority shall first make all of the following findings:

1. **The site for the proposed project is adequate in terms of location, physical characteristics, shape, and size to accommodate the type of use and the level of development proposed.**

The debris nets project is temporary, and nets would only be allowed to be maintained on the properties until December 21, 2019 unless a future permit to extend the timeframe of the project is obtained. The project sites are located in San Ysidro, Cold Springs, and Buena Vista Canyons in the Montecito area, where significant debris flow from the January 9, 2018 debris flow event occurred. The project sites range in size from approximately 43 acres to 358 acres, and the nets would be located across creek channels to capture debris and material from a storm event. Further, as the project description in Section 5.2 of the staff report, dated May 30, 2019 and incorporated herein by reference states, nets will be installed at a minimum elevation of three feet above the water surface of the low-flow channel to allow for natural stream processes and wildlife use. The project would not obstruct any existing public trails on the properties. Nets would range between 12-20 feet in height. Therefore, the sites for the project are adequate in location, physical characteristics, shape, and size to accommodate the type of use and level of development proposed, and this finding can be made.

2. **Adverse impacts will be mitigated to the maximum extent feasible.**

The applicant is proposing avoidance and minimization measures to reduce impacts to special-status plant species and special status wildlife species, including pre-construction surveys, worker environmental awareness training, and biological survey and monitoring. Temporary impacts to 0.32 acres of ESH during construction and 1.21 acres of ESH during maintenance and removal will be compensated through an invasive plant management program. The proposed invasive plant management program would include twice-annual removal of target invasive species until the nets are removed. Additionally, given the temporary nature of the impacts, natural re-colonization of native riparian vegetation is anticipated with the aid of the invasive plant management program.

The applicant also proposed to use helicopters to drop supplies, including the debris nets, and will have monitors and construction crews hike into the canyons using existing trails. Monitors on trails near the net locations will hold hikers for minutes at a time in order for helicopters to safely drop the debris net equipment. The monitors will have radios that allow communications to ensure hiker safety and to reduce the time of impacts on any recreational use. The applicant has also stated that they intend to notify the Montecito Trails Foundation 72 hours before each instance of helicopter use. As a result, monitoring, avoidance, and minimization measures would reduce any potential adverse impacts to the maximum extent feasible. Further, the project is temporary, and nets would be removed within one year, unless a subsequent permit is obtained to extend the life of the project. Therefore, this finding can be made.

3. **Streets and highways will be adequate and properly designed to carry the type and quantity of traffic generated by the proposed use.**

Public trails exist on the project sites. However, there are no paved roads to the debris net locations. Access to the debris nets would be limited to on-foot access via public trails or dropping supplies at the sites via helicopter. No streets and highways are necessary for the project, and the project would not result in traffic generation. Therefore, this finding can be made.

4. **There will be adequate public services, including fire and police protection, sewage disposal, and water supply to serve the subject project.**

Public services (i.e. water and sewer) are not required to serve the project sites since the project consists solely of debris nets. The net locations cannot be accessed by roads.

As a result, the applicant proposes using helicopters to drop supplies and the debris nets and proposes to have monitors and construction crews hike into the canyons using existing public trails. The properties are currently, and would continue to be, served by the Montecito Fire Protection District and the Santa Barbara County Sheriff. Therefore, this finding can be made.

5. **The proposed project will not be detrimental to the comfort, convenience, general welfare, health and safety of the neighborhood and will not be incompatible with the surrounding areas.**

Given the denuded hillside above the Montecito area after the Thomas Fire, the area remains at risk of dangerous debris flow events during upcoming winter rain seasons until vegetation grows back. An abundant supply of sediment remains, including loose sediment on the watershed slopes, loose sediment concentrated in watershed channels, and erodible sediment exposed in channel banks. Debris flow nets are meant to reduce the volume and intensity of debris flows in the canyons located above the community of Montecito by resisting the velocities, dynamic, and static pressures unique to debris flows. Therefore, the project is intended to provide an additional safety measure for the Montecito community and would not be detrimental to the comfort, convenience, general welfare, health and safety of the Montecito neighborhood. Further, the project is temporary, and nets would be required to be removed within one year from the Emergency Permit approval unless a subsequent permit is obtained to extend the life of the project. The surrounding areas are open space, and the temporary nets would not be incompatible with the surrounding areas. Therefore, this finding can be made.

6. **The proposed project will comply with all applicable requirements of this Development Code and the Comprehensive Plan including the Montecito Community Plan.**

As discussed in Section 6.2 and Section 6.3 of the staff report, dated May 30, 2019, and incorporated herein by reference, the proposed project is consistent with all applicable policies of the Comprehensive Plan, including the Montecito Community Plan, and with all requirements of the MLUDC. Therefore, this finding can be made.

7. **The proposed project will not adversely impact recreational facilities and uses.**

As stated in Section 6.2 of the staff report, dated May 30, 2019 and incorporated herein by reference, the locations of the proposed nets avoid existing public trails. Condition 7 (Attachment B-1 of the staff report, dated May 30, 2019) requires that if trails are temporarily closed during construction, maintenance, or removal activities, the applicant shall coordinate with the Montecito Trails Foundation and Parks Division. The applicant will have monitors on trails near the net locations that will hold hikers for minutes at a time in order for helicopters to safely drop the debris net equipment. No recreational facilities, including trails, would be adversely impacted by the construction, maintenance, and removal of debris nets. Further, the nets were approved under the Emergency Permit for one year only and a subsequent permit would be required for any additional time the nets are in place beyond December 21, 2019. Therefore, recreational facilities and uses, including trails, will not be impacted by the proposed project, and this finding can be made.

8. **Within Rural areas as designated on the Comprehensive Plan maps, the use will be compatible with and subordinate to the rural and scenic character of the area.**

As indicated in Section 6.2 of the staff report, dated May 30, 2019 and incorporated by reference, nets are temporary and would not be visible from a public road. Nets are also not located on trails. While the nets will be visible to trail users, they will be subordinate to the rural and scenic character of the surrounding mountains and canyons. Streams and creek habitats would be preserved since the nets contain a three to five feet opening at the bottom. Channel and debris accumulation would be inspected within 48-72 hours after a storm event occurs. The Development Plan requires removal of the nets after one year, unless a subsequent permit is obtained. As such, the proposed project will be compatible with and subordinate to the rural and scenic character of the area, and this finding can be made.

9. **The project will not conflict with any easements required for public access through, or public use of a portion of the subject property.**

Public access to the property for trail users will continue following implementation of the proposed project. Trails exist near locations of nets but would not be impacted or altered by net locations. Further, public recreational trails along creek corridors will be protected, preserved, and provided during development of the debris nets. Condition 7 (Attachment B-1 of the staff report, dated May 30, 2019) requires that if trails are temporarily closed during construction, maintenance, or removal activities, the applicant shall coordinate with the Montecito Trails Foundation and Parks Division.

The applicant will have monitors on trails near the net locations that will hold hikers for minutes at a time in order for helicopters to safely drop the debris net equipment. The monitors will have radios that allow communications to ensure hiker safety and to reduce the time of impacts on any recreational use. The applicant will notify the Montecito Trails Foundation 72 hours before each instance of helicopter use. The project will not conflict with any easements required for public access through, or public use of a portion of the subject property. Therefore, this finding can be made.

B. Additional finding required for Final Development Plans. In compliance with Subsection 35.472.080.E.2 of the Montecito Land Use and Development Code, prior to the approval or conditional approval of an application for a Final Development Plan the review authority shall first find that the plan is in substantial conformity with any previously approved Preliminary Development Plan except when the review authority considers a Final Development Plan for which there is no previously approved Preliminary Development Plan. In this case, the review authority may consider the Final Development Plan as both a Preliminary and Final Development Plan.

There is no Preliminary Development Plan for the project. Therefore, the proposed development plan is both the preliminary and final plan.

ATTACHMENT B-1:

DEVELOPMENT PLAN CONDITIONS OF APPROVAL

1. **Proj Des-01 Project Description**. This Development Plan is based upon and limited to compliance with the project description, the hearing exhibits marked A-G, dated June 19, 2019, and all conditions of approval set forth below, including mitigation measures and specified plans and agreements included by reference, as well as all applicable County rules and regulations. The project description is as follows:

The project consists of a temporary debris flow prevention and mitigation system located in three canyons north of the community of Montecito, including Cold Spring Canyon, San Ysidro Canyon, and Buena Vista Canyon. As requested by the Applicant, the follow-up Development Plan to the Emergency Permit involves the installation, one year of maintenance, and the removal of six of the 11 Geobrugg flexible debris control nets that were approved under the Emergency Permit Case No. 18EMP-00000-00007.

The basic debris flow protection system consists of a steel ring net engineered to resist the velocities, dynamic, and static pressures unique to debris flows. Support ropes are installed into channel banks and transfer debris impact and pressure loads from ring nets to the ground. Excessive energy is absorbed by net braking elements in the wire support ropes.

The nets are installed at a minimum elevation of three feet above the water surface of the low-flow channel to allow for natural stream processes and wildlife use. This space between the water surface and the bottom of the net will be maintained, such that debris will not restrict the low-flow channel, except during high-flow or debris flow events.

Net Location	Owner	APNs
BV-4, -10	Pollock Peggy L Trust; Pollock Thomas Philip Trust	007-020-009
CS-11, -18	Robinson Mary Kay Living Trust	011-010-027, 011-010-028
SY-7A, -18	Wilderness BB LLC	151-180-019, 007-020-003

Two nets are in Cold Spring Canyon (APNs 011-010-027, 011-010-028), two nets are in San Ysidro Canyon (APNs 151-180-019, 007-020-003), and two nets are in Buena Vista Canyon (APN 007-020-009). Four of the six nets (CS-11, CS-18, SY-18, and BV-10) have already been installed under the terms of the Emergency Permit.

The nets are pre-fabricated to specification for each location. The debris nets range in height from 12-20 feet. The bottom length of each net ranges from 13 – 98 feet wide, the middle length of each net ranges from 40 – 134 feet wide, and the top length of each net ranges from 60 – 150 feet wide.

Maintenance:

Intense and localized rainfall events, as occurred on January 9, 2018, have the potential to mobilize soil and debris. The timing of the need for removal of debris will depend on frequency, intensity and the amount of precipitation experienced in the surrounding watershed. The nets will be inspected routinely for repairs each year outside of the rainy season by Kane GeoTech, Inc., the applicant's geotechnical engineer firm.

Annual and post-event inspections will be conducted. After a Storm Event[1] ends, each net will be inspected within 24 hours for repairs or debris removal. Should the nets accumulate sufficient material to block the channel, equipment will be mobilized to the location via aerial transport once stream flow has subsided sufficiently to allow safe access. If the inspection indicates that a repair is required and/or that there is debris in a net, repair and/or removal of debris shall commence as soon as possible, preferably within 48 hours but no later than 72 hours after the net inspection.

In addition, every two weeks year-round the applicant will informally inspect each net. Minor repairs and debris removal may be done using tools and materials transported by hand. Major damage may require equipment and materials to be delivered in the same manner as installation (via helicopter).

A biologist will be onsite to conduct wildlife surveys, monitor for permit compliance, and provide oversight during construction and maintenance work. All measures identified in the Biological Resources Assessment, including Site Specific and Sensitive Habitat Avoidance and Minimization Measures, General Construction Avoidance and Minimization Measures, and the Invasive Plant Management Program will be implemented, incorporated herein as part of the project, see Attachment G).

Major Debris Flow Maintenance:

After a major debris flow, excavators and operators will be air-lifted via helicopter to the net locations. The crew size will average four personnel per net. The contractor will use heavy-lift helicopters and a Spyder excavator or a 10-ton class excavator depending on the specific

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[1] A "Storm Event" is an event consistent with the triggering thresholds developed by the United States Geological Survey and used by the National Weather Service for post-burn areas as guidance for issuing watches and warnings of possible flash floods and debris flows (http://www.scag.ca.gov/programs/Documents/Earthquake/RAFwebinar_NWSdebrisFlowWarningSystem.pdf). A Storm Event ends when no further precipitation is forecasted and entry is permitted by public safety officials.

characteristics of the debris flow.

The first action will be to restore the low-flow channel to pre-event elevation to permit fish passage.

Under the supervision of biologists, the contractor will immediately re-establish the low flow channel upstream of the net using an excavator once stream flows have subsided sufficiently to allow safe access and working conditions. Restoring the low-flow channel to pre-event elevation will begin from the back of the accumulated debris working towards the net. The excavators used will be as small as practical to perform the work. Any management of the stream flow and associated best management practices (BMPs) necessary to minimize turbidity from the debris management activities will be installed in coordination with biologists prior to and during the work activities.

Depending on the characteristics of the debris flow, the net may be disconnected from the top support ropes, laid on the ground, and the excavator could distribute the material down channel. Under the supervision of biologists, the material excavated during re-establishment of the low flow channel will be placed downstream in a manner that does not impede the low flow channel and maximizes the potential for habitat restoration. This would include assurance that flow conditions are maintained and creation of pools or eddies that mimic natural deposition of material. The distance downstream depends on the biologist's professional judgment given the amount of debris material and precise down channel topography.

If the nets are substantially full and are under tension, the biologist in consultation with the contractor may decide in their professional judgment to not disassemble the net. The debris will in such case be moved by the excavator over the net.

The materials will remain in the riparian area.

If large boulders are in the debris that cannot be lifted by the excavator, they will be broken in place using a hydraulic excavator mounted hammer or by using hydraulic splitters to enable management with the excavator. They will be placed outside the low-flow channel or as directed by the biological monitor.

If large organic (woody) debris is present and poses an issue to reestablishing the low-flow channel, a portable wood chipper can be mobilized to the work area to chip the organic debris and place outside of the stream channel or as directed by the biological monitor.

Minor Debris Maintenance:

After minor debris accumulation, the hand cleaning method may be used to allow immediate rectification of low flow channel fish passage. The hand cleaning will be performed with picks, shovels and small hydraulic splitters if necessary. Otherwise, the same methods and protocols used for full debris flow maintenance will apply to minor debris flow maintenance.

Grouting at Installation:

The grout plant is located in coordination with biologists away from surface water and inside of appropriate containment vessels. When an anchor hole is drilled and the anchor is inserted with a tremie tube, grout is pumped through a hose into the tremie tube. The grout flows from the bottom of the hole to the top without pressure.

This operation requires a crew member to operate the grout pump valve and a crew member to monitor the grout placement at the hole. The crew coordinates to send and shut off grout delivery. A valve on the hose end where it connects to the tremie tube prevents leaking between placement operations.

In addition to these safeguards, thick plastic sheeting are used around the anchor holes to prevent any errant placement of grout. The anchors are located a sufficient distance from the stream flows to allow ample distance for the containment measures.

This Development Plan, as a follow-up to Emergency Permit No. 18EMP-00000-00007, authorizes the installation of debris nets as well as the monitoring and maintenance of the nets for one year only, as detailed in the Site Plans, Master Work Plan, and Biological Resources Assessment (Attachments D, F, and G). This permit also authorizes and requires removal of the debris nets after one year from the Emergency Permit approval date (i.e. by December 21, 2019) if a subsequent permit or new Emergency Permit is not obtained. The net systems will be removed entirely, generally by helicopter, under the supervision of biologists.

The project occurs on parcels zoned RMZ-40, RMZ-100, and RMZ-320 (Resource Management Zone, 40-320 minimum acre parcel size), located in creeks and canyons in the Montecito Community Plan Area, First Supervisorial District.

Any deviations from the project description, exhibits or conditions must be reviewed and approved by the County for conformity with this approval. Deviations may require approved changes to the permit and/or further environmental review. Deviations without the above described approval will constitute a violation of permit approval.

2. **Proj Des-02 Project Conformity**. The grading, development, use, and maintenance of the property, the size, shape, arrangement, and location of the structures, parking areas and landscape areas, and the protection and preservation of resources shall conform to the project description above and the hearing exhibits and conditions of approval below. The property and any portions thereof shall be sold, leased or financed in compliance with this project description and the approved hearing exhibits and conditions of approval thereto. All plans (such as Landscape and Tree Protection Plans) must be submitted for review and approval and shall be implemented as approved by the County.

3. This permit is granted on the express condition that the permittee obtain and maintain throughout the term of this Emergency Permit and follow-up Development Plan all required authorizations, approvals, and/or permits from other Departments or regulatory agencies.

4. Parking during construction, maintenance, and removal activities shall not occur in trailhead parking areas by construction crews or biological monitors. Crews and monitors shall be required to be shuttled to each canyon and walk into each net location.

5. All heavy equipment shall be airlifted to each net location for construction and installation, maintenance, and removal. Heavy machinery and/or vehicles shall not be permitted on trails used to access the canyon sites by foot.

6. If trails are temporarily closed during construction, maintenance, or removal activities, the applicant shall coordinate with the Montecito Trails Foundation and Parks Division of the Community Services Department to ensure adequate noticing has occurred in the Montecito community.

7. Spray paint markings in the canyons identifying debris net locations shall be removed during construction of each net.

8. **CulRes-09 Stop Work at Encounter.** The Owner/Applicant and/or their agents, representatives or contractors shall stop or redirect work immediately in the event archaeological remains are encountered during grading, construction, landscaping or other construction-related activity. The Owner/Applicant shall immediately contact P&D staff, and retain a P&D approved archaeologist and Native American representative to evaluate the significance of the find in compliance with the provisions of the County Archaeological Guidelines and conduct appropriate mitigation funded by the Owner/Applicant.

9. **Bio-08 Fish and Wildlife**. No work authorized by this Development Plan shall commence until the Owner/Applicant demonstrates receipt of all authorizations from the California Department of Fish and Wildlife, U.S. Army Corps of Engineers, and the Regional Water Quality Control Board for any planned alteration to stream channels or banks.

10. The Applicant shall post a performance security, the amount and form of which shall be approved by CDFW, to cover the full cost of all obligations under Emergency Permit 18EMP-00000-00007 and any and all additional requirements imposed through any authorization, approval, or permit granted by CDFW, including a minimum of one year of maintenance (i.e., debris removal) and removal of all of the nets. The performance security shall identify CDFW as the named obligee, and it must be approved by CDFW prior to the commencement of construction activities. Proof that the financial security has been approved by CDFW shall be submitted to the Planning and Development Department prior to the commencement of construction activities. The performance security will only be released after all approved debris nets have been satisfactorily maintained and removed, in compliance with Emergency Permit 18EMP-00000-00007 and any and all additional requirements imposed through any authorization, approval, or permit granted by CDFW.

11. **Rules-01 Effective Date-Not Appealable to CCC.** This Development Plan shall become effective upon the date of the expiration of the applicable appeal period provided an appeal has not been filed. If an appeal has been filed, the planning permit shall not be deemed effective until final action by the final review authority on the appeal. No entitlement for the use or development shall be granted before the effective date of the planning permit [MLUDC §35.472.020].

12. **Rules-05 Acceptance of Conditions.** The Owner/Applicant‘s acceptance of this permit and/or commencement of use, construction and/or operations under this permit shall be deemed acceptance of all conditions of this permit by the Owner/Applicant.

13. **Rules-07 DP Conformance**. No permits for development, including grading, shall be issued except in conformance with an approved Final Development Plan. The size, shape, arrangement, use, and location of the debris nets shall be developed in conformity with the approved development plan marked Attachment D of the staff report, dated May 30, 2019.

14. **Rules-23 Processing Fees Required**. Prior to issuance of a Land Use Permit, the Owner/Applicant shall pay all applicable P&D permit processing fees in full as required by County ordinances and resolutions.

15. **Rules-33 Indemnity and Separation**. The Owner/Applicant shall defend, indemnify and hold harmless the County or its agents or officers and employees from any claim, action or proceeding against the County or its agents, officers or employees, to attack, set aside, void, or annul, in whole or in part, the County's approval of this project. In the event that the County fails promptly to notify the Owner / Applicant of any such claim, action or

proceeding, or that the County fails to cooperate fully in the defense of said claim, this condition shall thereafter be of no further force or effect.

16. **Rules-37 Time Extensions-All Projects.** The Owner / Applicant may request a time extension prior to the expiration of the permit or entitlement for development. The review authority with jurisdiction over the project may, upon good cause shown, grant a time extension in compliance with County rules and regulations, which include reflecting changed circumstances and ensuring compliance with CEQA. If the Owner / Applicant requests a time extension for this permit, the permit may be revised to include updated language to standard conditions and/or mitigation measures and additional conditions and/or mitigation measures which reflect changed circumstances or additional identified project impacts.