

Mitigation and Monitoring Plan Annual
Report (October 2014 – September 2015)

APPENDIX I
2015 BMP REPORT (RCI)

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Heavenly Mountain Resort BMP Effectiveness Monitoring

2015 Annual Report & Construction Season Summary

April 27, 2016



Prepared for:

Cardno
295 Highway 50, Suite 1
P.O. Box 1533
Zephyr Cove, NV 89448

Prepared by:



Resource Concepts Inc.
340 N. Minnesota St.
Carson City, NV 89703-4152

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Prepared by:

RESOURCE CONCEPTS, INC.

340 North Minnesota Street
Carson City, Nevada 89703-4152
Office: (775) 883-1600
Fax: (775) 883-1656
www.rci-nv.com

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INTRODUCTION

The following report summarizes the results of the BMP Effectiveness Monitoring at Heavenly Mountain Resort (Heavenly) for the 2015 construction season. It has been prepared by Resource Concepts, Inc. (RCI) to comply with the Lahontan Regional Water Quality Control Board (Lahontan) Waste Discharge Requirements (*Board Order R6T-2015-0021*, WDID No. 6A090033000) which requires submittal of an annual monitoring report.

Best Management Practices (BMPs) for sediment and erosion control are structural and non-structural measures used to reduce soil movement, manage surface runoff, and improve runoff water quality. BMPs at Heavenly Mountain Resort are applied to construction projects, roads, ski runs, and facilities, which include buildings, utilities, and parking lots. Structural BMPs are generally categorized as either Permanent or Temporary BMPs:

- > Temporary BMPs are short-term, used during construction and maintenance projects, and removed upon project completion.
- > Permanent BMPs are used on a long-term basis to control contaminant sources or treat runoff, and require ongoing maintenance to be effective.

Monitoring was conducted following the BMP Effectiveness component (Chapter 5) of the Revised Environmental Monitoring Program, as set forth in the 1996 Master Plan and the approved Master Plan Amendment (2007). Under this program, BMPs are monitored for both implementation and effectiveness. BMP implementation concerns whether plans/specifications are adequate for resource protection, and if improvements are constructed according to design. BMP effectiveness is determined from observed or estimated erosion and sediment transport at sites evaluated.

Key components of the program include:

- > Evaluation forms that focus on implementation and effectiveness adapted from the USDA Forest Service, Region 5, BMP Evaluation Program (Region 5 BMPEP),
- > Monitoring frequency for Permanent BMPs: post-construction, 1-year post-construction, 3-, 6-, and 9-year post-construction,
- > Monitoring frequency for Temporary BMPs for ongoing construction projects: bi-weekly during construction, and after precipitation events,
- > The revised monitoring program “Needs Assessments” conducted on the facilities constructed prior to 2000,
- > Assessment of road BMP upgrade effects using water quality risk assessment protocols, stream crossing evaluations, and modeling to estimate road erosion and sediment yield.

In February 2015, the Epic Discovery EIR/EIS/EIS was completed, which includes updates to the approved Environmental Monitoring Program. Monitoring was conducted in 2015 under the previously approved protocol with the understanding that an updated program would be implemented in 2016. An updated BMP Effectiveness Monitoring Program is discussed in the “2015 Conclusions and Recommendations for 2016” section of this report.

2015 RESPONSES TO 2014 SUMMARY REPORT

BMP Effectiveness Monitoring reports developed over the past decade have provided annual recommendations for improved planning, implementation, effectiveness and monitoring of Temporary and Permanent BMPs at Heavenly. Consistent with the adaptive management approach, Heavenly has considered these results and recommendations to develop and improve the BMP retrofit and maintenance program. A summary of the Resort's responses in 2015 to the recommendations provided in the 2014 report is provided in the following section.

Planning

Heavenly's Annual Work List is typically generated from BMP construction and maintenance items identified during the previous year's BMP Effectiveness Monitoring. The Annual Work List now also includes "Erosion Hotspots" identified in the Epic Discovery EIR/EIS/EIS. Table 1 (Appendix A) includes the BMP retrofit and maintenance projects completed in 2015 based on recommendations made in 2014, the Epic Discovery EIR/EIS/EIS, and Heavenly's ongoing inspections focusing on erosion and sediment control facilities. Projects are prioritized by potential for increasing erosion, accessibility and proximity to stream environment zones (SEZs). Also included in the BMP project recommendations for 2016, are projects planned but not completed in 2015.

The Construction Erosion Reduction Plan (CERP) remains a helpful tool for selecting appropriate BMPs for projects that lack detailed plan sets and specifications. The Epic Discovery EIR/EIS/EIS also requires that Heavenly continue to implement the CERP to meet water quality standards. As such, the CERP was referenced and evaluated in 2015 during the planning phase and throughout construction season. Additional recommendations developed from monitoring effectiveness of temporary and permanent BMPs are summarized in Appendix A. RCI inspectors consistently refer to these observations as supplemental guidance for assessing project implementation.

On-site scoping meetings conducted in the field with key staff are useful for particularly challenging sites. An on-site field meeting ensures that managers, field crews, agency staff and inspectors can voice opinions, provide insight and reach common ground to develop practical and effective solutions. An example of a successful on-site meeting was conducted at Hellwinkle's Road with representatives from Heavenly, Lahontan and RCI to discuss potential solutions to address erosion associated with the steep roadway. A phased approach with stages being completed in 2015, 2016, and 2017 was agreed upon as the most effective plan for the site. Another successful on-site meeting conducted between Heavenly and RCI resulted an effective approach to address drainage at the Adventure Peak/Gondola Top Station area, which was completed in 2015.

Permanent BMPs

Observations and recommendations made through the BMP monitoring from 2005 through 2015 were used to identify specific projects, incorporate general recommendations, and enhance the BMPs at Heavenly using the adaptive management approach. Recommendations for Permanent BMPs from past years and Heavenly's efforts to respond to these recommendations in 2015 are summarized in Tables 2 and 3 (Appendix A).

Temporary BMPs

Heavenly has continued to implement effective temporary construction BMPs identified and developed through the BMP Effectiveness Monitoring Program. The “BMP Breakfast” remains a successful training event and increases implementation scores, since well-trained staff are aware of how to properly install temporary BMPs. A summary of past recommendations for Temporary BMPs and how they were addressed in 2015 is included in Tables 4 and 5 (Appendix A).

Monitoring

The BMP Effectiveness Monitoring Program is reviewed each year to assess and improve the implementation process, following the adaptive management approach. A critical component of the monitoring program continues to be on-going coordination with Heavenly to schedule, implement, and track work related to BMP maintenance. The Annual Work List is reviewed on a regular basis throughout the construction season. Regular field meetings between the primary RCI inspector, Heavenly Environmental Manager, construction and BMP/revegetation crew (trail crew) leaders to review Annual Work List project status, potential BMP issues, actions to prepare for and respond to storm events, and additional work added by Heavenly identified during their internal inspection process.

Other monitoring tools being implemented by Heavenly include “Revegetation and Materials Trackers” which are Excel spreadsheets maintained by the Environmental Manager. Weekly forms are given to the BMP/revegetation crew (trail crew) supervisor to record information by location and date, type and quantity of BMPs installed, total staff hours, and number of loads of mulch (pine needle or wood chip). Effectiveness of the trackers will be evaluated by Heavenly and RCI in 2016 and will be modified if needed for ease of use by supervisors, relevant data for reporting requirements, and other pertinent information that may be needed. This is an example of Heavenly’s proactive approach to the BMP Effectiveness Monitoring Program; the Resort is continually incorporating new ideas and modifying the program each year.

2015 MONITORING RESULTS AND DISCUSSION

The 2015 construction season began following snowmelt in late May and ended with the first snow received in early November. As explained in previous reports, while this monitoring period is logical for seasonal operation of the Resort, it does not correspond directly with the Water Year reporting timeframe indicated in the Waste Discharge Requirements, as noted below:

- > The first quarter of the 2015 Water Year (October 1 through December 31, 2014) was reported previously as part of the 2014 Construction Season Summary (RCI, April 2014).
- > No evaluations were conducted during the second quarter of the 2015 Water Year (January 1 through March 31, 2015) due to snow.
- > Evaluations began during the third quarter of the 2015 Water Year (April 1 through June 30, 2014); however, since only one day of monitoring was conducted in June, this evaluation is included with the remainder of the evaluations discussed below.
- > Evaluations conducted during the 4th quarter of the 2015 Water Year (July 1 through September 30, 2015) and the 1st quarter of the 2016 Water Year (October 1 through December 31, 2016) were combined into one report to incorporate the logical conclusion of summer maintenance and construction projects. This report is included as Appendix B.

Facility and Construction Project BMP Monitoring

The annual monitoring conducted for facility maintenance and construction projects during the 2015 construction season continued use of the HV-1 and HV-2 forms and BMP Effectiveness monitoring protocols. A total of 79 evaluations were conducted at 27 sites in 2015. Summaries of the collected data and associated evaluation forms are included in Appendix B.

Permanent BMPs

In 2015, 34 permanent BMP evaluations were performed by RCI at 19 different sites. The evaluations included post-construction monitoring at 3-year intervals and follow up visits to review BMPs after maintenance activities or after storm events.

Implementation

Results for implementation of permanent BMPs at facilities monitored in 2015 showed that BMPs were fully “implemented” at 100% of the sites scored. Permanent BMPs were implemented in accordance with project specific plans and the CERP throughout the Resort. Full implementation can be attributed to Heavenly ensuring that plans for new construction include BMPs to address runoff and reduce erosion and to Heavenly implementing BMPs on existing facilities following “Needs Assessments” conducted in past years.

Effectiveness

In 2015, 100% of the sites had “effective” permanent BMPs monitored during the construction season. Maintenance of existing structures during the construction season and following storm events continues to be a priority at Heavenly; therefore, effectiveness scores remain consistently high. After a decade of considering results from the BMP Effectiveness monitoring, Heavenly has developed an existing knowledge base for methods and structures that work best on the Mountain.

Temporary BMPs

In 2015, Temporary construction BMPs were installed by Heavenly at 8 construction sites. Sites were typically evaluated on a biweekly schedule for the duration of construction and following precipitation events. A total of 45 separate Temporary BMP evaluations were conducted at the active construction sites in 2015.

Implementation

Temporary BMPs were installed in accordance with project plans and the CERP. Minor field adjustments were made throughout the construction season; however, 100% implementation was achieved at all construction sites in 2015 (see Appendix B). Heavenly's commitment to training new staff, reminding all staff of the importance of BMPs (especially at the beginning of the construction season at the BMP Breakfast) and emphasis on BMP maintenance resulted in these high scores.

Effectiveness

Scheduled and completed maintenance resulted in temporary BMPs operating 100% "effective" during construction and during storm events in 2015 (see Appendix B). As stated previously, field adjustments and maintenance are critical to effective BMPs and resulted in subsequent high scores.

Road BMP Upgrade and Reconstruction Monitoring

The Heavenly BMP Effectiveness monitoring data for roads evaluates the effect of road reconstruction and BMP upgrade projects on the potential for sediment transport. In accordance with the existing monitoring protocols, roads monitoring is conducted on a three-year interval; roads monitoring was most recently conducted in 2014. A summary of the 2015 annual roadway maintenance mapping is included in the Environmental Monitoring Annual Report (Cardno Jan 1, 2015). During the 2015 summer construction season, 2.5 miles of roadways were repaired, maintained, and resurfaced. This maintenance mapping does not include BMP Effectiveness monitoring for roads. Future BMP Effectiveness monitoring for roads will be conducted with reference to the new USDA Forest Service National Core BMP Monitoring protocols (Technical Guide Vol. 2, FS-990b publication is expected in FY 2016). These protocols may be adapted specifically for use at Heavenly.

2015 CONCLUSIONS AND RECOMMENDATIONS FOR 2016

The following conclusions and recommendations were generated from the results of the 2015 BMP Effectiveness Monitoring at Heavenly. Recommendations are provided for planning, implementation, effectiveness, and monitoring. Recommendations aim to follow directives in the Waste Discharge Requirements from the Lahontan Regional Water Quality Control Board, USDA Forest Service monitoring protocols and the Epic Discovery EIR/EIS/EIS.

Planning

Heavenly has utilized recommendations provided as a result of the BMP Effectiveness Monitoring Program to improve planning for projects throughout the Mountain. The monitoring results should still be referred to when establishing and prioritizing BMP maintenance and retrofit projects. Recommendations for future improvements and maintenance are summarized in Table 6 and were developed from the 2015 monitoring results. This summary has typically been used to draft the Annual Work List.

The CERP also continues to serve as a tool for selecting suitable Temporary and Permanent BMPs, which is reiterated by the Epic Discovery EIR/EIS/EIS. The BMP recommendations developed in Tables 2 through 5 are be useful supplements to the CERP. Both the CERP and BMP recommendations from past years are referenced throughout the construction season.

On-site meetings should remain a priority at complex sites to discuss potential erosion risks, resource protection, and siting for facilities and access routes. Heavenly managers should continue to interface with field crews implementing projects and resource specialists conducting monitoring. Scoping level meetings and status update meetings aid in planning and implementing effective BMPs and coordinating monitoring.

Implementation

Heavenly BMPs received “100%” implemented scores for both temporary and permanent BMPs in 2015. Plans and specifications for projects at the Resort continue to include both temporary and permanent BMPs that are the most effective at Heavenly. Tables 2 and 4 in Appendix A should be used as a reference for reviewing project BMPs during the plan development process.

Heavenly’s commitment to staff training resulted the 100% implementation scores for both temporary and permanent BMPs for a second year in a row. While some experienced staff return year after year, new employees also join the Heavenly team each year. In order to convey the importance of BMPs, all staff with Mountain access, contractors and third party vendors are required to attend the “BMP Breakfast.” This morning training is also attended by Heavenly management and regulatory agency representatives from TRPA, the USDA Forest Service, and the Lahontan Regional Water Quality Control Board. The Heavenly Environmental Manager conducts the BMP Breakfast Training and includes critical elements to BMP implementation and effectiveness specific to Heavenly. As noted in previous reports, the BMP Breakfast includes a field component every other year. The field component allows Heavenly staff to practice the proper installation of pine needle wattles and sediment fence. In 2015 the field training was held on the World Cup Ski Run near the California Base Lodge; 113 attendees were present at the BMP Breakfast and 46 attended the field training.

In last year's report, it was recommended that an experienced field team should be employed each season. Consistent employment of the same team may be infeasible, which is the reason Heavenly's training program and oversight of the field crews is critical. Heavenly's Environmental Manager meets regularly with the BMP/revegetation crew (trail crew) to make sure resource goals are being met on a project by project basis. In 2015, another step was added to enhance BMP implementation: field crew supervisors were given the responsibility to track revegetation and materials treatments. Additionally, the Environmental Manager continues to be a significant asset by providing guidance to field crews, interfacing with inspectors and giving insight to other managers on critical processes and projects at Heavenly.

Innovative BMP and erosion control technologies continue to be tested by Heavenly. In 2015, Heavenly installed several "Durawattles" manufactured by Heavyweight Sediment Control Systems, which are durable and reusable sediment control systems that can be used in applications similar to fiber rolls/wattles. The Durawattles were installed in an area of chronic sediment movement near the California Main Lodge. Also, pilot testing of a "Shred Vac" was conducted to chip and distribute pine needle mulch onto ski runs and areas with access challenges. Effectiveness of the two technologies will be evaluated in 2016.

Effectiveness

Heavenly has been committed to incorporating environmental improvement into the planning process and by complying with regulatory requirements which have helped to improve BMP effectiveness on the Mountain. Heavenly's BMP effectiveness has also improved since the beginning of the BMP Effectiveness Monitoring Program in 2004 because they have continually implemented new techniques, which is reflected in the monitoring results. Tables 3 and 5 in Appendix A should be used as a reference for reviewing project BMPs for effectiveness.

Permanent and Temporary BMPs received 100% effective scores for 2015. During inspections, little to no erosion was observed in areas associated with active construction, no unexpected ponding was observed, hazardous materials were contained and construction area delineation fencing was generally observed by Heavenly employees and outside contractors. Permanent BMPs were inspected for maintenance needs by Heavenly throughout the Mountain. As stated previously, Heavenly's commitment to training for all employees (new and experienced) resulted in effective Temporary BMPs. Regularly scheduled maintenance inspections and coordination on action items for maintenance resulted in effective Permanent BMPs. The Environmental Manager remains a key element of the BMP Effectiveness Monitoring Program in spearheading both training and maintenance work at Heavenly.

Monitoring

The BMP Effectiveness Monitoring Program has provided useful information over the past ten years for evaluating BMPs at Heavenly, particularly with respect to permanent facility BMPs, temporary construction BMPs and road BMPs. Results have been incorporated into planning measures over the past decade; yearly modifications have helped keep the Program up to date with changing BMP technologies and regulatory requirements. As noted previously and in the 2015 Annual Report, the Epic Discovery EIR/EIS/EIS was approved in 2015 and has provided an updated approach to monitoring. The updated 2015 Waste Discharge Requirements provide additional details on the monitoring requirements. The following discussion provides recommended updates to the BMP Effectiveness Monitoring Program at Heavenly.

BMP Effectiveness Monitoring is required to meet Heavenly Valley Creek Sediment TMDL Targets (Section I.D WDR). A Rating Criteria is provided in Attachment C of the WDR, which rates BMPs using percent implemented and effective with an overall score of excellent, good, fair or poor. The 2004 BMP Effectiveness Monitoring protocol (developed from the “USDA FS BMP Effectiveness Program” and modified specifically for Heavenly) can achieve these ratings for BMPs (temporary and permanent) at facilities. In general, the existing monitoring protocol for “BMP Effectiveness” satisfies the WDR, and has the benefit of producing results comparable to previous years for use in the annual and comprehensive reporting. In 2016, RCI proposes to continue conducting the monitoring for “BMP Effectiveness” for permanent BMPs and temporary BMPs on a biweekly basis. In addition, a review may be necessary of the recently established USDA Forest Service National BMP Program (for selecting, implementing and monitoring water quality BMPs) for applicability to the monitoring requirements at Heavenly. Modifying monitoring protocols at Heavenly to match the updated agency programs is consistent with the adaptive management approach taken over the past decade.

In particular, the roads component of the 2004 BMP Effectiveness Monitoring, which was based on the protocols for the USDA Forest Service “Water Quality Risk Assessment Program (WQRAP)”, could be modified to be more consistent with the protocols in the new USDA Forest Service National BMP Program. This would be part of the BMP Effectiveness Monitoring Program rather than the monitoring related to road operations and maintenance. The 2004 BMP Effectiveness Monitoring calls for roads assessment on 3 year intervals; monitoring was conducted in 2014, and so would be repeated in 2017.

In addition to the updated monitoring protocol, it is suggested that the following recommendations made previously in the 2012 Annual Report be reconsidered at this time. The 2012 monitoring report proposed that facilities could be removed from the monitoring schedule if they posed little risk to water quality. After monitoring for nine years (at three year intervals), or sooner if warranted by site stability, facilities that present little water quality risk no longer need to be monitored under the BMP Effectiveness Monitoring Program protocol. The previously used Risk Assessment Protocol (WQRAP) monitoring for roads uses a distance of 450 feet from an SEZ as a screening method to identify roads with potential to adversely affect water quality.

It is suggested the monitoring method for facilities adopt a similar screening distance for sites where BMPs have been implemented. These sites would continue to be inspected routinely by Heavenly under the seasonal maintenance requirements in the Resort’s Waste Discharge Requirements. Typical maintenance items may include improving effective cover and erosion resistance by means of wood chip or pine needle mulch, cleaning and maintaining infiltration areas and cleaning of any hazardous materials spills. The following sites were identified in 2012 and are recommended again for removal from the BMP Effectiveness Monitoring Program based on distance from an SEZ or existing erosion resistance in the form of established vegetation:

- Big Easy Lower Terminal
- Big Easy Upper Terminal
- Calif. Main Lodge Lot Surface Lift
- Sky Express Upper Terminal
- Sky Patrol Building
- Tamarack Express Upper Terminal
- World Cup Lower Terminal
- Pump house Near STPUD Tank
- Boulder Magic Carpet (X)
- Boulder Magic Carpet Removed
- Boulder Magic Carpet (X1)
- Canyon Express Upper Terminal
- Patsy's Upper Terminal
- Pistol Pump House
- Skyline Trail
- Powderbowl Express Upper Terminal

Appendix A

2015 Summary Tables 1 through 6

Table 1. 2015 Completed Projects and BMP Installation or Maintenance

Location	Treatment
California Projects	
Alpine Coaster	Constructed the Alpine Coaster as part of the 2015 Epic Discovery Activities. Drip line infiltration trenches and basin installed at loading/operator buildings.
Canyon Express Lift Lower Terminal	Added pine needle mulch, compost and seed to areas of low cover. Area roped off for delineated parking space and ski chair staging. Installed a vegetated swale with coir material matting and pine needle check dams in existing rock lined ditch adjacent to the operator's booth.
Climbing Rock Wall	Constructed the Climbing Rock Wall adjacent to Tamarack Lodge as part of the 2015 Epic Discovery Activities. Wood chip mulch applied around entire structure; will be refurbished annually.
Directional Signage Upgrades	New directional signage installed at existing sign locations throughout Mountain; pine needle wattles deployed during construction and pine needle mulch applied following work.
Double Down Ski Run	Repaired water bar and applied mulch/needles uphill of water bar. Flattened profile of the water bar and installed large pine needle berm below water bar to infiltrate run-off before reaching maintenance road.
Ellie's Ski Run	Repaired water bar and converted to an infiltration swale. Covered lower portion of ski run with mulch.
Face Patrol Sewer Line*	Completed maintenance on rilling over trench following one-year post construction monitoring.
Gondola Top Station Drainage	Installed drainage infrastructure to eliminate standing water at the Gondola Top Station/Adventure Peak area.
Hellwinkle's Road	Utilized pine needle wattles anchored with rebar and angular rock at water bar outlets. Cleaned out periodically throughout construction season. Developed phased approach to addressing erosion from steep roadway.
Kids Zipline & Challenge Course	Constructed the zipline and challenge course at Adventure Peak as part of the 2015 Epic Discovery Activities. Wood chip mulch applied around entire structure; will be refurbished annually.
Maggie's Corner to Cal Dam Road Segment	Erosion resistance on road shoulders was improved and stabilized with wood chip mulch. Water bar outlets were cleaned out and water bars rebuilt.
Mid Station Canopy Tour	Constructed the Mid Station Canopy Tour as part of the 2015 Epic Discovery Activities. Wood chip application in laydown areas; trees removed. Majority of work conducted without soil disturbance.
Mombo Trail (Blue Angel Chute) Ski Run	Improved erosion resistance and stabilized slope, recontoured water bars to increase capacity. Installed infiltration swales at top of run, seeded and mulched with pine needles.
Sky Chute Ski Run	Application of both wood chip and pine needle filter berms.
Sky Express Road	Improved wood chip cover adjacent to vehicle turnaround.
Nevada Projects	
Aries Ski Run	Eliminated several rills and gullies near the top of the Aries Ski Run. Stabilized ski run with a series of mulch berms at the top of the slope. Added 2-3 inches of mulch ground cover in areas lacking effective cover. Created infiltration spreading area below the top of ski run.
Tubing Run Revisions	Constructed revised summer tubing lanes, associated grading and slope stabilization and access road to the top of the tubing lift. Existing access road permanently decommissioned and reclaimed with mulch.

*BMP maintenance project identified during BMP Effectiveness Monitoring and Maintenance Inspection by Heavenly; therefore, was not listed in the 2014 Annual Summary Report.

Table 2. Permanent BMP Implementation – Recommendations and Responses

Observations/Recommendation	Responses/Actions in 2014
Revegetation specifications need to be updated to present standards in the Lake Tahoe Basin (2004-2005).	Revegetation specifications for construction projects including the Epic Discovery Projects were site-specific and consistent with present standards.
Design of facilities to treat or infiltrate the 20-yr 1-hour event need to be site-specific (2004-2005). Infiltration areas should be flat bottomed, filled with sufficient gravel or drain rock and bordered with rocks (4 to 8" diameter).	Maintenance and reconstruction of infiltration facilities was implemented at the following number of sites: 36 in 2006, 4 in 2007, 7 in 2008, 27 in 2009, 3 in 2010, 1 in 2011, 3 in 2012, 1 in 2013, 1 in 2014, and 3 in 2015.
Trench settlement can be prevented by compaction and mounding (2004-2005).	Backfill for trenching was compacted for the Gondola Top Station Drainage Project.
Use fiber rolls for long-term slope stabilization as well as temporary erosion control (2004-2005).	Permanent fiber rolls (pine needle wattles) were installed along the roadway to the Upper Maintenance Shop above the SEZ to provide stabilization through the construction season and during spring snowmelt and runoff. Fiber rolls were also utilized on slopes for the Hellwinkle's Road and Maggie's Corner water bar outlets.
Gravel and riprap specifications should include: sizing, gradation, angularity and geotextile installation underneath (2006).	Riprap was installed with geotextile underneath for the Tubing Lift Run Revision.
Geotextile fabric installation for slope stabilization must address anchor trenches at fabric edges, overlaps, and appropriate anchor intervals for lined channels and steep slopes (2006).	Riprap was installed with geotextile underneath at the Tubing Lift Run Revision.
New prescriptions for soil amendments and revegetation need better coordination regarding timing, accessibility, and materials availability (2007).	Logs were chipped throughout the Mountain and stockpiled for later use during the construction season. Pine needles stockpiled in strategic locations for projects.
Water bars should be elongated and installed at an angle to the direction of traffic (2009).	Road maintenance was ongoing after storms in 2015 and newly constructed water bars were angled.
Road base should be applied in areas with steep slopes, water quality concerns (proximity to SEZ/stream crossings), and high traffic areas where rutting and dust may be a problem (2009).	In 2015, road base was applied on road segments near the Powderbowl Express Upper Terminal to the Sky Express Upper Terminal and applied at select switchbacks and high traffic areas throughout the Mountain.
Excess fill could be reused on-site to build up road base in depressed areas and improve drainage. (2010)	Sediment from collection areas was placed in low areas on roads during maintenance activities.
Riprap installation on steep slopes provides better stabilization than cover with mulch (2011).	Riprap (large boulders) was placed at the Tubing Lift Run Revision project.
Incorporation of wood chip mulch provides erosion resistance and effective cover (2012).	Wood chip mulch was incorporated at Powderbowl Express Lift Upper Terminal/Mombo Trail (Blue Angel Chute).
Wattles constructed by Heavenly in-house from coir fabric and pine needles on-site provide a cost effective, easily constructible alternative to straw wattles (2013).	Pine needle wattles were deployed at active construction sites, at the Upper Shop SEZ, at water bar outlets on Hellwinkle's and Cal Dam to Maggie's Corner.
Removal of sediment from collection areas can be achieved by dry vactoring to provide extra capacity (2014).	Drop inlets were cleaned in the California Main Lodge parking lot with a vactor truck.
Testing of new available BMP technology such as the "Durawattle" and "Shred Vac" help determine innovative methods to incorporate into plans (2015).	"Durawattles" were installed at the California Main Lodge and the "Shred Vac" was used to spread pine needle mulch on a test plot on a ski run with difficult access.

Table 3. Permanent BMP Effectiveness – Recommendations and Responses

Observations/Recommendation	Responses/Actions in 2014
Soil cover was not typically achieved with straw mulch after the first construction season. (2004-2005)	Pine needle and wood chip mulch continue to be very successful for providing erosion resistance; projects with extensive mulch application include the Alpine Coaster, Mombo Trail (Blue Angel Chute), Tubing Run Revisions, Gondola Top Station Drainage, Climbing Rock Wall, Cal Dam to Maggie’s Corner and ski run erosion projects.
Revegetation develops minor deficiencies after construction that requires on-going correction for several years to provide effective soil cover. (2004-2005)	Sites throughout the Mountain were revisited for mulch application. Wood chip mulch or gravel, rather than revegetation, continues to appear more effective for high traffic areas, especially road shoulders.
Fabric installed on steep slopes often slides down in small sections, even anchored securely during installation. Geotextile needs continuing maintenance if vegetation is not established. (2006)	No geotextile fabric was installed for revegetation projects in 2015.
Projects using wood chip mulch and soil amendments appear to provide longer lasting effective cover, particularly in high traffic areas. Heavenly will continue spot treatments at facility sites where barren areas occur. (2006)	Bare areas throughout the resort were refurbished with wood chip and pine needle mulch, particularly in high traffic areas. New wood chips are added throughout high traffic areas at Adventure Peak/Gondola Top Station area annually.
Sediment from outside the project area has the potential to impair the long-term effectiveness of SEZ restoration and soil stabilization projects unless follow-up work is performed. (2007)	Stabilization work was completed in 2015 on the Canyon Express Lift Lower Terminal and Operator’s Booth and Ski Runs in the vicinity, which are upslope from SEZ at Sky Deck.
Wood borders for infiltration areas and trenches are often caught and pulled out by equipment in the winter, particularly in areas alongside roadways. Rock borders keyed into the soil are a more stable option to prevent movement of gravel (2009).	Wood borders have been replaced with rock borders around all infiltration areas. Rock borders were observed to hold up well from previous years; wood borders are no longer used.
Rock armored channels routing runoff from drip lines to infiltration areas are more effective than drip line trenches. Channel low points must be well defined; otherwise, new channels erode around rocks (2009).	Channels were refurbished throughout the Resort as routine maintenance, focusing on the Heavenly Valley Creek watershed following storm events.
Water bar outlet protection using energy dissipaters and enhanced infiltration is effective (2010).	Maggie’s Corner to Cal Dam water bar outlets captured sediment and minimized down slope erosion after storm events and winter season; additional pine needle wattles were added in 2015 to the end of the outlet to provide additional sediment capture. Waterbar outlet protection was added to Hellwinkle’s Road in 2015.
Channels lined with rock or fabric accumulate sediment over time. Sediment should be routinely removed from the channels and used for fill in low areas on roads or removed from the site (2011).	Routine sediment removal remains a priority for maintaining capacity of existing sediment capture areas, especially in the Heavenly Valley Creek watershed.
On steep slopes that require pedestrian access, rock steps are effective at providing access without contributing to erosion (2012).	Rock steps were not installed on projects in 2015.
Water bar outlets, energy dissipaters and areas to enhance infiltration of road runoff accumulate sediment and need to be cleaned periodically (2013).	Water bar outlets were cleaned along the road from Cal Dam to Maggie’s Corner and Hellwinkle’s by hand in 2015, a vactor truck was used in 2014.

<p>New mulch incorporation and revegetation treatment for slope stabilization should be implemented in areas prone to erosion or with erosive soils (2014).</p>	<p>Pioneer Poma was 100% effective in 2015 following storm events; mulch was incorporated at the erosion resistance ski run projects (Sky, Ellie's, Double Down).</p>
<p>New available BMP technology such as the "Durawattle" and "Shred Vac" should be evaluated for effectiveness in erosion resistance and sediment control (2015).</p>	<p>"Durawattles" were installed at the California Main Lodge and the "Shred Vac" was used to spread pine needle mulch on a difficult to reach ski run in 2015; effectiveness of these technologies will be evaluated in 2016.</p>

Table 4. Temporary BMP Implementation – Recommendations and Responses

Observations/Recommendation	Responses/Actions in 2015
BMPs should not be disassembled prematurely, because vegetation may take several seasons to be established. Specifically, plans did not specify clearly that fiber rolls were to remain after construction (2004/2005).	Construction project winterization included removal of sediment fence (presents a skier hazard, does not typically last through the winter) at the end of the season. Fiber rolls remained in place as needed (Epic Discovery projects).
Place BMPs prior to construction, thereby ensuring readiness for summer storms or winter closures (2004-2005).	BMPs were in place prior to initiation of each 2015 construction project. Small maintenance projects and stockpiles had BMPs installed per the CERP (Directional Signage Upgrades, Sky Meadows Creek Crossing).
Clean out and repair BMPs after a runoff event (2004-2005).	Repairs to and maintenance of water bars, rock lined channels and sediment basins throughout the resort.
Maintain BMPs through the life of the project, again to ensure readiness for summer storms or winter closures (2004-2005).	Temporary BMPs were in place at all active construction sites during the precipitation events and winterization measures were implemented prior to snowfall.
Temporary BMPs may concentrate runoff to a discharge point (sediment fence, fiber rolls, temporary division swales, temporary culverts, and stream diversion). Provide energy dissipation and stabilization at the point where the temporary BMPs terminate (2006).	Sediment barriers were used for Adventure Peak Epic Discovery projects and the Gondola Top Station Drainage project, mostly parallel to the slope with outlet protection in the form of a curved straw wattle or sediment fence.
If a construction project initially proposed for a single season must be extended over the winter, winterization plans should be added to the design documents (2006).	Construction was completed on projects started in 2015; no winterization plans were required. Alpine Coaster continued construction over snow with no soil disturbance.
Maintenance of sediment fence can be reduced by using proper T-Posts for support and adequate burial of fabric edges, particularly for longer-term projects. Project designs need to allow alternative fencing at sites with substantial rock or limited access (2007).	Fiber rolls were often used in lieu of sediment fence in 2015. Where sediment fence was used, edges were properly buried, reducing the need for frequent maintenance.
Dust control for soil stockpiles on the mountain can be improved. If water is unavailable from the snowmaking system, stockpiles need to be covered with plastic sheeting (2007).	Primarily, stockpiles were covered in a timely manner and were only partially uncovered when in use for construction (Alpine Coaster and Gondola Top Station Drainage). Effort was made to protect stockpiles throughout the mountain.
Location of sediment barriers (silt fence or fiber rolls) shown on project plans needs to be parallel to the slope or with energy dissipaters along the flow line and at discharge points (2008).	Sediment barriers were shown on the plans for the Adventure Peak Summer Activity projects and the Gondola Top Station Drainage. Installation was typically per plans.
Staging areas should have Temporary BMPs in place before materials stockpiled on-site (2009).	BMPs were installed prior to use at staging areas on the Mountain.
Rope fencing for road delineation is typically removed prior to the winter season. Vehicles and equipment should observe road corridors when fencing is not in place (2011).	Crews were reminded at the beginning of the construction season and throughout the construction season to observe delineated road corridors.
Communication with outside contractors regarding importance of observing BMPs (2012).	Outside contractors were diligent in respecting construction equipment boundaries. Very little impact outside rope fencing was observed.
Wattles constructed by Heavenly in-house from coir fabric and pine needles can be used in lieu of straw wattles (2013).	Wattles were deployed at staging areas to protect stockpiles, at the Upper Shop SEZ, and at water bar outlets from Maggie’s Corner to Cal Dam and Hellwinkle’s.
Employee training on BMPs including field installation methods should be conducted for all new employees	The BMP Breakfast continues to be held at the start of the construction season and featured a field element in 2015

and as a refresher for continuing employees (2014).	which will be repeated every other year.
Weekly reports completed by field crew supervisors can be beneficial in tracking materials used, types of BMPs installed and manpower required to help inform planning decisions (2015).	Weekly revegetation and materials treatment tracker was established in 2015; viability of the tracker will be evaluated in 2016.

Table 5. Temporary BMP Effectiveness – Recommendations and Responses

Observations/Recommendation	Responses/Actions in 2015
Disturbance outside construction limits (2004-2005).	Heavenly employees and outside contractors were diligent in respecting construction equipment boundaries. Very little impact outside rope fencing was observed.
Exposed soils with potential for sediment delivery to SEZ (2006).	Sediment barriers were generally installed and routinely maintained.
Dust control measures for stockpiles are more effective when snowmaking water is available to wet down soils. Plastic sheeting is less effective and is difficult to keep anchored in windy conditions, but may be the only option in some areas (2007).	No projects in 2015 were located in especially wind prone areas so alternatives to plastic sheeting were not required.
Sediment fence is effective in containing excavated stockpiled soils. If stockpiles are larger than initially anticipated, the fence must be extended (2008).	Stockpiles were generally contained with fiber rolls. In 2015, stockpiles were typically soil. Stockpiles were in continuous use so fiber rolls were adjusted accordingly.
Despite proper installation, burial of fabric edges does not always prevent wind from pulling the fabric out, and metal mesh backing does not always prevent holes and blowing fabric. Prompt inspection and repair of sediment fence is almost always needed after windy conditions (2010).	Sediment fence was used at Epic Discovery projects and was inspected and repaired following storm events on the Mountain.
Fiber rolls are most effective when keyed into the native soil and anchored securely (2011).	Fiber rolls in construction areas were keyed in and staked per the plans. Fiber rolls at the base of stockpiles were anchored with rocks or sandbags if they will be in place for a length of time.
Communication to all outside contractors and subcontractors to convey importance of observing and maintaining temporary BMPs around an active construction site (2012).	Outside contractors were diligent in respecting construction equipment boundaries. Very little impact outside rope fencing was observed.
Wattles constructed by Heavenly in-house from coir fabric and pine needles appear to be an effective alternative to typical straw wattles (2013).	Wattles were deployed at staging areas to protect stockpiles, at the Upper Shop SEZ, and at water bar outlets from the Cal Dam to Maggie's Corner and Hellwinkle's.
Pine needle wattles constructed by Heavenly in-house can be used in erosion prone areas but usually need to be replaced annually (2014).	Pine needle wattles were replaced at the Upper Shop SEZ and at water bar outlets from the Cal Dam to Maggie's Corner in 2015.
Weekly reports completed by field crew supervisors can help determine effective BMPs based on material availability, manpower required and type of BMP most often utilized (2015).	Weekly revegetation and materials treatment tracker was established in 2015; viability of the tracker will be evaluated in 2016.

Table 6. 2016 Annual Work List Projects & Related BMPs

Location	Treatment
Priority Projects for 2015 in California	
Adventure Peak Signage	Install directional and interpretive signage throughout Adventure Peak Area as part of 2016 Epic Discovery Activities. Temporary BMPs to be installed during construction.
Complete Waterfall Lift Removal Top Station Regrading (Top of Epic Mix Race Course)	Regrade top station area. Fill and stabilize as shown on approved project plans (2015 project).
Discovery Forest/Black Bear Challenge Course Gear-up Deck	Construct gear-up deck and connecting trails as part of 2016 Epic Discovery Activities. Temporary BMPs to be installed during construction.
Family Loop Trail and Animal Abilities Exhibits	Construct trail and exhibits and permanent BMPs per plans. Temporary BMPs to be installed during construction.
Gondola Top Station Enclosure	Enclose ground floor of Gondola Top Station for storage. Install permanent BMPs in accordance with plans.
Hellwinkle's Road	Complete Phase II: apply dust palliative and water bar adjustments per plans. Utilize pine needle wattles and angular rock. Install temporary BMPs during construction.
Mid Station Canopy Tour Weather Shelters	Construct the Mid Station Canopy Tour Weather Shelters as part of the 2016 Epic Discovery Activities.
Road to Canyon Express Top Station	Rehab water bars at failure points and convert into infiltration swales through soil loosening, wood chip incorporation.
Sky Deck Revegetation	Restoration and planting of shade tolerant meadow/riparian species.
Tamarack Express Lift to Adventure Peak Hiking Trail	Construct trail to from Tamarack Express to Adventure Peak and East Peak Lodge (out of Basin segment).
Top of Gondola to Tamarack Lodge Trail	Repave existing walking path from Top of Gondola to Tamarack Lodge. Refurbish effective cover around walking path. Temporary BMPs to be installed during construction.
Welcome Area at Top of Gondola	Construct Welcome Area at base of stairs at Gondola Top Station, remove existing Adventure Peak Grill seating area concrete surface. Restore paved area with wood chips.
Priority Projects for 2015 in Nevada	
Decommission Roads and Turnaround Areas	Phased over multiple years: Year 1 spread chips on existing construction access roads (completed in 2015); Year 2 till and add mulch; Year 3 complete project.
East Peak Canopy Tour	Construct East Peak Canopy Tour as part of 2016 Epic Discovery Activities. Also construct connecting trails and weather shelters and permanent BMPs per plans.

Appendix B

BMP Effectiveness Monitoring Report:

3rd & 4th Quarter 2015 Water Year & 1st Quarter 2016 Water Year

Heavenly Mountain Resort

BMP Effectiveness Monitoring

3rd & 4th Quarter 2015 Water Year &
1st Quarter 2016 Water Year

Summary Report

April 27, 2016

Prepared for:

Cardno
295 Highway 50, Suite 1
P.O. Box 1533
Zephyr Cove, NV 89448

Prepared by:



Resource Concepts Inc.
340 N. Minnesota St.
Carson City, NV 89703-4152

Heavenly Mountain Resort
BMP Effectiveness Monitoring

3rd & 4th Quarter 2015 Water Year &
1st Quarter 2016 Water Year
Summary Report

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Prepared by:

RESOURCE CONCEPTS, INC.
340 North Minnesota Street
Carson City, Nevada 89703-4152
Office: (775) 883-1600
Fax: (775) 883-1656
www.rci-nv.com

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Attachments

- Attachment A – BMP Monitoring Rule Set
- Attachment B – California Evaluation Sheets
- Attachment C – Nevada Evaluation Sheets

File Doc: 2016-04-27 Final 2015 Ann Rpt App B-Facilities BMP Rpt 07611-12 Cardno.doc
April 27, 2015

Introduction

Resource Concepts, Inc. (RCI) has been contracted by Cardno to monitor Best Management Practices (BMPs) performance at Heavenly Mountain Resort (Heavenly) since 2005. The monitoring program addresses BMP monitoring for compliance with the resort Master Plan based on requirements of the USDA Forest Service (USFS), Tahoe Regional Planning Agency (TRPA) and the Lahontan Regional Water Quality Control Board (Lahontan) Waste Discharge Requirements (Board Order No. R6T-2015-0021, WDID No. 6A090033000).

In keeping with the past decade of monitoring, the RCI Field Team used the monitoring protocols outlined in BMP Effectiveness Monitoring, Chapter 5, Heavenly Mountain Resort Environmental Monitoring Program dated December 19, 2005. In 2007, the Environmental Monitoring Program was revised and approved in conjunction with the Master Plan Amendment EIR/EIS/EIS (Appendix 3.1-D) and previous Board Order No. R6T-2003-003.

Following completion of the Epic Discovery EIR/EIS/EIS in February 2015, Waste Discharge Requirements were updated again by Board Order No. R6T-2015-0021. The revised requirements include updates to the approved Environmental Monitoring Program. Monitoring was conducted in 2015 under the previously approved protocol with the understanding that an updated program would be implemented in 2016. An updated BMP Effectiveness Monitoring Program is discussed in the “BMP Effectiveness Monitoring 2015 Annual Report & Construction Season Summary;” this report is Appendix B of the Annual Report.

The goal of the BMP Effectiveness Monitoring Program is to assess temporary BMPs at on-going construction sites, permanent BMPs after construction completion, and “BMP Needs” for continued resource protection at facilities constructed prior to 2000. BMPs are structural and non-structural measures used to reduce soil movement and resist erosion, control surface runoff, and improve runoff water quality. BMPs at Heavenly are applied to roads, ski runs, construction projects, and facilities such as buildings, utilities, and parking lots.

- Temporary BMP evaluations (Form HV-1) are generally conducted biweekly during construction.
- Permanent BMP evaluations (Form HV-2) are conducted upon construction completion, at one-year post-construction, and at three-year intervals after construction completion.
- Both types of BMPs are evaluated following storm events.

BMPs are monitored for both implementation and effectiveness. BMP “implementation” concerns whether plans/specifications are adequate for resource protection, and if improvements are constructed according to design. BMP “effectiveness” is determined from observed or estimated erosion and sediment transport at sites evaluated. Results of all assessments are entered into an ACCESS database and digital photos are uploaded to a photodocumentation database.

The 2015 construction season at Heavenly began following snowmelt in late May and ended with the first snow received in early November. Key information provided in the report includes a summary of all monitoring completed, the BMP Monitoring Rule Set (Attachment A), datasheets for evaluations on California sites (Attachment B), and datasheets for evaluations performed on Nevada sites (Attachment C). As explained in previous reports, the monitoring period coincides with the seasonal operation of the

Resort, and does not correspond directly with the Water Year reporting timeframe indicated in the Waste Discharge Requirements, as noted below:

- > The first quarter of the 2015 Water Year (October 1 through December 31, 2014) was reported previously as part of the 2014 Construction Season Summary (RCI, April 2014).
- > No evaluations were conducted during the second quarter of the 2015 Water Year (January 1 through March 31, 2015) due to snow.
- > Evaluations began during the third quarter of the 2015 Water Year (April 1 through June 30, 2014); however, since only one day of monitoring was conducted in June, this evaluation is included with the remainder of the evaluations discussed below.
- > Evaluations conducted during the 4th quarter of the 2015 Water Year (July 1 through September 30, 2015) and the 1st quarter of the 2016 Water Year (October 1 through December 31, 2016) were combined into one report to incorporate the logical conclusion of summer maintenance and construction projects.

Assessments

Over the 2015 construction season, the RCI Field Team performed BMP evaluations at 27 different sites: 78 evaluations total; 74 within the Lake Tahoe Basin and 4 outside the Lake Tahoe Basin.

Temporary BMP monitoring (Form HV-1) was performed at the following 8 sites:

- Alpine Coaster – Constructed as part of the of the 2015 Adventure Peak Epic Discovery Activities; top and bottom station buildings were constructed along with uphill and downhill coaster tracks. Minor ground disturbance as a result of track installation; bare areas covered with pine needle or wood chip mulch. Drip line infiltration trenches and a basin were installed at loading/operator buildings.
- Tubing Run Revisions – Revisions to the summer tubing lanes to increase slope required grading and slope stabilization. A new access road was installed to the Tubing Lift Top Station; the old access road was decommissioned with pine needle coverage.
- Kids Zipline & Challenge Course – Constructed as part of the of the 2015 Adventure Peak Epic Discovery Activities, the low challenge course and short zipline was constructed for smaller visitors in mind. Wood chip mulch applied in all exposed soil; entire challenge course disassembled and stored for winter operations.
- Gondola Top Station Drainage – Drainage improvements were installed to eliminate standing water from snowmelt runoff and stormwater in the Adventure Peak area from the bottom of the Tubing Run to the Gondola Top Station. Included installation of swales, infiltration areas, and PVC piping to route drainage flows under the Gondola Top Station area to existing basins.
- Climbing Rock Wall – Adjacent to Tamarack Lodge as part of the 2015 Adventure Peak Epic Discovery Activities, rock wall constructed of rebar frame and spray concrete. Flat, stable site will receive annual layer of wood chip mulch.
- Mid Station Canopy Tour – Constructed as part of the of the 2015 Adventure Peak Epic Discovery Activities; multiple, elevated, interconnected ziplines and aerial bridges within the forest canopy. Some tree removal was required and anchoring to trees. Ladders and rappel equipment will provide access to/from platforms, little ground disturbance required for construction. Wood chip mulch added in laydown areas.

- The Sky Base Staging Area, East Peak Staging Area, and Boulder Parking Lot Staging Area have been used periodically for storage of logs, wood chips, pine needles, riprap, and construction equipment in the past. The Sky Base Staging Area was restored in 2014; therefore, it no longer serves as a staging area. However, the road is used as an access to lift terminals in the vicinity so the Sky Meadows Stream Crossing has been added to the temporary BMP inspection list. Wood chips were stockpiled at the East Peak Staging Area and green waste and pine needles were stored at the Boulder Parking Lot Staging Area. Since stockpiles are not soil materials, wattles were not necessary. All soil stockpiles associated with active construction were covered and protected with wattles during the 2015 construction season.

Permanent BMP monitoring (Form HV-2) included the following 19 project sites:

- | | |
|--------------------------------------|------------------------------------|
| 1. Angel's Roost Cell Tower | 11. Mombo Trail (Blue Angel Chute) |
| 2. Aries Ski Run | 12. Multi-Rider Zipline |
| 3. Canyon Express Lower Terminal | 13. Nevada Trail Ski Run |
| 4. Double Down Ski Run | 14. Olympic Express Lower Terminal |
| 5. Ellie's Ski Run | 15. Pioneer Poma |
| 6. Face Patrol (277) | 16. Sky Chute Ski Run |
| 7. Galaxy Wetland | 17. Sky Express - Lower Terminal |
| 8. Hellwinkle's Road Segment | 18. Sky Express Road |
| 9. Lakeview Water System | 19. Upper Maintenance Shop |
| 10. Maggie's to Cal Dam Road Segment | |

Tables 1 and 2 provide a summary of types of monitoring and locations evaluated to date.

Table 1. Types of Evaluations Performed

CALIFORNIA SITES		NEVADA SITES	
Lake Tahoe Basin		Lake Tahoe Basin	
Permanent BMP Evaluations	28	Permanent BMP Evaluations	2
Temporary BMP Evaluations	30	Temporary BMP Evaluations	14
Carson River Basin		Carson River Basin	
Permanent BMP Evaluations	0	Permanent BMP Evaluations	4
Temporary BMP Evaluations	0	Temporary BMP Evaluations	0
Total BMP Sites Evaluated – 27		Total Evaluations Performed – 78	

Table 2. Sites Evaluated by Location

CALIFORNIA SITES	NEVADA SITES
Lake Tahoe Basin	
1. Angel's Roost Cell Tower	1. Alpine Coaster
2. Canyon Express Lower Terminal	2. Multi-Rider Zipline
3. Climbing Rock Wall	3. Olympic Express Lower Terminal
4. Directional Signage Upgrades	4. Tubing Run Revisions
5. Double Down Ski Run	

6. Ellie's Ski Run	
7. Face Patrol (277)	
8. Gondola Top Station Drainage	
9. Hellwinkle's Road Segment	
10. Kids Zipline & Challenge Course	
11. Lakeview Water System	
12. Maggie's to Cal Dam Road Segment	
13. Mid Station Canopy Tour	
14. Mombo Trail (Blue Angel Chute)	
15. Pioneer Poma	
16. Sky Chute Ski Run	
17. Sky Deck Stream Crossing	
18. Sky Express - Lower Terminal	
19. Sky Express Road	
20. Upper Maintenance Shop	
Carson River Basin	Carson River Basin
None	1. Aries Ski Run
	2. Galaxy Wetland
	3. Nevada Trail Ski Run

Implementation and Effectiveness Scoring

The database scoring is based on a regional “rule set” developed for the Region 5 BMPEP program (USDA Forest Service, 2002). It has been modified slightly to correspond with the Heavenly rating system (included in Attachment A). Scoring results for the data collected for permanent and temporary BMPs during are summarized in Tables 3 and 4. Evaluation forms for California and Nevada sites are included in Attachments B and C, respectively.

Temporary BMPs

All 44 of the temporary BMP evaluations conducted at 8 sites during the 2015 construction season resulted in “Implemented” (I) and “Effective” (E) scores during biweekly and post-storm inspections. Table 3 provides locations, dates and scores for Temporary BMP Evaluations.

Table 3. Temporary BMP Evaluation Summary

Temporary BMP Evaluations	Survey Date	Implementation	Effectiveness
Lake Tahoe Basin - California			
1. Climbing Rock Wall	6/19/2015*	I	E
2. Climbing Rock Wall	7/2/2015*	I	E
3. Climbing Rock Wall	7/16/2015*	I	E
4. Climbing Rock Wall	7/31/2015	I	E
5. Climbing Rock Wall	8/12/2015	I	E
6. Climbing Rock Wall	8/24/2015	I	E
7. Climbing Rock Wall	9/10/2015	I	E
1. Directional Signage Upgrades	7/16/2015*	I	E
2. Directional Signage Upgrades	7/31/2015	I	E
3. Directional Signage Upgrades	9/10/2015	I	E
4. Directional Signage Upgrades	9/25/2015	I	E

Temporary BMP Evaluations	Survey Date	Implementation	Effectiveness
Lake Tahoe Basin - California			
1. Gondola Top Station Drainage	10/8/2015*	I	E
2. Gondola Top Station Drainage	10/22/2015	I	E
1. Kids Zipline & Challenge Course	6/19/2015*	I	E
2. Kids Zipline & Challenge Course	7/2/2015*	I	E
3. Kids Zipline & Challenge Course	7/16/2015*	I	E
4. Kids Zipline & Challenge Course	7/31/2015	I	E
5. Kids Zipline & Challenge Course	8/12/2015	I	E
6. Kids Zipline & Challenge Course	8/24/2015	I	E
7. Kids Zipline & Challenge Course	9/10/2015	I	E
1. Mid Station Canopy Tour	8/12/2015	I	E
2. Mid Station Canopy Tour	8/24/2015	I	E
3. Mid Station Canopy Tour	9/10/2015	I	E
4. Mid Station Canopy Tour	9/25/2015	I	E
5. Mid Station Canopy Tour	10/8/2015*	I	E
6. Mid Station Canopy Tour	10/22/2015	I	E
1. Sky Meadows Stream Crossing	7/2/2015*	I	E
2. Sky Meadows Stream Crossing	7/16/2015*	I	E
3. Sky Meadows Stream Crossing	7/31/2015	I	E
4. Sky Meadows Stream Crossing	8/12/2015	I	E
Lake Tahoe Basin - Nevada			
1. Alpine Coaster	6/19/2015*	I	E
2. Alpine Coaster	7/2/2015*	I	E
3. Alpine Coaster	7/16/2015*	I	E
4. Alpine Coaster	7/31/2015	I	E
5. Alpine Coaster	8/12/2015	I	E
6. Alpine Coaster	8/24/2015	I	E
7. Alpine Coaster	9/10/2015	I	E
8. Alpine Coaster	9/25/2015	I	E
9. Alpine Coaster	10/8/2015*	I	E
10. Alpine Coaster	10/22/2015	I	E
1. Tubing Run Revisions	6/19/2015*	I	E
2. Tubing Run Revisions	7/2/2015*	I	E
3. Tubing Run Revisions	7/16/2015*	I	E
4. Tubing Run Revisions	7/31/2015	I	E
Carson River Basin - California			
None			
Carson River Basin - Nevada			
None			

* – Post-storm event inspection

Permanent BMPs

During the 2015 construction season, 34 Permanent BMP evaluations were conducted at 19 sites and all scores were “Implemented” (I) and “Effective” (E). Evaluations are summarized in Table 4.

Table 4. Permanent BMP Evaluation Summary

Permanent BMP Evaluations	Survey Date	Survey Type	Implementation	Effectiveness
Lake Tahoe Basin - California				
1. Angel's Roost Cell Tower	10/8/2015	3 Yr Post Construction	I	E
2. Canyon Express Lower Terminal	8/24/2015	Follow-up	I	E
3. Double Down Ski Run	8/24/2015	Follow-up	I	E
4. Ellie's Ski Run	8/24/2015	Follow-up	I	E
5. Face Patrol (277)	7/2/2015	1 Yr Post Construction	I	E
6. Face Patrol (277)	7/16/2015	Post Storm Survey	I	E
7. Face Patrol (277)	7/31/2015	Follow-up	I	E
8. Face Patrol (277)	10/8/2015	Post Storm Survey	I	E
9. Hellwinkle's Road Segment	7/31/2015	Routine	I	E
10. Hellwinkle's Road Segment	9/10/2015	Routine	I	E
11. Hellwinkle's Road Segment	9/25/2015	Routine	I	E
12. Hellwinkle's Road Segment	10/8/2015	Post Storm Survey	I	E
13. Hellwinkle's Road Segment	10/22/2015	Follow-up	I	E
14. Lakeview Water System	10/8/2015	6 Yr Post Construction	I	E
15. Maggie's Road Segment	7/2/2015	Post Storm Survey	I	E
16. Maggie's Road Segment	7/16/2015	Post Storm Survey	I	E
17. Maggie's Road Segment	7/31/2015	Routine	I	E
18. Maggie's Road Segment	8/12/2015	Follow-up	I	E
19. Maggie's Road Segment	8/24/2015	Routine	I	E
20. Maggie's Road Segment	9/10/2015	Routine	I	E
21. Maggie's Road Segment	9/25/2015	Routine	I	E
22. Maggie's Road Segment	10/8/2015	Post Storm Survey	I	E
23. Mombo Trail (Blue Angel Chute)	10/22/2015	Follow-up	I	E
24. Pioneer Poma	7/2/2015	Post Storm Survey	I	E
25. Sky Chute Ski Run	8/24/2015	Follow-up	I	E
26. Sky Express Lower Terminal	8/24/2015	Follow-up	I	E
27. Sky Express Road	8/24/2015	Follow-up	I	E
28. Upper Maintenance Shop	10/8/2015	Post Storm Survey	I	E
Lake Tahoe Basin - Nevada				
1. Multi-Rider Zipline Launch Tower	10/8/2015	Post Storm Survey & 1 Yr Post Construction	I	E
2. Olympic Express Lower Terminal	10/8/2015	Post Storm Survey	I	E

Permanent BMP Evaluations	Survey Date	Survey Type	Implementation	Effectiveness
Carson River Basin - California				
None			I	E
Carson River Basin - Nevada				
1. Aries Ski Run	8/24/2015	Follow-up	I	E
2. Galaxy Wetland	6/19/2015	9 Yr Post Construction	I	E
3. Nevada Trail Ski Run	6/19/2015	Post Storm Survey	I	E
4. Nevada Trail Ski Run	10/8/2015	Post Storm Survey	I	E

Attachment A

BMP Monitoring Rule Set

BMP Monitoring Rule Set – Adapted from Region 5 2002 BMPEP Rule Set

Implementation (2 questions)	Effectiveness (5 to 7 questions)
Implemented All questions answered “meets/exceeds” and/or less than ½ of the questions are “minor departure”. None are “major” or “repeated” departure. <i>(Note: HV protocols have only two questions so both must be answered “meets/exceeds” to score Implemented.)</i>	Effective All questions answered “1” or “2” and less than ½ the questions are answered “2”.
Minor Departure Greater than or equal to ½ the questions are answered “minor” departure. <i>(Note: HV protocols have only two questions so “minor departure” means one “meets/exceeds” and one “minor departure”).</i>	At Risk Greater than or equal to ½ the questions are answered as “2” or “3”. No more than one question answered as “3”.
Not Implemented At least one question answered “major” or “repeated” departure or both questions answered “minor departure”.	Not Effective Two or more questions answered as “3”.

Attachment B

California Evaluation Sheets

UTM Zone	11
Easting	247760
Northing	4313741

Form HV1: Temporary BMPs for On-going Construction

ID# 586

Selection Code S03

Forest LTBMU District State CA

Construction Site Name Climbing Rock Wall

Township 12N Range 18E Section 1

Date of Project Start 6/15/2015

Survey Date/Time 6/19/2015

6th Field HUC Watershed CA-1

Reviewer(s) K. Roaldson, K. Flannagan, E. Harmon

Construction Foreman Bill Brown

Construction Type:	Building Structure	Project Is:	New Construction	Other (Describe)	Ropes Course/Climbing Structure
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General Information

Name Of Plans Adventure Peak Epic Discovery Activities Job No. 15-102.1

Date 4/30/2015 Rev Date NA

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Straw wattles to prevent runoff from exiting construction site. Exclusion fencing to minimize disturbance and soil compaction. Concrete washout for spray concrete; materials management.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns	3=Major departure from contract and/or major resource concerns
2=Minor departure from contract and/or minor resource concerns	4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1

1 = Meets / Exceeds contract requirements and/or no resource concerns	3 = Major departure from contract and/or major resource concerns
2 = Minor departure from contract and/or minor resource concerns	4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score: 1 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
---	---	---	--------------------------

b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
---	---	--	--------------------------

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

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|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Rebar installed for construction of climbing wall. Temporary BMPs include straw wattle below active areas on flat site, no erosion after ~1" rain storm. Delineation fencing installed.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Straw wattles to prevent runoff from exiting construction site. Exclusion fencing to minimize disturbance and soil compaction. Concrete washout for spray concrete; materials management.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

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|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Framing work in progress on climbing rock wall. Temporary BMPs include straw wattle below active areas on flat site, no erosion after storm event. Delineation fencing installed. Very Clean site

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start Survey Date/Time

6th Field HUC Watershed

Reviewer(s) Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Straw wattles to prevent runoff from exiting construction site. Exclusion fencing to minimize disturbance and soil compaction. Concrete washout for spray concrete; materials management.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

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|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Spray concrete work in progress on climbing rock wall. Temporary BMPs include straw wattle below active areas on flat site, Delineation fencing installed. Good housekeeping and materials management of spray concrete, site is very clean

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Straw wattles to prevent runoff from exiting construction site. Exclusion fencing to minimize disturbance and soil compaction. Concrete washout for spray concrete; materials management.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

<input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event.	<input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.	<input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.	<input type="radio"/> NA
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

<input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	<input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.	<input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.	<input type="radio"/> NA
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Spray concrete work in progress on climbing rock wall. Temporary BMPs include straw wattle below active areas on flat site, Delineation fencing installed. Concrete batch production on-site, concrete washouts in place. Clean site and good management of concrete materials.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Straw wattles to prevent runoff from exiting construction site. Exclusion fencing to minimize disturbance and soil compaction. Concrete washout for spray concrete; materials management.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

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|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Concrete spray work complete, finish work in progress. Temporary BMPs include straw wattle below active areas on flat site, Delineation fencing installed. Good housekeeping and materials management of spray concrete, site is very clean following this work.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start Survey Date/Time

6th Field HUC Watershed

Reviewer(s) Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Straw wattles to prevent runoff from exiting construction site. Exclusion fencing to minimize disturbance and soil compaction. Concrete washout for spray concrete; materials management.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

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|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Climbing rock wall nearly complete, placement of handholds and climbing systems in progress. Temporary BMPs include straw wattle below active areas on flat site, delineation fencing in place still. Thick layer of wood chips placed around and beneath entire structure.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start Survey Date/Time

6th Field HUC Watershed

Reviewer(s) Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.
 Straw wattles to prevent runoff from exiting construction site. Exclusion fencing to minimize disturbance and soil compaction. Concrete washout for spray concrete; materials management.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

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|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|--|---|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Climbing rock wall complete and open to public. Thick layer of wood chips placed around and beneath entire structure.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start Survey Date/Time

6th Field HUC Watershed

Reviewer(s) Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.
 BMPs to minimize soil disturbance; pine needle wattle to protect areas downslope from construction activity. Erosion resistance with pine needle mulch in disturbed areas.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
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 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
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Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

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| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Upgrade of existing signs throughout the Mountain protected with pine needle wattles during construction and soil disturbing activities. No evidence of erosion following ~1" storm event.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

<input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event.	<input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.	<input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.	<input type="radio"/> NA
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

<input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	<input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.	<input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.	<input type="radio"/> NA
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Upgrade of existing signs throughout the Mountain protected with pine needle wattles during construction and soil disturbing activities. Locations where work has been completed fully covered with pine needle mulch and erosion resistance/effective cover achieved.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start Survey Date/Time

6th Field HUC Watershed

Reviewer(s) Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.
 BMPs to minimize soil disturbance; pine needle wattle to protect areas downslope from construction activity. Erosion resistance with pine needle mulch in disturbed areas.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|--|---|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Upgrade of existing signs throughout the Mountain protected with pine needle wattles during construction and soil disturbing activities. Locations where work has been completed fully covered with pine needle mulch and erosion resistance/effective cover achieved.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start Survey Date/Time

6th Field HUC Watershed

Reviewer(s) Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.
 BMPs to minimize soil disturbance; pine needle wattle to protect areas downslope from construction activity. Erosion resistance with pine needle mulch in disturbed areas.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
|---|--|--|--------------------------|

3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|--|---|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Upgrade of existing signs throughout the Mountain protected with pine needle wattles during construction and soil disturbing activities. Locations where work has been completed fully covered with pine needle mulch and erosion resistance/effective cover achieved.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe) Infiltration & Conveyance BMPs

General Information

Name Of Plans

Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Wattles to protect stockpiled materials during trenching, equipment exclusion zones delineated.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

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|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction in progress on swale below Tubing Run, wood chips being spread throughout, wattles in place below active site. Trenching for PVC pipe installatin adjacent to Gondola Top Station, wattles in place and overlapped below stockpiled trench material. No evidence of erosion or ponding after ~1" rain event.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans

Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Wattles to protect stockpiled materials during trenching, equipment exclusion zones delineated.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

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|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|--|---|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction complete on infiltration areas, swale, piping and drop inlet at Gondola Top Station. Disturbed areas covered with wood chip mulch.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Pine needle wattles to prevent sediment movement, needs erosion resistance on bare areas following construction.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

<input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event.	<input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.	<input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.	<input type="radio"/> NA
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

<input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	<input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.	<input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.	<input type="radio"/> NA
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction in progress, straw wattles in place near active construction, construction corridor delineated. No evidence of erosion or ponding following ~1" rain event.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Pine needle wattles to prevent sediment movement, needs erosion resistance on bare areas following construction.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
|---|--|--|--------------------------|

3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|--|---|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction in progress, straw wattles in place near active construction, construction corridor delineated.No evidence of erosion or ponding following ~0.5" rain event.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start Survey Date/Time

6th Field HUC Watershed

Reviewer(s) Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Pine needle wattles to prevent sediment movement, needs erosion resistance on bare areas following construction.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

<input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event.	<input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.	<input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.	<input type="radio"/> NA
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

<input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	<input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.	<input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.	<input type="radio"/> NA
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction in progress, straw wattles in place near active construction, construction corridor delineated.No evidence of erosion or ponding following ~1" rain event.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Pine needle wattles to prevent sediment movement, needs erosion resistance on bare areas following construction.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
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 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction in progress, straw wattles in place near active construction, construction corridor delineated.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Pine needle wattles to prevent sediment movement, needs erosion resistance on bare areas following construction.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
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 3=Major departure from contract and/or major resource concerns
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2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
|---|--|--|--------------------------|

3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|--|---|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
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- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction in progress, straw wattles in place near active construction, construction corridor delineated.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Pine needle wattles to prevent sediment movement, needs erosion resistance on bare areas following construction.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

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2) Are BMP measures constructed according to contract design specifications?

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Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

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b) Cut and fill slope protection (including surface erosion and slope failure potential)

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2) Runoff infiltration and drainage control system effectiveness.

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a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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|--|--|--|--------------------------|
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|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
|---|--|--|--------------------------|

3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|--|---|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction nearly complete, straw wattles in place near active construction, construction corridor delineated. Wood chips placed on all bare soils.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Pine needle wattles to prevent sediment movement, needs erosion resistance on bare areas following construction.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- | | | | |
|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction complete and open to the public. Wood chips placed on all bare soils.

UTM Zone	11
Easting	247137
Northing	247137

Form HV1: Temporary BMPs for On-going Construction

ID# 635

Selection Code S03

Forest LTMBU District State CA

Construction Site Name Mid Station Canopy Tour

Township 12N Range 18E Section 1

Date of Project Start 8/10/2015

Survey Date/Time 8/12/2015

6th Field HUC Watershed CA-1

Reviewer(s) K. Roaldson, K. Flannagan, E. Harmon

Construction Foreman Bill Brown

Construction Type: Other Project Is: New Construction Other (Describe) Ropes Course/Climbing Structure

General Information

Name Of Plans Adventure Peak Epic Discovery Activities Job No. 15-102.1

Date 4/30/2015 Rev Date NA

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Minor soil disturbance expected, needs construction corridor delineation, minimization of walking paths outside of corridor, erosion resistance on bare areas following construction.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist. 1

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns	3=Major departure from contract and/or major resource concerns
2=Minor departure from contract and/or minor resource concerns	4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications? 2

1 = Meets / Exceeds contract requirements and/or no resource concerns	3 = Major departure from contract and/or major resource concerns
2 = Minor departure from contract and/or minor resource concerns	4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score: 1 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|---|--|--|--------------------------|
| <input type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input checked="" type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|---|--|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Work on tree platforms and ziplines in progress, construction corridor delineated, marked trees have been cut within the corridor. Minor resource concerns.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Minor soil disturbance expected, needs construction corridor delineation, minimization of walking paths outside of corridor, erosion resistance on bare areas following construction.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
|---|--|--|--------------------------|

3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|---|--|--|--------------------------|
| <input type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input checked="" type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|---|--|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Work on tree platforms and ziplines in progress, construction corridor delineated, marked trees have been cut within the corridor.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start Survey Date/Time

6th Field HUC Watershed

Reviewer(s) Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Minor soil disturbance expected, needs construction corridor delineation, minimization of walking paths outside of corridor, erosion resistance on bare areas following construction.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

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|---|--|--|--------------------------|
| <input type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input checked="" type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Work on tree platforms and ziplines in progress, construction corridor delineated, marked trees have been cut within the corridor.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#

Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Minor soil disturbance expected, needs construction corridor delineation, minimization of walking paths outside of corridor, erosion resistance on bare areas following construction.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
(BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

<input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event.	<input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.	<input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.	<input type="radio"/> NA
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

<input type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	<input checked="" type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.	<input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.	<input type="radio"/> NA
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Work on tree platforms and ziplines in progress, construction corridor delineated, marked trees have been cut within the corridor.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Minor soil disturbance expected, needs construction corridor delineation, minimization of walking paths outside of corridor, erosion resistance on bare areas following construction.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

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|---|--|--|--------------------------|
| <input type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input checked="" type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|---|--|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Work on tree platforms and ziplines in progress, construction corridor delineated, no evidence of erosion related to construction after ~1" event.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start Survey Date/Time

6th Field HUC Watershed

Reviewer(s) Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.
 Minor soil disturbance expected, needs construction corridor delineation, minimization of walking paths outside of corridor, erosion resistance on bare areas following construction.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|---|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- | | | | |
|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
|---|--|--|--------------------------|

3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|---|--|--|--------------------------|
| <input type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input checked="" type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|---|--|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Work completed on tree platforms and ziplines, wood chips placed on disturbed soil around laydown areas.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start Survey Date/Time

6th Field HUC Watershed

Reviewer(s) Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Temp. BMPs including weighted pine needle wattles across stream crossing to prevent sediment migration.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
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 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
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 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

- No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.
- Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.
- On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.
- NA

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.
- NA

3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.
- NA

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Weighted pine needle and straw wattles in place at stream crossing, placed in anticipation of work on ski runs and terminals requiring access via the stream crossing.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start Survey Date/Time

6th Field HUC Watershed

Reviewer(s) Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Temp. BMPs including weighted pine needle wattles across stream crossing to prevent sediment migration.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

<input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event.	<input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.	<input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.	<input type="radio"/> NA
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

<input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	<input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.	<input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.	<input type="radio"/> NA
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Weighted pine needle and straw wattles in place at stream crossing, in place and sufficient protection

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Temp. BMPs including weighted pine needle wattles across stream crossing to prevent sediment migration.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

<input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event.	<input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.	<input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.	<input type="radio"/> NA
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

<input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	<input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.	<input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.	<input type="radio"/> NA
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
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- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Weighted pine needle and straw wattles in place at stream crossing, in place and sufficient protection

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start Survey Date/Time

6th Field HUC Watershed

Reviewer(s) Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.
 Temp. BMPs including weighted pine needle wattles across stream crossing to prevent sediment migration.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from contract and/or minor resource concerns
- 3=Major departure from contract and/or major resource concerns
- 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

- 1 = Meets / Exceeds contract requirements and/or no resource concerns
- 2 = Minor departure from contract and/or minor resource concerns
- 3 = Major departure from contract and/or major resource concerns
- 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- | | | | |
|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
|---|--|--|--------------------------|

3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|--|---|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

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- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Weighted pine needle and straw wattles in place at stream crossing, in place and sufficient protection

UTM Zone	11	ID#	540				
Easting	247727	Selection Code	S03				
Northing	4313595	Form HV2: Permanent BMPs for Buildings and Structure Developments					
Building/Structure Name	Aries Ski Run					Township	12N
Date of Project Start		Date of Project End		6th Field HUC Watershed	CA-1	State	CA
Reviewer(s)	K. Roaldson	Survey Date	8/24/2015	Date BMP Implementation Complete		Last BMP Maintenance	
Structure Type:	Other	Survey Type	Follow-up	Depth/Duration:		Other (Describe)	Ski Run
Plan Title:	Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:		Plan Date:		Plan Revision Date:	
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.							
Soil stabilization, prevention of sediment transport, improve erosion resistance.							
Implementation							
For Permanent or Temporary-Seasonal Structures:				1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns			
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?							1
2) Are BMP measures constructed according to contract design specifications?							1
Additional Comments:							
Implementation of treatment identified in Erosion Hotspot Inventory.							
Effectiveness						Implementation Score:	1
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.						(BMP Monitoring Rule Set)	
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.							
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)							

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input checked="" type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Eliminated several rills and gullies near the top of the Aries Ski Run. Stabilized ski run with a series of mulch berms at the top of the slope. Added 2-3 inches of mulch ground cover in areas lacking effective cover. Created infiltration spreading area below the top of ski run. Effectiveness will be evaluated in 2016.

UTM Zone	11	ID#	470
Easting	247727	Selection Code	S03
Northing	4313595		

Form HV2: Permanent BMPs for Buildings and Structure Developments

Building/Structure Name	Ellie's Ski Run	Township	12N	Range	18E	Section	1
Date of Project Start		Date of Project End		6th Field HUC Watershed	CA-1	State	CA

Reviewer(s)	K. Roaldson	Survey Date	8/24/2015	Date BMP Implementation Complete		Last BMP Maintenance	
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Structure Type:	Other	Survey Type	Follow-up	Depth/Duration:		Other (Describe)	Ski Run
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Plan Title:	Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:		Plan Date:		Plan Revision Date:	
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Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
Soil stabilization, prevention of sediment transport, improve erosion resistance.

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1
2) Are BMP measures constructed according to contract design specifications?	1

Additional Comments:

Implementation of treatment identified in Erosion Hotspot Inventory.

Effectiveness

Implementation Score: 1
(BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input checked="" type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Repaired water bar and converted to an infiltration swale. Covered lower portion of ski run with mulch. Effectiveness will be evaluated in 2016.
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UTM Zone	11	ID#	382
Easting	245882	Selection Code	S03
Northing	4312774		

Form HV2: Permanent BMPs for Buildings and Structure Developments

Building/Structure Name	Angel's Roost Cell Tower	Township	12N	Range	18E	Section	1
Date of Project Start	9/12/2012	Date of Project End		6th Field HUC Watershed	CA-6	State	CA

Reviewer(s)	K. Roaldson	Survey Date	10/8/2015	Date BMP Implementation Complete	10/15/2013	Last BMP Maintenance	10/15/2013
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Structure Type:	Other	Survey Type	1st Year Post Construction	Depth/Duration:		Other (Describe)	Monopine Cell Tower
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Plan Title:	Mobilite Telecommunications Infrastructure Angel's Roost	Job No.:		Plan Date:	06/24/2011	Plan Revision Date:	
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Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
Erosion and sediment transport prevention, revegetation establishment

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1
2) Are BMP measures constructed according to contract design specifications?	1

Additional Comments:

Straw wattles remain in place, pine needle mulch for erosion resistance.

Effectiveness

Implementation Score:
(BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

- Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.
- Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.
- Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).
- NA

b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

- Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.
- Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.
- Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.
- NA

c) Cut and fill slope protection (including surface erosion and slope failure potential).

- BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.
- BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.
- BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.
- NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

- Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.
- Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.
- Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.
- NA

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

No erosion around equipment building next to Face Patrol building. Monopine cell tower shows no erosion. Sufficient erosion resistance provided with pine needle mulch on access slope and around tower.

UTM Zone	11	Form HV2: Permanent BMPs for Buildings and Structure Developments		ID#	534			
Easting	247158			Selection Code	S03			
Northing	4312234							
Building/Structure Name	Canyon Express - Lower Terminal		Township	12N	Range	18E	Section	1
Date of Project Start	8/7/2006	Date of Project End	10/15/2006	6th Field HUC Watershed	CA-1	State	CA	
Reviewer(s)	K. Roaldson		Survey Date	8/24/2015	Date BMP Implementation Complete		Last BMP Maintenance	
Structure Type:	Lift-Base	Survey Type	Follow-up	Depth/Duration:		Other (Describe)	Completed BMP Proj.	
Plan Title:	Infiltration BMP Maintenance, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS		Job No.:		Plan Date:		Plan Revision Date:	
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.								
Roof downspout outfall infiltration, soil erosion. Reference construction plans job #00-607-11 4/14/2003 revision date 7/14/2003, Canyon lift replacement and Ridge lift removal erosion control.								
Implementation								
For Permanent or Temporary-Seasonal Structures:				1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns				
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?							1	1
2) Are BMP measures constructed according to contract design specifications?							1	1
Additional Comments:								
Area requiring additional cover identified during BMP monitoring, area given revegetation treatment with wood chip mulch, compost and seed. Implementation of treatment identified in Erosion Hotspot Inventory.								
Effectiveness						Implementation Score: 1		
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.						(BMP Monitoring Rule Set)		
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.								
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)								

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input checked="" type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input checked="" type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Flat, vegetated area adjacent to lift terminal identified as needing additional stabilization measures shows marked improvement with revegetation treatment. Also Installed a vegetated swale with coir material matting and pine needle check dams in existing rock lined ditch adjacent to the operator's booth.

UTM Zone	11	ID#	505
Easting	247158	Selection Code	S03
Northing	4312234		

Form HV2: Permanent BMPs for Buildings and Structure Developments

Building/Structure Name: Double Down Ski Run Township: 12N Range: 18E Section: 1

Date of Project Start: 8/7/2006 Date of Project End: 10/15/2006 6th Field HUC Watershed: CA-1 State: CA

Reviewer(s): K. Roaldson Survey Date: 8/24/2015 Date BMP Implementation Complete: Last BMP Maintenance:

Structure Type: Other Survey Type: Follow-up Depth/Duration: Other (Describe): Ski Run

Plan Title: Infiltration BMP Maintenance, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS Job No.: Plan Date: Plan Revision Date:

Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
Soil stabilization, prevention of sediment transport, improve erosion resistance.

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?

2) Are BMP measures constructed according to contract design specifications?

Additional Comments:

Area requiring additional cover identified during BMP monitoring, area given revegetation treatment with wood chip mulch, compost and seed.

Effectiveness

Implementation Score:
(BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input checked="" type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Repaired water bar and applied mulch/needles uphill of water bar. Flattened profile of the water bar and installed large pine needle berm below water bar to infiltrate run-off before reaching maintenance road. Effectiveness will be evaluated in 2016.

UTM Zone	11	ID#	499
Easting	245909	Selection Code	S03
Northing	4312841		

Form HV2: Permanent BMPs for Buildings and Structure Developments

Building/Structure Name	Face Patrol (227)	Township	12N	Range	18E	Section	1
Date of Project Start	8/7/2006	Date of Project End		6th Field HUC Watershed	CA-1	State	CA

Reviewer(s)	K. Roaldson	Survey Date	8/24/2015	Date BMP Implementation Complete		Last BMP Maintenance	
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Structure Type:	Building	Survey Type	1st Year Post Construction	Depth/Duration:		Other (Describe)	
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Plan Title:	Face Patrol Building Retrofit	Job No.:		Plan Date:		Plan Revision Date:	
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Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
 Attainment of effective ground cover, splash and scour erosion protection: roofline infiltration trenches, wood chip mulch

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1
2) Are BMP measures constructed according to contract design specifications?	1

Additional Comments:
 [Empty text box]

Effectiveness

Implementation Score:
 (BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

- Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.
- Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.
- Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).
- NA

b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

- Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.
- Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.
- Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.
- NA

c) Cut and fill slope protection (including surface erosion and slope failure potential).

- BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.
- BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.
- BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.
- NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

- Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.
- Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.
- Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.
- NA

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

No signs of erosion or sediment movement after storm event. Trench settlement looks good and revegetation/effective cover/erosion resistance is successful.

UTM Zone	11
Easting	245909
Northing	4312841

Form HV2: Permanent BMPs for Buildings and Structure Developments

ID# 558

Selection Code S03

Building/Structure Name Face Patrol (227) Township 12N Range 18E Section 1

Date of Project Start 8/7/2006 Date of Project End 6th Field HUC Watershed CA-1 State CA

Reviewer(s) K. Roaldson Survey Date 10/8/8015 Date BMP Implementation Complete Last BMP Maintenance

Structure Type: Building Survey Type Post Storm Survey Depth/Duration: ~1.0" Other (Describe)

Plan Title: Face Patrol Building Retrofit Job No.: Plan Date: Plan Revision Date:

Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
 Attainment of effective ground cover, splash and scour erosion protection: roofline infiltration trenches, wood chip mulch

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?

2) Are BMP measures constructed according to contract design specifications?

Additional Comments:

Effectiveness

Implementation Score:
 (BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

- Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.
- Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.
- Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).
- NA

b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

- Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.
- Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.
- Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.
- NA

c) Cut and fill slope protection (including surface erosion and slope failure potential).

- BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.
- BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.
- BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.
- NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

- Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.
- Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.
- Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.
- NA

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Inspected gully location after ~1.0" rain, no evidence of erosion. Will inspect in 2016 again.

UTM Zone	11	ID#	557
Easting	245909	Selection Code	S03
Northing	4312841		

Form HV2: Permanent BMPs for Buildings and Structure Developments

Building/Structure Name	Face Patrol (227)	Township	12N	Range	18E	Section	1
Date of Project Start	8/7/2006	Date of Project End		6th Field HUC Watershed	CA-1	State	CA
Reviewer(s)	K. Roaldson	Survey Date	7/31/2015	Date BMP Implementation Complete		Last BMP Maintenance	
Structure Type:	Building	Survey Type	Follow-up	Depth/Duration:		Other (Describe)	

Plan Title:	Face Patrol Building Retrofit	Job No.:		Plan Date:		Plan Revision Date:	
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Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.

Attainment of effective ground cover, splash and scour erosion protection: roofline infiltration trenches, wood chip mulch

Implementation

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from standards and/or minor resource concerns
 3=Major departure from standards and/or major resource concerns
 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1
2) Are BMP measures constructed according to contract design specifications?	1

Additional Comments:

Effectiveness

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

Implementation Score: 1
(BMP Monitoring Rule Set)

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

- Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.
- Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.
- Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).
- NA

b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

- Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.
- Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.
- Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.
- NA

c) Cut and fill slope protection (including surface erosion and slope failure potential).

- BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.
- BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.
- BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.
- NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

- Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.
- Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.
- Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.
- NA

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

<p>Wood chips incorporated to stabilize slope and repair gully, significant improvement.</p>
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UTM Zone	11	ID#	556
Easting	245909	Selection Code	S03
Northing	4312841	Form HV2: Permanent BMPs for Buildings and Structure Developments	
Building/Structure Name	Face Patrol (227)		
		Range	18E
		Section	1
Date of Project Start	8/7/2006	Date of Project End	
		6th Field HUC Watershed	CA-1
		State	CA
Reviewer(s)	K. Roaldson	Survey Date	7/16/2015
		Date BMP Implementation Complete	
		Last BMP Maintenance	
Structure Type:	Building	Survey Type	Post Storm Survey
		Depth/Duration:	~1.0"
		Other (Describe)	
Plan Title:	Face Patrol Building Retrofit	Job No.:	
		Plan Date:	
		Plan Revision Date:	
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.			
Attainment of effective ground cover, splash and scour erosion protection: roofline infiltration trenches, wood chip mulch			
Implementation			
For Permanent or Temporary-Seasonal Structures:		1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns	
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?		1	
2) Are BMP measures constructed according to contract design specifications?		1	
Additional Comments:			
Effectiveness		Implementation Score: 1	
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.		(BMP Monitoring Rule Set)	
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.			
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)			

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

- Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.
- Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.
- Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).
- NA

b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

- Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.
- Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.
- Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.
- NA

c) Cut and fill slope protection (including surface erosion and slope failure potential).

- BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.
- BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.
- BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.
- NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

- Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.
- Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.
- Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.
- NA

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

<p>Evidence of gully formation over trench, need to incorporate wood chips to stabilize slope.</p>
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UTM Zone	11	ID#	548
Easting	247287	Selection Code	S03
Northing	4312392		

Form HV2: Permanent BMPs for Buildings and Structure Developments

Building/Structure Name	Hellwinkle's Road Segment	Township	12N	Range	18E	Section	1
Date of Project Start	8/7/2006	Date of Project End		6th Field HUC Watershed	CA-1	State	CA

Reviewer(s)	K. Roaldson	Survey Date	10/8/2015	Date BMP Implementation Complete	9/30/2006	Last BMP Maintenance	9/30/2006
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Structure Type:	Other	Survey Type	Post Storm Survey	Depth/Duration:		Other (Describe)	Road
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Plan Title:	CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:		Plan Date:		Plan Revision Date:	
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Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
 Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1
2) Are BMP measures constructed according to contract design specifications?	1

Additional Comments:

Effectiveness

Implementation Score:
 (BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input checked="" type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input checked="" type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Pine needle wattles and riprap stabilization at water bar outlets effectively captured sediment before leaving roadway. All outlets need cleanout as soon as possible to provide capacity before next storm. May need additional wattles to stabilize.

UTM Zone	11	ID#	545
Easting	247287	Selection Code	S03
Northing	4312392		

Form HV2: Permanent BMPs for Buildings and Structure Developments

Building/Structure Name	Hellwinkle's Road Segment	Township	12N	Range	18E	Section	1
Date of Project Start	8/7/2006	Date of Project End		6th Field HUC Watershed	CA-1	State	CA

Reviewer(s)	K. Roaldson	Survey Date	10/22/2015	Date BMP Implementation Complete	9/30/2006	Last BMP Maintenance	9/30/2006
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Structure Type:	Other	Survey Type	Follow-up	Depth/Duration:		Other (Describe)	Road
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Plan Title:	CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:		Plan Date:		Plan Revision Date:	
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Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
 Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1
2) Are BMP measures constructed according to contract design specifications?	1

Additional Comments:
 [Empty text box]

Effectiveness

Implementation Score:
 (BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input checked="" type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input checked="" type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Pine needle wattles and riprap stabilization at water bar outlets effectively captured sediment before leaving roadway. Potential surface treatment for road could be addressed in Phase II work at this site.

UTM Zone	11	ID#	546
Easting	247287	Selection Code	S03
Northing	4312392		

Form HV2: Permanent BMPs for Buildings and Structure Developments

Building/Structure Name	Hellwinkle's Road Segment	Township	12N	Range	18E	Section	1
Date of Project Start	8/7/2006	Date of Project End		6th Field HUC Watershed	CA-1	State	CA

Reviewer(s)	K. Roaldson	Survey Date	7/31/2015	Date BMP Implementation Complete	9/30/2006	Last BMP Maintenance	9/30/2006
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Structure Type:	Other	Survey Type	Routine	Depth/Duration:		Other (Describe)	Road
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Plan Title:	CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:		Plan Date:		Plan Revision Date:	
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Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
 Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1
2) Are BMP measures constructed according to contract design specifications?	1

Additional Comments:
 [Empty text box]

Effectiveness

Implementation Score:
 (BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input checked="" type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Need additional protection for water bar outlets. All outlets need cleanout as soon as possible to provide capacity before next storm.

UTM Zone	11	ID#	420
Easting	247287	Selection Code	S03
Northing	4312392		

Form HV2: Permanent BMPs for Buildings and Structure Developments

Building/Structure Name	Hellwinkle's Road Segment	Township	12N	Range	18E	Section	1
Date of Project Start	8/7/2006	Date of Project End		6th Field HUC Watershed	CA-1	State	CA

Reviewer(s)	K. Roaldson	Survey Date	9/10/2015	Date BMP Implementation Complete	9/30/2006	Last BMP Maintenance	9/30/2006
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Structure Type:	Other	Survey Type	Routine	Depth/Duration:		Other (Describe)	Road
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Plan Title:	CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:		Plan Date:		Plan Revision Date:	
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Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
 Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1
2) Are BMP measures constructed according to contract design specifications?	1

Additional Comments:
 [Empty text box]

Effectiveness

Implementation Score:
 (BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input checked="" type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Pine needle wattles and riprap stabilization at water bar outlets effectively captured sediment before leaving roadway. Work on cleaning out outlets and stabilizing with angular riprap and pine needle wattles.

UTM Zone	11	ID#	547
Easting	247287	Selection Code	S03
Northing	4312392	Form HV2: Permanent BMPs for Buildings and Structure Developments	
Building/Structure Name	Hellwinkle's Road Segment		
		Range	18E
		Section	1
Date of Project Start	8/7/2006	Date of Project End	
		6th Field HUC Watershed	CA-1
		State	CA
Reviewer(s)	K. Roaldson	Survey Date	9/25/2015
		Date BMP Implementation Complete	9/30/2006
		Last BMP Maintenance	9/30/2006
Structure Type:	Other	Survey Type	Routine
		Depth/Duration:	
		Other (Describe)	Road
Plan Title:	CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:	
		Plan Date:	
		Plan Revision Date:	
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.			
Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.			
Implementation			
For Permanent or Temporary-Seasonal Structures:		1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns	
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?		1	
2) Are BMP measures constructed according to contract design specifications?		1	
Additional Comments:			
<div style="border: 1px solid black; height: 40px;"></div>			
Effectiveness		Implementation Score: 1	
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.		(BMP Monitoring Rule Set)	
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.			
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)			

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

- Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.
- Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.
- Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).
- NA

b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

- Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.
- Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.
- Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.
- NA

c) Cut and fill slope protection (including surface erosion and slope failure potential).

- BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.
- BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.
- BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.
- NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

- Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.
- Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.
- Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.
- NA

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Pine needle wattles and riprap stabilization at water bar outlets effectively captured sediment before leaving roadway. All outlets need cleanout as soon as possible to provide capacity before next storm. Road shoulder on upslope side would benefit from wood chip mulch application.

UTM Zone	10	ID#	541				
Easting	245942	Selection Code	S02				
Northing	4312894	Form HV2: Permanent BMPs for Buildings and Structure Developments					
Building/Structure Name	Lakeview Water System					Township	12N
Date of Project Start	8/25/2008	Date of Project End	9/15/2011	6th Field HUC Watershed	CA-6	State	CA
Reviewer(s)	K. Roaldson	Survey Date	10/8/2015	Date BMP Implementation Complete	8/1/2011	Last BMP Maintenance	8/1/2011
Structure Type:	Other	Survey Type	3rd Year Post Construction	Depth/Duration:		Other (Describe)	Water System

Plan Title:	Lakeview Water System	Job No.:	08607.1	Plan Date:	7/25/2008	Plan Revision Date:	7/31/2008
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Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
 Effective cover over trench and on decommissioned road, revegetation.

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1
2) Are BMP measures constructed according to contract design specifications?	1

Additional Comments:

Effectiveness

Implementation Score:
 (BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

- Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.
- Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.
- Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).
- NA

b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

- Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.
- Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.
- Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.
- NA

c) Cut and fill slope protection (including surface erosion and slope failure potential).

- BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.
- BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.
- BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.
- NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

- Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.
- Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.
- Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.
- NA

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Revegetation along trench line is robust, no evidence of erosion. Excellent coverage throughout site. Access road to old tank has been decommissioned, old tank removed and coverage is extensive.

UTM Zone	11	ID#	555
Easting	246846	Selection Code	S03
Northing	4312787	Form HV2: Permanent BMPs for Buildings and Structure Developments	
Building/Structure Name	Maggie's Corner to Cal Dam		
Date of Project Start	8/7/2006	Date of Project End	9/1/2006
Reviewer(s)	K. Roaldson, K. Flannagan, E. Har	6th Field HUC Watershed	CA-1
Survey Date	7/2/2015	Date BMP Implementation Complete	9/1/2006
Structure Type:	Other	Survey Type	Post Storm Survey
Depth/Duration:	~1.0"	Other (Describe)	Road
Plan Title:	CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:	
Plan Date:		Plan Revision Date:	
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection. Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.			
Implementation			
For Permanent or Temporary-Seasonal Structures:		1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns	
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?			1
2) Are BMP measures constructed according to contract design specifications?			1
Additional Comments: Water bar outlets built up with riprap additional protection provided with wattles			
Effectiveness			Implementation Score: 1 (BMP Monitoring Rule Set)
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.			
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas. (Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)			

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

- Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.
- Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.
- Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).
- NA

b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

- Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.
- Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.
- Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.
- NA

c) Cut and fill slope protection (including surface erosion and slope failure potential).

- BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.
- BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.
- BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.
- NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

- Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.
- Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.
- Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.
- NA

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Pine needle wattles and riprap stabilization at water bar outlets effectively captured sediment before leaving roadway. Road should has been covered with wood chips to significantly increase stabilization.

UTM Zone	11	Form HV2: Permanent BMPs for Buildings and Structure Developments		ID#	550			
Easting	246846			Selection Code	S03			
Northing	4312787							
Building/Structure Name	Maggie's Corner to Cal Dam		Township	12N	Range	18E	Section	1
Date of Project Start	8/7/2006	Date of Project End	9/1/2006	6th Field HUC Watershed	CA-1	State	CA	
Reviewer(s)	K. Roaldson, K. Flannagan, E. Har		Survey Date	7/2/2015	Date BMP Implementation Complete	9/1/2006	Last BMP Maintenance	10/1/2010
Structure Type:	Other	Survey Type	Post Storm Survey	Depth/Duration:	~1.0"	Other (Describe)	Road	
Plan Title:	CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS		Job No.:		Plan Date:		Plan Revision Date:	
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.								
Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.								
Implementation								
For Permanent or Temporary-Seasonal Structures:				1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns				
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?							1	
2) Are BMP measures constructed according to contract design specifications?							1	
Additional Comments:								
Water bar outlets built up with riprap additional protection provided with wattles								
Effectiveness						Implementation Score: 1		
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.						(BMP Monitoring Rule Set)		
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.								
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)								

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input checked="" type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Pine needle wattles and riprap stabilization at water bar outlets effectively captured sediment before leaving roadway. All outlets need cleanout as soon as possible to provide capacity before next storm. Road shoulder on upslope side would benefit from wood chip mulch application.

UTM Zone	11	Form HV2: Permanent BMPs for Buildings and Structure Developments		ID#	551			
Easting	246846			Selection Code	S03			
Northing	4312787							
Building/Structure Name	Maggie's Corner to Cal Dam	Township	12N	Range	18E	Section	1	
Date of Project Start	8/7/2006	Date of Project End	9/1/2006	6th Field HUC Watershed	CA-1	State	CA	
Reviewer(s)	K. Roaldson, K. Flannagan, E. Har		Survey Date	7/2/2015	Date BMP Implementation Complete	9/1/2006	Last BMP Maintenance	10/1/2010
Structure Type:	Other	Survey Type	Routine	Depth/Duration:		Other (Describe)	Road	
Plan Title:	CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:		Plan Date:		Plan Revision Date:		
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.								
Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.								
Implementation								
For Permanent or Temporary-Seasonal Structures:				1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns				
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?							1	
2) Are BMP measures constructed according to contract design specifications?							1	
Additional Comments:								
Water bar outlets built up with riprap additional protection provided with wattles								
Effectiveness						Implementation Score:	1	
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.						(BMP Monitoring Rule Set)		
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.								
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)								

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input checked="" type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Outlets have been cleaned. Road shoulder on upslope side would benefit from wood chip mulch application.

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input checked="" type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Pine needle wattles and riprap stabilization at water bar outlets effectively captured sediment before leaving roadway. All outlets need cleanout as soon as possible to provide capacity before next storm. Road shoulder on upslope side would benefit from wood chip mulch application.

UTM Zone	11	ID#	552
Easting	246846	Selection Code	S03
Northing	4312787		

Form HV2: Permanent BMPs for Buildings and Structure Developments

Building/Structure Name	Maggie's Corner to Cal Dam	Township	12N	Range	18E	Section	1
Date of Project Start	8/7/2006	Date of Project End	9/1/2006	6th Field HUC Watershed	CA-1	State	CA

Reviewer(s)	K. Roaldson, K. Flannagan, E. Har	Survey Date	7/2/2015	Date BMP Implementation Complete	9/1/2006	Last BMP Maintenance	10/1/2010
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Structure Type:	Other	Survey Type	Follow-up	Depth/Duration:		Other (Describe)	Road
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Plan Title:	CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:		Plan Date:		Plan Revision Date:	
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Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
 Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1
2) Are BMP measures constructed according to contract design specifications?	1

Additional Comments:
 Water bar outlets built up with riprap additional protection provided with wattles

Effectiveness

Implementation Score:
 (BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input checked="" type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Additional wattles have been added to water bar outlets to further impede sediment. Road shoulder on upslope side would benefit from wood chip mulch application.

UTM Zone	11	Form HV2: Permanent BMPs for Buildings and Structure Developments		ID#	553		
Easting	246846			Selection Code	S03		
Northing	4312787						
Building/Structure Name	Maggie's Corner to Cal Dam	Township	12N	Range	18E	Section	1
Date of Project Start	8/7/2006	Date of Project End	9/1/2006	6th Field HUC Watershed	CA-1	State	CA
Reviewer(s)	K. Roaldson, K. Flannagan, E. Har						
Survey Date	7/2/2015	Date BMP Implementation Complete	9/1/2006	Last BMP Maintenance	10/1/2010		
Structure Type:	Other	Survey Type	Routine	Depth/Duration:	Other (Describe) Road		
Plan Title:	CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:		Plan Date:		Plan Revision Date:	
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.							
Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.							
Implementation							
For Permanent or Temporary-Seasonal Structures:				1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns			
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?							1
2) Are BMP measures constructed according to contract design specifications?							1
Additional Comments:							
Water bar outlets built up with riprap additional protection provided with wattles							
Effectiveness						Implementation Score: 1	
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.						(BMP Monitoring Rule Set)	
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.							
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)							

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input checked="" type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Inspection to check on water bar outlet capacity before next storm. Road shoulder on upslope side would benefit from wood chip mulch application.

UTM Zone	11	Form HV2: Permanent BMPs for Buildings and Structure Developments		ID#	554			
Easting	246846			Selection Code	S03			
Northing	4312787							
Building/Structure Name	Maggie's Corner to Cal Dam	Township	12N	Range	18E	Section	1	
Date of Project Start	8/7/2006	Date of Project End	9/1/2006	6th Field HUC Watershed	CA-1	State	CA	
Reviewer(s)	K. Roaldson, K. Flannagan, E. Har		Survey Date	7/2/2015	Date BMP Implementation Complete	9/1/2006	Last BMP Maintenance	10/1/2010
Structure Type:	Other	Survey Type	Routine	Depth/Duration:		Other (Describe)	Road	
Plan Title:	CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:		Plan Date:		Plan Revision Date:		
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.								
Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.								
Implementation								
For Permanent or Temporary-Seasonal Structures:				1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns				
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?							1	
2) Are BMP measures constructed according to contract design specifications?							1	
Additional Comments:								
Water bar outlets built up with riprap additional protection provided with wattles								
Effectiveness						Implementation Score:	1	
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.						(BMP Monitoring Rule Set)		
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.								
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)								

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input checked="" type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Road shoulder on upslope side would benefit from wood chip mulch application.

UTM Zone	11	ID#	549
Easting	246846	Selection Code	S03
Northing	4312787		

Form HV2: Permanent BMPs for Buildings and Structure Developments

Building/Structure Name	Maggie's Corner to Cal Dam	Township	12N	Range	18E	Section	1
Date of Project Start	8/7/2006	Date of Project End	9/1/2006	6th Field HUC Watershed	CA-1	State	CA

Reviewer(s)	K. Roaldson, K. Flannagan, E. Har	Survey Date	7/2/2015	Date BMP Implementation Complete	9/1/2006	Last BMP Maintenance	10/1/2010
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Structure Type:	Other	Survey Type	Post Storm Survey	Depth/Duration:	~1.0"	Other (Describe)	Road
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Plan Title:	CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:		Plan Date:		Plan Revision Date:	
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Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
 Water bar connection to SEZ, road shoulder effective cover, soil stabilization, prevention of sediment transport, improve erosion resistance, water bar outlet protection.

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1
2) Are BMP measures constructed according to contract design specifications?	1

Additional Comments:

Water bar outlets built up with riprap additional protection provided with wattles

Effectiveness

Implementation Score:
 (BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input checked="" type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Pine needle wattles and riprap stabilization at water bar outlets effectively captured sediment before leaving roadway. All outlets need cleanout as soon as possible to provide capacity before next storm. Road shoulder on upslope side would benefit from wood chip mulch application.

UTM Zone	11
Easting	246817
Northing	4312030

Form HV2: Permanent BMPs for Buildings and Structure Developments

ID#	472
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Selection Code	S03
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Building/Structure Name	Mombo Ski Run/Blue Angel Chutes	Township	12N	Range	18E	Section	1
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Date of Project Start	10/1/2010	Date of Project End	10/15/2010	6th Field HUC Watershed	CA-1	State	CA
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Reviewer(s)	K. Roaldson	Survey Date	10/22/2015	Date BMP Implementation Complete	10/15/2010	Last BMP Maintenance	10/15/2010
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Structure Type:	Other	Survey Type	Follow-up	Depth/Duration:		Other (Describe)	Ski Run
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Plan Title:	CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:		Plan Date:		Plan Revision Date:	
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Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
 Soils very fine and sandy. Water bars needed to prevent gullies down slope. Road waterbar diverts drainage away from slope.

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1
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2) Are BMP measures constructed according to contract design specifications?	1
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Additional Comments:

Water bar, effective cover, slope stabilization

Effectiveness

Implementation Score:	1
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(BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input checked="" type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Improved erosion resistance and stabilized slope, recontoured water bars to increase capacity. Installed infiltration swales at top of run, seeded and mulched with pine needles. Effectiveness will be evaluated in 2016.

UTM Zone	11	ID#	466
Easting	246148	Selection Code	S03
Northing	4313086		

Form HV2: Permanent BMPs for Buildings and Structure Developments

Building/Structure Name: Pioneer Poma Township: 12N Range: 18E Section: 1

Date of Project Start: Date of Project End: 6th Field HUC Watershed: CA-1 State: CA

Reviewer(s): K. Roaldson, K. Flannagan, E. Har Survey Date: 7/2/2015 Date BMP Implementation Complete: 7/31/2002 Last BMP Maintenance:

Structure Type: Lift Survey Type: Post Storm Survey Depth/Duration: ~1.0" Other (Describe):

Plan Title: Pioneer Poma Lift Replacement Job No.: 00-607-03 Plan Date: 12-14-2001 Plan Revision Date:

Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
 Soil stabilization and sediment transport to SEZ, revegetation.

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?

2) Are BMP measures constructed according to contract design specifications?

Additional Comments:

Effectiveness

Implementation Score:
 (BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

- Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.
- Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.
- Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).
- NA

b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

- Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.
- Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.
- Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.
- NA

c) Cut and fill slope protection (including surface erosion and slope failure potential).

- BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.
- BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.
- BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.
- NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

- Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.
- Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.
- Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.
- NA

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Innovative mulch treatment with pine needles and wood chips applied to entire Pioneer Poma Trail. Significant improvement to effective cover/erosion resistance. Post storm event, some minor rilling observed along roadway, no erosion or sediment transport observed in the treatment area after storm event.

UTM Zone	11	ID#	494
Easting	247245	Selection Code	S03
Northing	4312403		

Form HV2: Permanent BMPs for Buildings and Structure Developments

Building/Structure Name	Sky Chute Ski Run	Township	12N	Range	18E	Section	1
Date of Project Start	8/7/2006	Date of Project End		6th Field HUC Watershed	CA-1	State	CA

Reviewer(s)
K. Roaldson

Survey Date	8/24/2015	Date BMP Implementation Complete		Last BMP Maintenance	
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Structure Type:	Other	Survey Type	Follow-up	Depth/Duration:		Other (Describe)	Ski Run
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Plan Title:	Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:		Plan Date:		Plan Revision Date:	
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Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
Infiltration trench beneath dripline, gravel beneath pervious deck.

Implementation

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from standards and/or minor resource concerns
 3=Major departure from standards and/or major resource concerns
 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1
2) Are BMP measures constructed according to contract design specifications?	1

Additional Comments:
Infiltration areas in place and functioning.

Effectiveness

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

Implementation Score: 1
(BMP Monitoring Rule Set)

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input checked="" type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

<p>Application of both wood chip and pine needle filter berms. Effectiveness will be evaluated in 2016.</p>

UTM Zone	11	ID#	451
Easting	247202	Selection Code	S03
Northing	4312286	Form HV2: Permanent BMPs for Buildings and Structure Developments	
Building/Structure Name	Sky Express - Lower Terminal		
		Range	18E
		Section	1
Date of Project Start	8/7/2006	Date of Project End	
		6th Field HUC Watershed	CA-1
		State	CA
Reviewer(s)	K. Roaldson	Survey Date	8/24/2015
		Date BMP Implementation Complete	
		Last BMP Maintenance	
Structure Type:	Lift-Base	Survey Type	Follow-up
		Depth/Duration:	
		Other (Describe)	
Plan Title:	Infiltration BMP Maintenance	Job No.:	
		Plan Date:	
		Plan Revision Date:	
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.			
Infiltration trenches for impervious surfaces (roof drip lines), prevent soil erosion, erosion resistance			
Implementation			
For Permanent or Temporary-Seasonal Structures:		1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns	
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?		1	
2) Are BMP measures constructed according to contract design specifications?		1	
Additional Comments:			
Effectiveness		Implementation Score: 1	
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.		(BMP Monitoring Rule Set)	
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.			
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)			

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

- Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.
- Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.
- Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).
- NA

b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

- Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.
- Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.
- Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.
- NA

c) Cut and fill slope protection (including surface erosion and slope failure potential).

- BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.
- BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.
- BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.
- NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

- Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.
- Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.
- Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.
- NA

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Infiltration trenches show no signs of clogging, minimal trash and debris, and are well maintained. No evidence of sediment transport or erosion. Per previous recommendations, wood chip mulch was added in bare areas.

UTM Zone	11	ID#	542
Easting	247277	Selection Code	S03
Northing	4312421		

Form HV2: Permanent BMPs for Buildings and Structure Developments

Building/Structure Name: Sky Express Road Township: 12N Range: 18E Section: 1

Date of Project Start: 8/7/2006 Date of Project End: 6th Field HUC Watershed: CA-1 State: CA

Reviewer(s): K. Roaldson Survey Date: 8/24/2015 Date BMP Implementation Complete: 9/30/2006 Last BMP Maintenance: 9/30/2006

Structure Type: Other Survey Type: Follow-up Depth/Duration: Other (Describe): Road

Plan Title: No plan set, CERP applies and Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS Job No.: Plan Date: Plan Revision Date:

Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
 Revegetation, infiltration areas, erosion resistance on bare areas.

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?

2) Are BMP measures constructed according to contract design specifications?

Additional Comments:
 Revegetation/stabilization area.

Effectiveness

Implementation Score:
 (BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input checked="" type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

<p>Improved wood chip cover adjacent to vehicle turnaround. Effectiveness will be evaluated in 2016.</p>
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UTM Zone	11	Form HV2: Permanent BMPs for Buildings and Structure Developments		ID#	471
Easting	246118			Selection Code	S03
Northing	4312927				
Building/Structure Name		Upper Maintenance Shop		Township	12N
		Range	18E	Section	1
Date of Project Start	8/22/2006	Date of Project End	10/15/2010	6th Field HUC Watershed	CA-1
				State	CA
Reviewer(s)					
K. Roaldson		Survey Date	10/8/2015	Date BMP Implementation Complete	
		Last BMP Maintenance			
Structure Type:	SEZ Restoration	Survey Type	Post Storm Survey	Depth/Duration:	~1.0"
		Other (Describe)			
Plan Title: Upper Shops Water Quality and Stream Environment Zone Improvements					
Job No.:		00-607-41		Plan Date:	4/25/06
				Plan Revision Date:	8/31/06
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.					
BMPs to protect adjacent SEZ - drainage diversion, concrete wall, SEZ drop pool design, revegetation					
Implementation					
For Permanent or Temporary-Seasonal Structures:			1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns		
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?					1
2) Are BMP measures constructed according to contract design specifications?					1
Additional Comments:					
SEZ protective measures in place, revegetation robust					
Effectiveness				Implementation Score: 1	
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.				(BMP Monitoring Rule Set)	
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.					
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)					

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input checked="" type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input checked="" type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Pine needle wattles deployed to provide stabilization and prevent sediment movement still in place. No major signs of erosion following rain event.

Attachment C

Nevada Evaluation Sheets

UTM Zone	11
Easting	247850
Northing	4313936

Form HV1: Temporary BMPs for On-going Construction

ID# 595

Selection Code S03

Forest LTMBU District State NV

Construction Site Name Alpine Coaster

Township 12N Range 18E Section 1

Date of Project Start 6/15/2015

Survey Date/Time 6/19/2015

6th Field HUC Watershed CA-1

Reviewer(s) K. Roaldson, K. Flannagan, E. Harmon

Construction Foreman Bill Brown

Construction Type: Lift Project Is: New Construction Other (Describe) NA

General Information

Name Of Plans Forest Flyer Alpine Coaster Job No. 15-102.1

Date 4/27/2015 Rev Date NA

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Temp BMPs to address erosion control, including: boundary fence, restricted access, water truck for dust control, covered/watered stockpiles, sediment barriers.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns	3=Major departure from contract and/or major resource concerns
2=Minor departure from contract and/or minor resource concerns	4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1

1 = Meets / Exceeds contract requirements and/or no resource concerns	3 = Major departure from contract and/or major resource concerns
2 = Minor departure from contract and/or minor resource concerns	4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score: 1 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

- | | | | |
|--|--|--|--------------------------|
| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- | | | | |
|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|--|---|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction in progress on loading and operator buildings , temporary BMPs in place include rope delineation, straw & pine needle wattles, hose connected to snow making system for dust control. Post storm event inspection, no evidence of erosion or unexpected ponding following event.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#

Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans

Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Temp BMPs to address erosion control, including: boundary fence, restricted access, water truck for dust control, covered/watered stockpiles, sediment barriers.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

- | | | | |
|--|--|--|--------------------------|
| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- | | | | |
|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
|---|--|--|--------------------------|

3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction in progress on loading and operator buildings and track installation, concrete truck on-site using washout, stockpiles covered with plastic sheeting and wattles, other temporary BMPs in place include rope delineation, straw & pine needle wattles, hose connected to snow making system for dust control. Post storm event inspection, minor evidence of erosion, no unexpected ponding following ~0.5" rain event.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans

Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Temp BMPs to address erosion control, including: boundary fence, restricted access, water truck for dust control, covered/watered stockpiles, sediment barriers.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|---|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

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|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|--|---|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction in progress on loading and operator buildings and track installation, stockpiles covered with plastic sheeting and wattles, other temporary BMPs in place include rope delineation, straw & pine needle wattles. Post storm event inspection, no evidence of erosion or unexpected ponding following event of ~1".

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#

Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans

Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Temp BMPs to address erosion control, including: boundary fence, restricted access, water truck for dust control, covered/watered stockpiles, sediment barriers.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
(BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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|--|--|--|--------------------------|
| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
|---|--|--|--------------------------|

3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|---|--|--|--------------------------|
| <input type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input checked="" type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|---|--|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction in progress on loading and operator buildings and track installation, stockpiles covered with plastic sheeting and wattles, other temporary BMPs in place include rope delineation, straw & pine needle wattles. Concrete washout onsite and portable restroom staked and away from equipment.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#

Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans

Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Temp BMPs to address erosion control, including: boundary fence, restricted access, water truck for dust control, covered/watered stockpiles, sediment barriers.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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|--|--|--|--------------------------|
| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- | | | | |
|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
|---|--|--|--------------------------|

3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|--|---|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction in progress on loading and operator buildings and track installation, temporary BMPs in place include rope delineation, straw & pine needle wattles.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans

Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Temp BMPs to address erosion control, including: boundary fence, restricted access, water truck for dust control, covered/watered stockpiles, sediment barriers.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

<input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event.	<input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.	<input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.	<input type="radio"/> NA
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

<input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	<input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.	<input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.	<input type="radio"/> NA
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction in progress on loading and operator buildings and track installation, infiltration area under construction, temporary BMPs in place include rope delineation, straw & pine needle wattles, hose connected to snow making system for dust control.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#

Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans

Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Temp BMPs to address erosion control, including: boundary fence, restricted access, water truck for dust control, covered/watered stockpiles, sediment barriers.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

<input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event.	<input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.	<input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.	<input type="radio"/> NA
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

<input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	<input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.	<input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.	<input type="radio"/> NA
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction in progress on loading and operator buildings and track installation, temporary BMPs in place include rope delineation, straw & pine needle wattles, hose connected to snow making system for dust control.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#

Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans

Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Temp BMPs to address erosion control, including: boundary fence, restricted access, water truck for dust control, covered/watered stockpiles, sediment barriers.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
(BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

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|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|--|---|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction in progress on loading and operator buildings and track installation, coverage work on upper portions of disturbed areas in progress, temporary BMPs in place include rope delineation, straw & pine needle wattles, hose connected to snow making system for dust control.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.

Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Temp BMPs to address erosion control, including: boundary fence, restricted access, water truck for dust control, covered/watered stockpiles, sediment barriers.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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|--|--|--|--------------------------|
| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
|---|--|--|--------------------------|

3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
|--|---|--|--------------------------|

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction in progress on loading and operator buildings and track installation, temporary BMPs in place include rope delineation, straw & pine needle wattles, post storm event, no major rilling or ponding evident after ~1" of rain.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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|--|--|--|--------------------------|
| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Construction still in progress on loading and operator buildings and track installation. Grading extension granted from TRPA. No soil disturbance expected, rope delineation still in place, straw & pine needle wattles on-site

UTM Zone	11
Easting	247850
Northing	4313936

Form HV1: Temporary BMPs for On-going Construction

ID# 594

Selection Code S03

Forest LTMBU District State NV

Construction Site Name Tubing Run Revisions

Township 12N Range 18E Section 1

Date of Project Start 6/15/2015

Survey Date/Time 6/19/2015

6th Field HUC Watershed CA-1

Reviewer(s) K. Roaldson, K. Flannagan, E. Harmon

Construction Foreman Bill Brown

Construction Type: Lift Project Is: Reconstruction Other (Describe) NA

General Information

Name Of Plans Summer Tubing Run

Job No. 15-102.2

Date 3/17/2015 Rev Date NA

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Temp. BMPs to address erosion control, including: boundary fence, restricted access, water truck for dust control, covered/watered stockpiles, sediment barriers.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns	3=Major departure from contract and/or major resource concerns
2=Minor departure from contract and/or minor resource concerns	4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1

1 = Meets / Exceeds contract requirements and/or no resource concerns	3 = Major departure from contract and/or major resource concerns
2 = Minor departure from contract and/or minor resource concerns	4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score: 1 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

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|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Work in progress on regrading of new tubing lane location. Geotextile placed under large riprap and soil on top. Stockpiled soil protected with wattles, wattles downslope from active construction. Minor stain spill on wood chips from deck work in progress. Stockpiled boulders for stabilization. No evidence of ponding or erosion following ~1" storm event.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Temp. BMPs to address erosion control, including: boundary fence, restricted access, water truck for dust control, covered/watered stockpiles, sediment barriers.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
 2=Minor departure from contract and/or minor resource concerns
 3=Major departure from contract and/or major resource concerns
 4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1 = Meets / Exceeds contract requirements and/or no resource concerns
 2 = Minor departure from contract and/or minor resource concerns
 3 = Major departure from contract and/or major resource concerns
 4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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|--|--|--|--------------------------|
| <input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns. | <input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. | <input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. | <input type="radio"/> NA |
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
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4) Effectiveness of hazardous substance control measures.

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- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Grading work complete on tubing lanes and tubing lane material installation in progress. Grading work and road base application on new access road. Wood chips placed around entire tubing area and on public access path. No evidence of erosion following ~0.5" rain event. New access road grading in progress.

UTM Zone
 Easting
 Northing

Form HV1: Temporary BMPs for On-going Construction

ID#
 Selection Code

Forest District State

Construction Site Name

Township Range Section

Date of Project Start

Survey Date/Time

6th Field HUC Watershed

Reviewer(s)

Construction Foreman

Construction Type: Project Is: Other (Describe)

General Information

Name Of Plans Job No.
 Date Rev Date

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

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2) Are BMP measures constructed according to contract design specifications?

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Implementation Score:
 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

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|--|--|--|--------------------------|

c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- | | | | |
|---|--|--|--------------------------|
| <input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event. | <input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely. | <input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management. | <input type="radio"/> NA |
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- | | | | |
|--|---|--|--------------------------|
| <input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. | <input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site. | <input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section. | <input type="radio"/> NA |
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Work on tubing lanes and new access road complete. Wood chips placed around entire tubing area and on public access path. Old access road to be decommissioned and stabilized.

UTM Zone	11
Easting	247850
Northing	4313936

Form HV1: Temporary BMPs for On-going Construction

ID# 621

Selection Code S03

Forest LTMBU District State NV

Construction Site Name Tubing Run Revisions

Township 12N Range 18E Section 1

Date of Project Start 6/15/2015

Survey Date/Time 7/31/2015

6th Field HUC Watershed CA-1

Reviewer(s) K. Roaldson

Construction Foreman Bill Brown

Construction Type: Lift Project Is: Reconstruction Other (Describe) NA

General Information

Name Of Plans Summer Tubing Run

Job No. 15-102.2

Date 3/17/2015 Rev Date NA

Specific concerns associated with construction project and describe BMP measures designed to achieved resource protection.

Temp. BMPs to address erosion control, including: boundary fence, restricted access, water truck for dust control, covered/watered stockpiles, sediment barriers.

Implementation

1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.

1

1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns	3=Major departure from contract and/or major resource concerns
2=Minor departure from contract and/or minor resource concerns	4=Repeated departure from contract and/or failure to address resource concerns

2) Are BMP measures constructed according to contract design specifications?

1

1 = Meets / Exceeds contract requirements and/or no resource concerns	3 = Major departure from contract and/or major resource concerns
2 = Minor departure from contract and/or minor resource concerns	4 = Repeated departure from contract and/or failure to address resource concerns

Implementation Score: 1 (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

<input checked="" type="radio"/> Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	<input type="radio"/> Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depositional fans, are evident near erodible soil areas; however, no evidence is observed of sediment delivery to SEZ.	<input type="radio"/> Substantial areas of exposed erodible soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	<input type="radio"/> NA
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b) Cut and fill slope protection (including surface erosion and slope failure potential)

<input checked="" type="radio"/> Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	<input type="radio"/> Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	<input type="radio"/> Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year--1 hour event; or any observation of sediment transport and/or deposition within SEZ.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

<input checked="" type="radio"/> No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.	<input type="radio"/> Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

<input checked="" type="radio"/> Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20-year 1-hour storm event.	<input type="radio"/> Minor resource concern is evident at infiltration zones (for storms <20-yr 1-hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.	<input type="radio"/> Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.	<input type="radio"/> NA
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3) Designation of construction zone and any equipment exclusion zones

a) Sensitive areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

<input checked="" type="radio"/> Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	<input type="radio"/> Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.	<input type="radio"/> Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts off-site or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.	<input type="radio"/> NA
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4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).
- Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
- NA

Effectiveness Score:
(BMP Monitoring Rule Set)

Additional Comments

Grading work complete and two tubing lanes open to the public. Wood chips placed around entire tubing area and on public access path. Old access road to be decommissioned and stabilized.

UTM Zone	11	Form HV2: Permanent BMPs for Buildings and Structure Developments		ID#	540			
Easting	247727			Selection Code	S03			
Northing	4313595							
Building/Structure Name	Aries Ski Run		Township	12N	Range	18E	Section	1
Date of Project Start		Date of Project End		6th Field HUC Watershed	CA-1	State	CA	
Reviewer(s)	K. Roaldson		Survey Date	8/24/2015	Date BMP Implementation Complete		Last BMP Maintenance	
Structure Type:	Other	Survey Type	Follow-up	Depth/Duration:		Other (Describe)	Ski Run	
Plan Title:	Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS		Job No.:		Plan Date:		Plan Revision Date:	
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.								
Soil stabilization, prevention of sediment transport, improve erosion resistance.								
Implementation								
For Permanent or Temporary-Seasonal Structures:				1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns				
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?							1	
2) Are BMP measures constructed according to contract design specifications?							1	
Additional Comments:								
Implementation of treatment identified in Erosion Hotspot Inventory.								
Effectiveness						Implementation Score: 1		
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.						(BMP Monitoring Rule Set)		
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.								
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)								

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input checked="" type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input checked="" type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Eliminated several rills and gullies near the top of the Aries Ski Run. Stabilized ski run with a series of mulch berms at the top of the slope. Added 2-3 inches of mulch ground cover in areas lacking effective cover. Created infiltration spreading area below the top of ski run. Effectiveness will be evaluated in 2016.

UTM Zone	11	Form HV2: Permanent BMPs for Buildings and Structure Developments		ID#	438
Easting	249800			Selection Code	S03
Northing	4314757				
Building/Structure Name	Galaxy Wetland			Township	13N
		Range	19E	Section	31
Date of Project Start		Date of Project End	10/30/2007	6th Field HUC Watershed	NV-2+5
				State	NV
Reviewer(s)	K. Roaldson, K. Flannagan, E. Har				
Survey Date	6/19/2015	Date BMP Implementation Complete		Last BMP Maintenance	
Structure Type:	Other	Survey Type	9th Year Post Construction	Depth/Duration:	
				Other (Describe)	
Plan Title:	Galaxy Wetland Restoration		Job No.:	Plan Date:	Plan Revision Date:
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.					
Inlet and Outlet Stability, sediment contribution to stream flow, maintenance of wetland vegetation for trapping sediment					
Implementation					
For Permanent or Temporary-Seasonal Structures:			1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns		
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?					1
2) Are BMP measures constructed according to contract design specifications?					1
Additional Comments:					
Effectiveness				Implementation Score:	1
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.				(BMP Monitoring Rule Set)	
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.					
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)					

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

<input checked="" type="radio"/> Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	<input type="radio"/> Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	<input type="radio"/> Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).	<input type="radio"/> NA
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b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

<input checked="" type="radio"/> Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	<input type="radio"/> Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	<input type="radio"/> Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.	<input type="radio"/> NA
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c) Cut and fill slope protection (including surface erosion and slope failure potential).

<input checked="" type="radio"/> BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	<input type="radio"/> BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	<input type="radio"/> BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	<input type="radio"/> NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

<input checked="" type="radio"/> Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	<input type="radio"/> Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	<input type="radio"/> Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	<input type="radio"/> NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

No evidence of erosion or unstable slopes at inlet or outlet of constructed wetland. Robust revegetation growth, no resource concerns at this time.

UTM Zone	11	ID#	515				
Easting	249410	Selection Code	S06				
Northing	4315724	Form HV2: Permanent BMPs for Buildings and Structure Developments					
Building/Structure Name	Nevada Trail Ski Run					Township	13N
Date of Project Start		Date of Project End		6th Field HUC Watershed	NV-4	State	NV
Reviewer(s)	K. Roaldson, K. Flannagan, E. Har						
Survey Date	6/19/2015	Date BMP Implementation Complete		Last BMP Maintenance			
Structure Type:	Other	Survey Type	Post Storm Survey	Depth/Duration:	~1.0"	Other (Describe)	Ski Run
Plan Title:	CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:		Plan Date:		Plan Revision Date:	
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.							
Erosion resistance along roadway							
Implementation							
For Permanent or Temporary-Seasonal Structures:				1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns			
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?							1
2) Are BMP measures constructed according to contract design specifications?							1
Additional Comments:							
Effective cover							
Effectiveness						Implementation Score:	1
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.						(BMP Monitoring Rule Set)	
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.							
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)							

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

- Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.
- Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.
- Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).
- NA

b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

- Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.
- Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.
- Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.
- NA

c) Cut and fill slope protection (including surface erosion and slope failure potential).

- BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.
- BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.
- BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.
- NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

- Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.
- Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.
- Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.
- NA

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Rock lined channel shows some signs of sediment movement after rain event. Excellent coverage on surrounding slope.

UTM Zone	11	ID#	544
Easting	249410	Selection Code	S06
Northing	4315724	Form HV2: Permanent BMPs for Buildings and Structure Developments	
Building/Structure Name	Nevada Trail Ski Run		
		Range	19E
		Section	30
Date of Project Start		Date of Project End	
		6th Field HUC Watershed	NV-4
		State	NV
Reviewer(s)	K. Roaldson, K. Flannagan, E. Har		
Survey Date	10/8/2015	Date BMP Implementation Complete	
		Last BMP Maintenance	
Structure Type:	Other	Survey Type	Post Storm Survey
		Depth/Duration:	~1.0"
		Other (Describe)	Ski Run
Plan Title:	CERP applies, Erosion Hotspot Inventory Epic Discovery EIR/EIS/EIS	Job No.:	
		Plan Date:	
		Plan Revision Date:	
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.			
Erosion resistance along roadway			
Implementation			
For Permanent or Temporary-Seasonal Structures:		1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns	
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?		1	
2) Are BMP measures constructed according to contract design specifications?		1	
Additional Comments:			
Effective cover			
Effectiveness		Implementation Score: 1	
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.		(BMP Monitoring Rule Set)	
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.			
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)			

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

- Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.
- Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.
- Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).
- NA

b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

- Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.
- Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.
- Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.
- NA

c) Cut and fill slope protection (including surface erosion and slope failure potential).

- BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.
- BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.
- BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.
- NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

- Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.
- Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.
- Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.
- NA

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Rock lined channel has been cleaned, no evidence of erosion following storm event. Excellent coverage on surrounding slope.

UTM Zone	11	ID#	411
Easting	248867	Selection Code	S03
Northing	4315031		

Form HV2: Permanent BMPs for Buildings and Structure Developments

Building/Structure Name	Olympic Express Lower Terminal	Township	13N	Range	19E	Section	31
Date of Project Start	7/23/2007	Date of Project End		6th Field HUC Watershed	NV-3	State	NV

Reviewer(s)	K. Roaldson	Survey Date	10/8/2015	Date BMP Implementation Complete		Last BMP Maintenance	
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Structure Type:	Lift-Base	Survey Type	Post Storm Survey	Depth/Duration:	~1.0"	Other (Describe)	
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Plan Title:	2007 Implementation - Northbowl/Olympic Express Lift Replacement Project	Job No.:	00-607.32	Plan Date:	06/27/2007	Plan Revision Date:	
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Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.
 Erosion and sediment transport prevention, revegetation establishment

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1
2) Are BMP measures constructed according to contract design specifications?	1

Additional Comments:

Permanent infiltration BMPs are implemented per the plans

Effectiveness

Implementation Score:
 (BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

- Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.
- Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.
- Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).
- NA

b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

- Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.
- Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.
- Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on-site erosion, or any evidence of sediment delivery to SEZ.
- NA

c) Cut and fill slope protection (including surface erosion and slope failure potential).

- BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.
- BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.
- BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year--1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.
- NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

- Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.
- Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.
- Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.
- NA

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

<input checked="" type="radio"/> Hazardous substance control measures provide effective mitigation.	<input type="radio"/> Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	<input type="radio"/> Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	<input type="radio"/> NA
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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Good coverage with pine needle and wood chip mulch beneath terminal and surrounding area. Sediment removed from geotextile fabric (pyramat) lined channel, riprap refurbished and mulch cover improved. Rock riprap slope below road appears very stable. No signs of erosion after rain event.

UTM Zone	11	Form HV2: Permanent BMPs for Buildings and Structure Developments	ID#	514
Easting	247813		Selection Code	S03
Northing	4313806			
Building/Structure Name	Zip Line (Multi Rider) - Launch Tower		Township	12N
			Range	18E
			Section	1
Date of Project Start	6/17/2013	Date of Project End	9/10/2014	6th Field HUC Watershed
				CA-1
				State
				NV
Reviewer(s)	K. Roaldson		Survey Date	10/8/2015
			Date BMP Implementation Complete	9/10/2013
			Last BMP Maintenance	9/10/2013
Structure Type:	Other	Survey Type	1st Year Post Construction	Depth/Duration:
				Other (Describe)
				Zip Line Terminal

Plan Title:	Heavenly Summer Activities	Job No.:	12-602.4	Plan Date:	11/9/12	Plan Revision Date:	
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Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.

Effective cover/erosion resistance

Implementation

- 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
- 2=Minor departure from standards and/or minor resource concerns
- 3=Major departure from standards and/or major resource concerns
- 4=Repeated departure from standards/failure to address concerns

For Permanent or Temporary-Seasonal Structures:

1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource protection during a 20-year 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1
2) Are BMP measures constructed according to contract design specifications?	1

Additional Comments:

Effectiveness

Implementation Score:

(BMP Monitoring Rule Set)

Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.

1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.

(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed separately)

a) Soil Protection measures, artificial or vegetative, designed to eliminate erosion by runoff and rain-drop impact

- Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.
- Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.
- Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ).
- NA

b) Observed progression/improvement of areas identified for revegetation in structure plan as scheduled; and adequate erosion protection measures applied for successful revegetation, such as temporary armoring measures (including mulch, rock, erosion cloth or other) applied while vegetation becomes established. .

- Revegetation establishment proceeding as expected--new and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.
- Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.
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- NA

c) Cut and fill slope protection (including surface erosion and slope failure potential).

- BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.
- BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.
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- NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

- Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.
- Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.
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- NA

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

<input checked="" type="radio"/> No evidence of unexpected ponding on-site, or constructed detention ponds and outlets are stable (naturally stable, stabilized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	<input type="radio"/> Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	<input type="radio"/> On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<input type="radio"/> NA
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3) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

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Effectiveness Score:

(BMP Monitoring Rule Set)

Additional Comments

Effective cover achieved with wood chip mulch. No evidence of rilling or soil movement 1 year post construction.

Mitigation and Monitoring Plan Annual
Report (October 2014 – September 2015)

APPENDIX II
2015 RESTORATION & MONITORING
ANNUAL REPORT (IERS)

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HEAVENLY MOUNTAIN RESORT OUTCOME-BASED WATERSHED MANAGEMENT PROGRAM 2015 RESTORATION AND MONITORING ANNUAL REPORT



Prepared by

Kevin Drake, CPESC
Integrated Environmental Restoration Services, Inc.

Prepared for

Frank Papandrea and Andrew Strain
Heavenly Mountain Resort

April 2016

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INTRODUCTION

This report describes the results of an outcome-based watershed management approach that guided restoration and monitoring efforts on a growing list of mountain improvement projects at Heavenly Mountain Resort since 2007. These projects were approved as part of Heavenly Mountain Resort's 2007 Master Plan Amendment. Integrated Environmental Restoration Services (IERS) principal Michael Hogan began working with Heavenly in 2006 to facilitate an agreement between Heavenly, the USDA Forest Service - Lake Tahoe Basin Management Unit (LTBMU), and the League to Save Lake Tahoe that established common ground between all parties. This agreement laid out a framework for setting clear goals, defining "success" in quantitative terms, developing low-maintenance and effective treatment strategies, and directly measuring the results of project implementation. This framework follows the principles of outcome-based management (described below).

In 2014, this outcome-based watershed management approach was formally incorporated into the Mitigation and Monitoring Program for the Heavenly Epic Discovery EIS and additional erosion hot spot assessment was completed in the upper portion of the CA-1 watershed (Sky Basin) and the NV-1 watershed (Mott Canyon). 2015 was focused on treating high priority hot spots identified in both the CA-1 and NV-1 watersheds.

PROJECT OVERVIEW

IERS has been working with Heavenly since 2006 to set goals and objectives, define success criteria, develop soil and vegetation treatment approaches, conduct pre-treatment (baseline) and post-treatment (performance) monitoring to measure whether each project had a net impact on soil, vegetation, or runoff and sediment transport, and to document implementation activities. This report describes the process and results of using this outcome-based adaptive management approach to plan, implement, monitor and continually improve specific projects and overall watershed management approaches at Heavenly. This approach has been supported by the League to Save Lake Tahoe, the USDA Forest Service - Lake Tahoe Basin Management Unit, the Tahoe Regional Planning Agency, and the Lahontan Regional Water Quality Control Board and is an integral component of Heavenly's Master Plan Amendment EIR.

Projects implemented under this program to date include lift replacement, lodge construction, spoils placement and stabilization, zip line construction, road construction and removal, ski run clearing and glading, and waterline and snowmaking line installation. For each project, goals and success criteria have been defined, performance monitoring has been conducted using direct erosion measurements (rainfall or runoff simulation) and a suite of soil and vegetation measurements, and follow-up actions have been developed where needed in order to achieve project success criteria. Despite much discussion about adaptive management in the Lake Tahoe Basin, this program is one of the only known multi-year examples of adaptive management actually being applied to improve the sediment source control effectiveness of on-the-ground restoration projects in the Lake Tahoe Basin.

This information being developed in this program is of great value in this region and beyond, as little monitoring of restoration treatment effectiveness has been conducted in high elevation (above 8000 ft) settings with poorly developed soils, particularly those derived from decomposed granite. The Heavenly restoration and monitoring program is demonstrating and continually refining a new model for land management, one that rethinks and tests assumptions about project outcomes. This program is also helping to develop new restoration treatment techniques, expand understanding of treatment effectiveness, define and refine appropriate success criteria, and sharing this information to support similar efforts within and beyond the Tahoe Basin.

OVERALL SITE DESCRIPTION

Heavenly Mountain Resort (Heavenly) is a ski resort located on the east slope of the central Sierra Nevada Mountains in the Carson Range on the southeast side of the Lake Tahoe Basin. Heavenly spans Nevada and California and has approximately 650 acres of ski runs, 30 ski lifts, 35 structures, and approximately 30 miles of roads within the resort boundary.

Soils are derived from granitic parent material and deposits of decomposed granite rock including quartz, monzonite, and granodiorite. Heavenly is predominantly located within a mixed conifer forest, with some of the upper reaches of the resort within a Western White Pine Series vegetation type (Sawyer and Keeler-Wolf, 1995). Elevations range from 6,225 ft above mean sea level (AMSL) in the Heavenly Village to 10,400 ft AMSL at the top of the Sky Express.

The environment varies from densely forested at the lower elevations to open and exposed slopes at the higher elevations. The overstory is dominated by red fir (*Abies magnifica*), whitebark pine (*Pinus albicaulis*), Western white pine (*Pinus monticola*), lodgepole pine (*Pinus contorta*), and mountain hemlock (*Tsuga mertensiana*). Native plants dominate the understory in undisturbed areas and include pinemat manzanita (*Arctostaphylos nevadensis*) and huckleberry oak (*Quercus vacciniifolia*). Native grasses and forbs are also present. At the higher elevations, plant cover is sparser and large areas of bare soil exist. Ski runs and other disturbed and revegetation treatment areas tend to be dominated by non-native fescue (*Festuca trachyphylla*).

OVERALL PROGRAM GOALS

TREATMENT GOALS

- To implement projects that result in no net increase in runoff or sediment transport
- To implement sediment source control treatments that are either self-sustaining (as measured by resilience indices, discussed below) OR are accompanied by a plan for ongoing maintenance and management to maintain erosion resistance
- To develop and demonstrate an applied adaptive management program for development, management and maintenance activities in upper watersheds

MONITORING GOALS

- To quantitatively assess whether projects result in no net increase in runoff or sediment transport
- To identify and quantify indices of long-term ecosystem sustainability to the greatest extent possible
- To use monitoring data to determine the cost-effectiveness of restoration techniques
- To use monitoring data to improve effectiveness of future treatments

OUTCOME-BASED WATERSHED MANAGEMENT APPROACH

The Heavenly Valley Master Plan Amendment EIR of 2007 included an innovative approach to project implementation known as adaptive management, or more recently described as “outcome-based management” (Drake and Hogan 2012). For many years in the Lake Tahoe Basin, projects have been designed to comply with regulations. In that attempt to comply is embedded the assumption that compliance measures actually attain the goals that they are designed to attain. However, a majority of the BMPs currently approved for specific projects have not been tested or measured for performance in the type of situation or conditions to which they are being applied. In fact, most permanent BMPs are based on model predictions, such as the Universal Soil Loss Equation. Thus we have made little progress toward either understanding or improving performance on many of the standard and accepted BMPs. Heavenly has departed from this approach and while the outcome-based management system being employed assures regulatory compliance, this approach is being used to assess the actual performance of both standard and newly developed BMPs in order to assure a higher level of environmental performance and cost-effectiveness.

The concept of adaptive management has been applied for centuries under a number of different names. Physical engineers have used this approach since the first structure or bridge was constructed to continually learn from ‘failures’ and successes to improve designs. In the realm of applied science, including restoration and erosion control, adaptive management has not, until recently, been widely embraced. This effort at Heavenly Mountain Resort is one of the first projects truly managed for outcomes (rather than simply compliance) in the Lake Tahoe Basin.

Outcome-based management is a stepwise process that enables effective watershed management by embracing the fact that we do not fully understand the range of complex variables within a watershed. The process acknowledges that we do not completely understand the system that we are working with, and that we must proceed with projects using existing information while simultaneously gathering the knowledge that we lack. This structured decision making process is designed to increase knowledge and understanding while taking concrete steps toward quantifiable sediment source control. It is an extremely powerful tool to help protect and improve water quality and guide watershed management programs. Outcome-based management allows flexibility, while supporting accountability and innovation. There are five steps in the outcome-based management process being used at Heavenly:

1. **AIMING:** articulating goals and objectives, defining success criteria, and identifying known and unknown information.
2. **GAINING UNDERSTANDING:** gathering on-the-ground information the site/project and watershed and assessing strategies for a site-specific implementation plan. Monitoring results from past projects are used as the basis for developing treatment strategies for new projects that are most likely to achieve project objectives and success criteria. Often this step includes small-scale development plots to test different treatment approaches.
3. **DOING:** the part of the process where the plan is understood, implemented, and documented to support monitoring and continual improvement.
4. **ACHIEVING:** directly assessing project performance/effectiveness relative to goals and success criteria and reporting this information annually.
5. **IMPROVING:** embracing unexpected project outcomes, sharing project successes and failures with others, making adjustments to projects that did not achieve their intended outcome(s), and integrating lessons learned into future projects.



Figure 1. Outcome-based Management Model (from Drake and Hogan 2012).

Many technical tools and examples of what has been achieved through this adaptive watershed management process at Heavenly (and many other sites in the Tahoe region) have been integrated into the *Watershed Management Guidebook* (Drake and Hogan 2012), a new resource for outcome-based watershed management prepared by Integrated Environmental Restoration Services for the California State Water Resources Control Board.

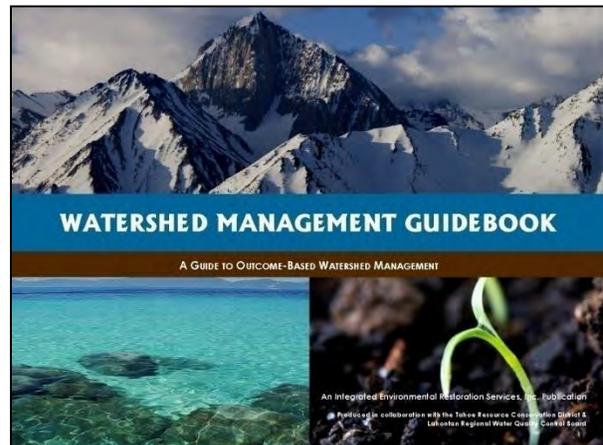


Figure 2. Watershed Management Guidebook (Drake and Hogan 2012).

SHIFTING FROM PLANT COVER TO EROSION RESISTANCE

For many decades, the success of erosion control projects has been defined largely in terms of plant cover or other form-based measures of vegetation response. At the core of Heavenly's Cumulative Watershed Effects (CWE) implementation program is the goal of establishing "effective soil cover." The term "effective soil cover" has its roots in the Universal Soil Loss Equation (USLE), an erosion model developed in and for agricultural settings, not high elevation forested settings like Heavenly. A core assumption in the USLE model is that control of erosion is dependent on the presence of vegetative cover. A growing body of research from Heavenly projects and throughout the Tahoe Basin has shown that effective erosion control is, instead, more dependent on a range of other readily-measurable variables including total cover (mulch, rock, vegetation, etc), soil density, infiltration, and slope and surface roughness than it is on vegetative cover alone (IERS/Grismer and Hogan, 2002-2009). Moreover, short-term plant establishment has been shown to be an insufficient (and sometimes misleading) predictor of long-term restoration success (Herrick et al. 2006) and erosion resistance (Grismer et al. 2008). Heavenly has gone to great lengths and made large financial investments in labor and infrastructure to repeatedly fertilize, seed and irrigate disturbed soil areas in an effort to establish vegetation. However, by using applied adaptive management, testing new treatment approaches, and directly measuring erosion reductions, Heavenly has demonstrated a range of cost-effective treatment and monitoring approaches over the past few years.

In this outcome-based watershed management program at Heavenly, a seemingly modest plant cover success criteria of 10% has been maintained for the past several years. Most treatment efforts at Heavenly over the past 3-4 years have met the success criteria for direct erosion measurements (e.g. sediment yield, infiltration rate) and indices of key soil edaphic¹ factors responsible for controlling erosion (e.g. organic matter, soil density). However, unmet vegetation success criteria in the first year or two after treatment have triggered actions such as reseeding and irrigation in an effort to accelerate vegetation establishment on several projects. In most cases these actions have not led to achievement of vegetation success criteria and in some isolated areas, temporary irrigation has actually *increased* erosion. One year following treatment, the overall *functional* goal of "no increase in runoff or sediment yield" had been met but in pursuit of the commonly accepted *form*-based indicator of erosion control success – vegetation cover – additional resources were expended with no further reduction in erosion risk.

In the arid, high-alpine conditions at Heavenly, soil development and vegetation establishment is a very slow process, even in undisturbed "native" areas. Rather, the ecosystem's natural strategy for resisting erosion and sustaining itself is to capture energy in the form of carbon through breakdown and assimilation of surface organic matter. The soil-based treatment approach at Heavenly has been aiming to re-establish the same soil edaphic factors found in undisturbed areas in areas where those factors have been disrupted (e.g. compaction, topsoil removal, etc.). When soil edaphic factors are optimized, not only is the overall goal of erosion resistance achieved but conditions are created that will eventually support native vegetation. At some sites, nearby seeds transported by wind or animals or root-propagating plants may have a competitive advantage over hand-applied commercial seed. The key variable is time, and we have limited understanding of how these sites will change over time. The outcome-based management process being used at Heavenly is based on this premise that while we cannot

¹ Of, or relating to, the physical, chemical and biological conditions of the soil. Edaphic characteristics include such factors as water content, aeration, and the availability of nutrients.

effectively predict change, we can take steps to learn from each project and simultaneously assure that the goal of erosion resistance is achieved and maintained over time.

We are now using a systematic approach that emphasizes the soil edaphic factors that are required to reduce erosion in the *present* and recognizes that such erosion-resistant soil conditions are a requirement for long-term re-establishment of self-sustaining vegetation communities. This approach is quite different than the way most erosion control efforts are planned, implemented and assessed, and is essentially an important shift from a vegetation-oriented “landscaping” approach to a function-driven “ecosystem” approach.

WATERSHED MANAGEMENT OBJECTIVES

TREATMENT OBJECTIVES

- To prioritize treatment types and locations based on water flow, connectivity and cost-effectiveness
- To maximize hydrologic function (surface flow patterns, infiltration)
- To stabilize soils (surface protection, minimize runoff)
- To re-establish native vegetation where appropriate²
- To minimize irrigation and fertilizer use to greatest extent possible

MONITORING OBJECTIVES

- To quantitatively assess erosion reductions and indices of long-term erosion resistance
- To use monitoring data to determine the cost-effectiveness of different restoration treatments
- To use monitoring data to improve effectiveness of future restoration treatments

WATERSHED ASSESSMENT AND RESTORATION PROCESS

PRIORITIZE TREATMENTS

Rather than assessing vegetation cover at fixed sites around the mountain, Heavenly is using the erosion-focused rapid assessment (EfRA) process described in the *Watershed Management Guidebook* (Drake et al. 2012). This methodology focuses on identifying the primary sources of erosion (“hot spots”) through a simple GIS flow accumulation mapping exercise followed by on-the-ground assessment and prioritizing treatments within a watershed context. That is, areas with high erosion potential (or actual observed erosion) and high hydrologic connectivity to surface waters are generally ranked as higher priorities and hot spots with lower erosion potential and/or connectivity to surface water are ranked as lower priorities. This approach is based on developing an understanding of water flow patterns in the watershed and addressing the root cause(s) of erosion issues (often a failed water bar or other concentrated drainage features) rather than using modeling and extrapolation to make statements about the theorized “condition” of the entire watershed. Ultimately, this approach is about actually

² Vegetation re-establishment goals will be determined on a project-specific basis. For instance, vegetation is typically more integral for creating erosion-resistant site conditions in an SEZ or on very steep slopes, whereas vegetation may be a lower priority on a high-elevation project near the top of the mountain. Vegetation establishment trajectories will also be different for sites with access to irrigation versus sites without access to irrigation.

fixing erosion problems. This effort of identifying and prioritizing hot spots began in the CA-1 watershed (Heavenly Valley Creek) in 2013 and will be expanded to other Heavenly watersheds in the coming years.

TREAT PRIORITY AREAS

Once erosion “hot spots” are identified and prioritized, treatments are developed based on the understanding of site conditions gained through Tier 2 or 3 assessment (see Table 1 below) , treatment goals and operational requirements. Different treatment levels – ranging from mulch-only to “full restoration” – have been tested and demonstrated at Heavenly over the past decade. Heavenly’s intention is to continue testing different erosion control and restoration treatments at different sites in order to demonstrate increasingly cost-efficient and ecologically effective outcomes in watershed management.

MEASURE OUTCOMES

Heavenly has already been using monitoring techniques that directly measure erosion reductions and indices of a site’s erosion resistance. These measurement methods are typically used before implementation of erosion control treatments and repeated one year after treatments to assess the effectiveness of a project at reducing erosion and rebuilding erosion resistance at a particular site.

Below is a brief description of the primary assessment approaches being used to measure erosion resistance and treatment effectiveness at Heavenly restoration sites. These methods can be used individually or in combination as assessment “tiers”, as described in 1, below. The exact monitoring approach will be adjusted where appropriate to best suit site conditions, assessment and management needs, and treatment goals for specific projects and/or watersheds. Monitoring will be more intensive on some projects and less intensive on others, depending on the site’s erosion risk and confidence in the repeatability of results from past projects with similar treatments.

- Visual Erosion Assessment: visually identify physical signs of erosion from direct or indirect field evidence in order to trace them to their source, characterize their nature and cause(s), and use this information to develop appropriate treatments.
- Cone Penetrometer: depth to refusal at a given pressure (typically 350 PSI) is relatively rapid and easy to measure and provides an important index of soil density/compaction.
- Cover Characterization: assess percent total cover, mulch cover, and plant cover using photo grid method and/or ocular estimates. These methods are far more rapid than transect-based approaches and since vegetation cover alone has been shown to have little to no correlation with sediment yield reductions at Heavenly, it is not necessary to be overly precise with plant cover measurements. Dominant vegetation species will be noted, as well as presence of any noxious weeds.
- Soil Assessment: field assessment of soil color, structure/texture, and other edaphic factors that provide insights into longer-term erosion resistance and the site’s ability to eventually support an appropriate vegetation community. May also include collecting soil samples before treatment (to determine soil deficiencies) and then again 2-3 years post-treatment³ for lab analysis of key indicators of soil “capital” such as organic matter and total nitrogen.

³ Analysis of soil post-treatment soil samples is best done 2-3 years following treatment, since decomposition of high-carbon soil amendments (e.g. wood chips), which are commonly used at Heavenly, takes at least several years in Taboe’s arid climate.

- **Runoff Simulation:** less time required than rainfall simulation and provides useful information about erosion processes and a site's erosion resistance, particularly with the coarse granitic soils at Heavenly (simulates snowmelt rather than rainfall). Runoff simulation is typically conducted on plots 1 meter wide and 2-4 meters in length, which enables assessment of runoff and erosion processes that are likely to be more representative of larger areas. Erosion measurements include: surface runoff velocity (ft/min), time and distance to rilling, rill characterization (#, soil loss), as well as site description elements such as slope angle, cover composition and litter depth.
- **Rainfall Simulation:** provides direct measurement of soil infiltration rate (in/hr), sediment yield (lbs/acre/inch), time to runoff, and other key erosion-related factors. Rainfall simulation is conducted on 1 square meter plots (smaller than runoff simulation plots) and resulting data is readily comparable to other sites and the large database of rainfall simulation data collected on past Heavenly projects and other projects throughout the Tahoe Basin.

Table 1. Heavenly Erosion Assessment Tiers

Tools	Tier 1 - Visual	Tier 2 – Soil/Site Condition	Tier 3 - Performance
Visual Erosion Assessment	X	X	X
Cone Penetrometer		X	X
Cover Characterization (mulch and veg cover, litter depth, veg composition)		X	X
Soil Assessment		X Visually assess texture, color, root penetration, soil development, etc.	X Same as Tier 2 + collect samples for analysis (organic matter, N)
Runoff/Rainfall Simulation			X
Purpose	Identify erosion problems and trace them to their source(s).	Characterize the nature/cause of erosion areas and develop appropriate treatments. This level of assessment will be applied to most sites before/after treatment and can be efficient at larger scales.	Directly assess erosion processes and post-treatment erosion reductions. This level of assessment will be applied at a smaller number of selected sites where new types of treatments and/or site conditions are being assessed.
Level of Effort	Low	Low to moderate	Moderate to intensive
Spatial Scale	Small catchment to whole watershed	Plot scale up to project treatment area (< 1 acre)	Plot scale up to project treatment area (< 1 acre)

EROSION-FOCUSED RAPID ASSESSMENT

Heavenly is using the erosion-focused rapid assessment (EfRA) process described in the *Watershed Management Guidebook* (Drake et al. 2012). This methodology focuses on identifying the primary sources of erosion (“hot spots”) through a simple GIS flow accumulation mapping exercise followed by on-the-ground assessment and prioritizing erosion “hot spots” for treatment within a watershed context. That is, areas with high erosion potential (or actual observed erosion) and high hydrologic connectivity to surface waters are generally ranked as higher priorities and hot spots with lower erosion potential and/or connectivity to surface water are ranked as lower priorities. This approach is based on developing an understanding of water flow patterns in the watershed and addressing the root cause(s) of erosion issues (often a failed water bar or other concentrated drainage features) rather than using modeling and extrapolation to make statements about the theorized “condition” of the entire watershed. Ultimately, this approach is about actually fixing erosion problems. This effort of identifying and prioritizing hot spots began in the CA-1 watershed (Heavenly Valley Creek) in 2013 and was expanded to the NV-1 (Mott Canyon) watershed in 2014. The erosion hot spots identified and their treatment status are summarized in this report.

EROSION HOT SPOT RANKING CRITERIA

- Erosion Risk (high/medium/low – H/M/L): combination of soil and site factors that directly influence erosion potential such as soil density/compaction, slope angle (steepness), total surface cover, and presence of flow concentration features (e.g. gully, water bar).
- Active Erosion (Y/N): visual evidence of erosion observed.
- Active Deposition (Y/N): visual evidence of sediment deposition observed.
- Proximity to Stream/SEZ (H/M/L): distance from hot spot to stream or SEZ (as the crow flies). Categories are: H = >500ft, M = 100-500ft, L = <100ft
- Connectivity to Stream/SEZ (H/M/L): likelihood of runoff and sediment from hot spot being transported to a stream or SEZ. Assessing connectivity requires basic understanding of hydrologic processes and a keen eye in the field, yet can be somewhat subjective. In general, high connectivity is characterized by a well-defined drainage path with minimal potential for storage or infiltration (e.g. a relatively steep gully/ditch). Low connectivity is generally characterized as having broad topographic definition and little to no evidence of recent concentrated flow.
- Watershed Priority (H/M/L): overall treatment priority for improving watershed conditions, based on above criteria.

CA-1: EROSION HOT SPOT SUMMARY MATRIX

Table 2. Heavenly Erosion Hot Spot Summary Matrix (CA-1 watershed)

Hot Spot #	Erosion Risk	Active Erosion	Active Deposition	Proximity to Stream/SEZ	Connectivity to Stream/SEZ	Watershed Priority	Problem Description	Treatment Recommended/ Implemented
1	H	Y	Y	L	L	M	Gully formed on slope from road drainage above	Rock armor gully; PN wattles to capture sediment
2	H	Y	Y	H	H	H	Powderbowl lower slope (directly above creek)	Full Hogan treatment completed in 2012
3	H	Y	Y	H	H	H	ski run with dense soil, little cover and drains direct to creek	remove lower 1-2 WBs; mulch and/or chip 'n' rip
4	H	Y	Y	H	H	H	small gully connecting road runoff to creek	chip 'n' rip road shoulder (to spread and infiltration runoff) + add PN wattle as sediment forebay
5	H	Y	Y	H	H	H	water bar creates quasi-basin off Maggies, which overtops to down drain direct to creek when full	slight reshaping and Full Hogan treatment to maximize infiltration
6	H	Y	Y	L	L	M	Giant sediment plume and incising WBs downslope of road, all caused by concentrated road runoff	2015: Infiltration area added for road runoff; entire slope mulched; sediment plume removed at bottom of slope
7	M	Y	Y	L	L	M	Road drainage to breached WB formed gully down fir-covered ski run.	maintain drainage to WB on ski run; rake out gully; apply thick mulch to lower ski run above road
8	H	Y	Y	H	M	M	Gully down 277 sidehill below mid-slope WB	remove WB and gully and treat with full Hogan
9	H	Y	Y	H	H	H	large plume of deposited sediment and eroding slope above (just downslope of 277 sidehill)	stabilize bare soil areas with Full Hogan and/or chip 'n' rip; mulch filter berm or PN wattle could be temp fix

Hot Spot #	Erosion Risk	Active Erosion	Active Deposition	Proximity to Stream/SEZ	Connectivity to Stream/SEZ	Watershed Priority	Problem Description	Treatment Recommended/ Implemented
10	H	Y	Y	H	H	H	Road drainage/erosion issues into SEZ above snow beach	PN wattles already installed as temp protection; stabilize compacted/bare source areas along roads upslope (e.g. chip 'n' rip); heavy chip 'n' rip below road to create spreading/infiltration area
11	H	Y	Y	M	M	L	gully on slope created from concentrated road drainage	re-orient road drainage or rock-armor gully
12	M	Y	Y	M	M	M	Combo of ski run erosion and road drainage near Patsy's chair. Head cutting along rock swale near summer road. Roadside swale buried in sediment. Several bare areas and gullies on ski run.	Consider surfacing road to reduce erosion. Stabilize bare/eroding areas on ski run. Maintain portions of rock armored swales and till in chips under swales to increase infiltration.
13	H	Y	Y	M	H	L	water bar draining to reservoir.	Infiltration swale constructed and wattles installed 2015
14	H	Y	Y	M	M	L	water bar draining to reservoir.	Infiltration swale constructed and wattles installed 2015
15	H	Y	Y	H	M	L	water bar draining to reservoir.	Infiltration swale constructed and wattles installed 2015
16	H	Y	Y	H	H	L	water bar draining to reservoir.	Infiltration swale constructed and wattles installed 2015
17	H	Y	Y	H	H	H	1st WB below res on Maggie's, drains direct to crk.	Wood chips applied along shoulders; PN wattles installed and maintained throughout season
18	H	Y	Y	H	H	H	2nd WB below res on Maggie's, drains direct to crk.	Wood chips applied along shoulders; PN wattles installed and maintained throughout season
19	H	Y	Y	M	M	M	WB along Maggie's, first below intersecting rd (drops of steep slope)	Wood chips applied along shoulders; PN wattles installed and maintained throughout season
20	H	Y	Y	M	M	M	WB along Maggie's	Wood chips applied along shoulders; PN wattles installed and maintained throughout season

Hot Spot #	Erosion Risk	Active Erosion	Active Deposition	Proximity to Stream/SEZ	Connectivity to Stream/SEZ	Watershed Priority	Problem Description	Treatment Recommended/ Implemented
21	H	Y	Y	M	H	H	WB along Maggie's, obvious flow accum above road	Wood chips applied along shoulders; PN wattles installed and maintained throughout season
22	H	Y	Y	M	M	M	WB along Maggie's, starting to flatten out (geogrid on slope)	Wood chips applied along shoulders; PN wattles installed and maintained throughout season
23	M	Y	Y	H	H	H	Lower Pioneer Poma - several WBs concentrate surface runoff into swale down middle of ski run, which routes sediment to SEZ	Full Hogan and chip 'n' rip treatments completed October 2013
24	H	Y	Y	H	H	H	water bar drains direct to creek	PN wattles installed and maintained above Creek
25	H	Y	Y	H	H	M	ditch between road and eroding cut slope; major deposition; req's frequent maintenance	stabilize cut slope (install a few small test treatments); use pine needle check dams to trap sediment and determine slope areas producing most sediment
30	L	N	Y	H	H	M	bare and poorly vegetated area under Sky Deck (~3000sf)	restoration and planting shade-tolerant meadow/riparian species
31	M	Y	Y	H	H	H	erosion from bare ski run area above road (and on road) directly to meadow below	Mulch application completed on road shoulders above meadow
32	M	Y	Y	H	H	H	rock-lined swale around Canyon base filled with sediment; sediment plume into meadow	Sediment removed and pine needle check dams added to drainage

Hot Spot #	Erosion Risk	Active Erosion	Active Deposition	Proximity to Stream/SEZ	Connectivity to Stream/SEZ	Watershed Priority	Problem Description	Treatment Recommended/ Implemented
33	H	Y	Y	H	M	H	steep ski run (lower double down) with low surface cover and sparse trees; water bar near bottom of run filled with sediment and overtopped	2015: Pine needle filter berms installed across slope; water bar tilled and converted to infiltration swale
34	H	Y	Y	H	H	H	steep ski run (lower ridge run/sky chute) with little surface cover and widespread erosion; several v-shaped water bars direct water to a culvert system that leads to meadow and several water bars have overtopped (causing erosion below)	2015: water bar to swale conversation; nearly 1 acre of mulching and mulch berms completed on ski run
35	M	N	N	H	H	H	bare, compacted vehicle turnaround and access to Sky lift base, which is ~20ft from creek channel	Thick wood chip mulch added to turnaround in 2014
36	H	Y	Y	M	H	H	water bar draining road is causing erosion under large ski run sign, compromising power box, and contributing runoff and sediment to ski run below (lower ridge run - hot spot 34)	Infiltration swale created and pine needle wattle installed in 2015
37	H	Y	Y	L	H	H	road drainage collects at V-shaped water bar with culvert direct to meadow; erosion along water bar (head cutting); water bar overtopped at culvert inlet, causing erosion downslope	Infiltration swale created and pine needle wattle installed in 2015

Hot Spot #	Erosion Risk	Active Erosion	Active Deposition	Proximity to Stream/SEZ	Connectivity to Stream/SEZ	Watershed Priority	Problem Description	Treatment Recommended/ Implemented
38	H	Y	Y	L	H	H	road drainage directed along water bar on ski run; erosion along water bar and downslope where water bar overtopped	Infiltration swale created and pine needle wattle installed in 2015
39	H	Y	Y	L	H	L	large ephemeral drainage; lots of woody debris in flow line and moderate mulch cover in surrounding areas	no action recommended
40	H	Y	Y	L	M	L	many water bars on high roller ski run above and below summer road; many have failures where they have overtopped, causing erosion downslope	rehab water bars at failure points and convert into infiltration swales through soil loosening, wood chip incorporation (~10,000-15,000sf)
41	H	Y	Y	L	H	M	ski run (upper ridge run) with ~6 eroding water bars that direct runoff into large drainage that eventually outlets at the Canyon lift base and connects to Sky Meadow; many water bars have failures.	rehab water bars at failure points and convert into infiltration swales through soil loosening, wood chip incorporation (~10,000-15,000sf)
42	M	N	N	H	H	M	south fork of SEZ channel above Sky Meadow culvert with mostly bare soil and moderately steep slopes on both sides of channel; old decomposed jute and plastic netting observed from previous USFS erosion control efforts; generally no visible erosion from banks; channel is somewhat straight and incised but no significant head cuts or bank erosion observed	definitely potential for restoration/stabilization of banks (loosening/seeding/mulch - no fabric); approx ~5000sf of bare soil along channel

Hot Spot #	Erosion Risk	Active Erosion	Active Deposition	Proximity to Stream/SEZ	Connectivity to Stream/SEZ	Watershed Priority	Problem Description	Treatment Recommended/ Implemented
43	M	Y	Y	H	H	M	bank erosion and sediment plume in south fork of SEZ channel above Sky Meadows culvert	bank stabilization/restoration treatment (loosening/seeding/mulch - no fabric); ~300sf
44	M	Y	Y	H	H	M	sediment plume in south fork of SEZ channel above Sky Meadows culvert; sediment appears to have come from short section of rock-lined swale upslope of creek; no obvious bank erosion	decommission rock-lined swale, which appears to unnecessarily collect dispersed runoff from rocky slope above it (~1000sf)
45	H	Y	Y	H	H	H	very steep section of road (Hellwinkle's) is delivering sediment downslope into a fingered section of the north fork of the SEZ channel above Sky Meadows culvert; rills and gullies formed on hillside below road and above channel	stabilize rills/gullies on hillside, and address road runoff. Road options: 1) surface and/or pave road; 2) decommission road and use only for emergency access; 3) improve infiltration capacity and conduct very frequent maintenance at sediment basins along road (~1000-5000sf)
46	H	Y	Y	H	H	H	very steep section of road (Hellwinkle's) is delivering sediment downslope into a fingered section of the north fork of the SEZ channel above Sky Meadows culvert; minor rilling on hillside below road and above channel	options: 1) surface and/or pave road; 2) decommission road and use only for emergency access; 3) improve infiltration capacity and conduct very frequent maintenance at sediment basins along road (~1000-5000sf)
47	M	Y	Y	L	H	L	large ephemeral drainage at crossing with lower Cal trail; relatively stable and well vegetated with small meadow below road crossing; evidence of flow during recent rain events but no obvious sediment transport	no action recommended

Hot Spot #	Erosion Risk	Active Erosion	Active Deposition	Proximity to Stream/SEZ	Connectivity to Stream/SEZ	Watershed Priority	Problem Description	Treatment Recommended/ Implemented
48	M	Y	Y	L	M	L	well-established gully formed at downslope end of lower Cal trail; collects water from large drainage area; moderate amount of erosion and deposition observed from recent rain storm	full restoration treatment along gully (maintain general swale-like shape) to slow and infiltrate surface runoff during spring snowmelt and rain storms; installation of mulch filter berms would provide short-term benefits (~1500sf)
49	H	Y	Y	H	M	H	steep ski run (lower Liz's) with compacted soil, moderate veg cover, and visible rilling; water bar near bottom of run filled with sediment and overtopped in several locations	2015: Water bar converted to infiltration swale and mulch berms installed on ski run upslope

CA-1: EROSION HOT SPOT PHOTOS

Table 3. Heavenly Erosion Hot Spot Photo Summary (CA-1)

Hot Spot #	Photo 1	Photo 2
1		
2	 <p>Water bar and erosion</p>	 <p>1 year after full restoration treatment</p>
3		

<p>4</p>		
<p>5</p>		
<p>6</p>	 <p>Full Hogan treatment to infiltrate road drainage above Blue Angel Chute - 2015</p>	 <p>Thick surface mulch added to slope; accumulated sediment removed at bottom of slope. 2015</p>

7		
8		
9		
10		

<p>11</p>		
<p>12</p>		
<p>13</p>	 <p>Treated in 2015 – photo needed</p>	 <p>Treated in 2015 – photo needed</p>

<p>14</p>	 <p>Before - eroding water bar</p>	 <p>After - Water bar to infiltration swale conversion complete</p>
<p>15</p>	 <p>Before - eroding water bar</p>	 <p>After - Water bar to infiltration swale conversion complete</p>
<p>16</p>	 <p>Before - eroding water bar</p>	 <p>After - Water bar to infiltration swale conversion complete</p>

<p>17</p>	 <p>Before – bare, rilled surface</p>	 <p>After adding surface mulch in 2014</p>
<p>18</p>	 <p>Before treatment</p>	 <p>After adding surface mulch in 2014</p>
<p>19</p>	 <p>Before treatment</p>	 <p>Wood chip mulch added in 2015</p>

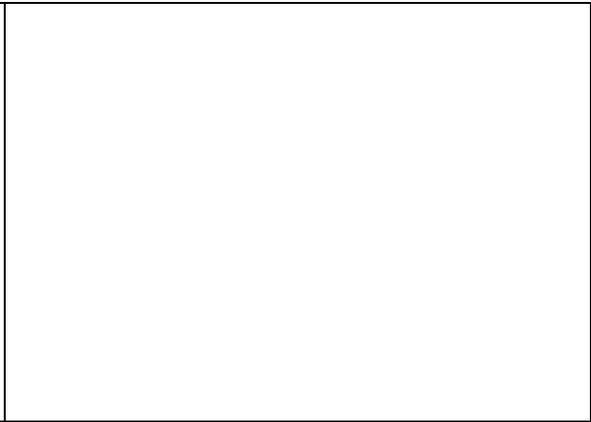
<p>20</p>	 <p>Before treatment</p>	 <p>Wood chip mulch added in 2015</p>
<p>21</p>	 <p>Before treatment</p>	 <p>Maggie's shoulders mulched in 2015</p>
<p>22</p>	 <p>Before treatment</p>	 <p>Maggie's shoulders mulched in 2015</p>

<p>23</p>	 <p>Before</p>	 <p>Full Hogan treatment in 2013</p>
<p>24</p>	 <p>Before - water bar drainage from summer road</p>	 <p>After - pine needle wattle installed to capture sediment upslope of creek</p>
<p>25</p>		

<p>30</p>		
<p>31</p>	 <p>Mulch applied on shoulders above Sky Meadows</p>	 <p>Mulch applied on shoulders above Sky Meadows</p>
<p>32</p>	 <p>Pine needle filter berms added to channel</p>	 <p>Pine needle filter berms added to channel</p>

<p>33</p>	 <p>Pine needle mulch filter berms added on Lower Double Down ski run</p>	 <p>Water bar to infiltration swale conversion complete on Lower Double Down ski run</p>
<p>34</p>	 <p>Mulching steep, eroding ski run with Shred-Vac + adding mulch berms across Sky Chute</p>	 <p>Close up of mulch applied on ski run and extra thick mulch at water bar on Sky Chute</p>
<p>35</p>	 <p>Before – bare soil near creek</p>	 <p>After – thick mulch cover</p>

<p>36</p>	 <p>Before - erosion and down-cutting</p>	 <p>After - shallow swale with amended/loosened soil, seed and surface mulch</p>
<p>37</p>	 <p>Before - erosion and down-cutting</p>	 <p>After - shallow swale with amended/loosened soil, seed and surface mulch</p>
<p>38</p>	 <p>Before - erosion and down-cutting</p>	 <p>After - shallow swale with amended/loosened soil, seed and surface mulch</p>

<p>39</p>		
<p>40</p>		
<p>41</p>		
<p>42</p>		

<p>43</p>		
<p>44</p>		
<p>45</p>	 <p>Erosion/rilling below Hellwinkles road drainage</p>	 <p>Angular rock rip-rap and large pine needle wattles installed as temp solution in 2015</p>

<p>46</p>	 <p>Lower water bar on Hellwinkles drains direct to SEZ, causing erosion and rilling downslope</p>	 <p>Angular rock rip-rap and large pine needle wattles installed as temp solution in 2015</p>
<p>47</p>		
<p>48</p>		

<p>49</p>	 <p>Eroding water bar across Lower Liz's ski run</p>	 <p>Water bar converted to infiltration swale in 2015</p>
<p>Patsy's gully</p>	 <p>Gully formed in spring 2015.</p>	 <p>Infiltration area added upslope to address source of runoff; Full Hogan treatment on slope. PROBLEM IDENTIFIED AND TREATED IN SAME SEASON!</p>

CA-1: EROSION HOT SPOT MAPS

See next page.

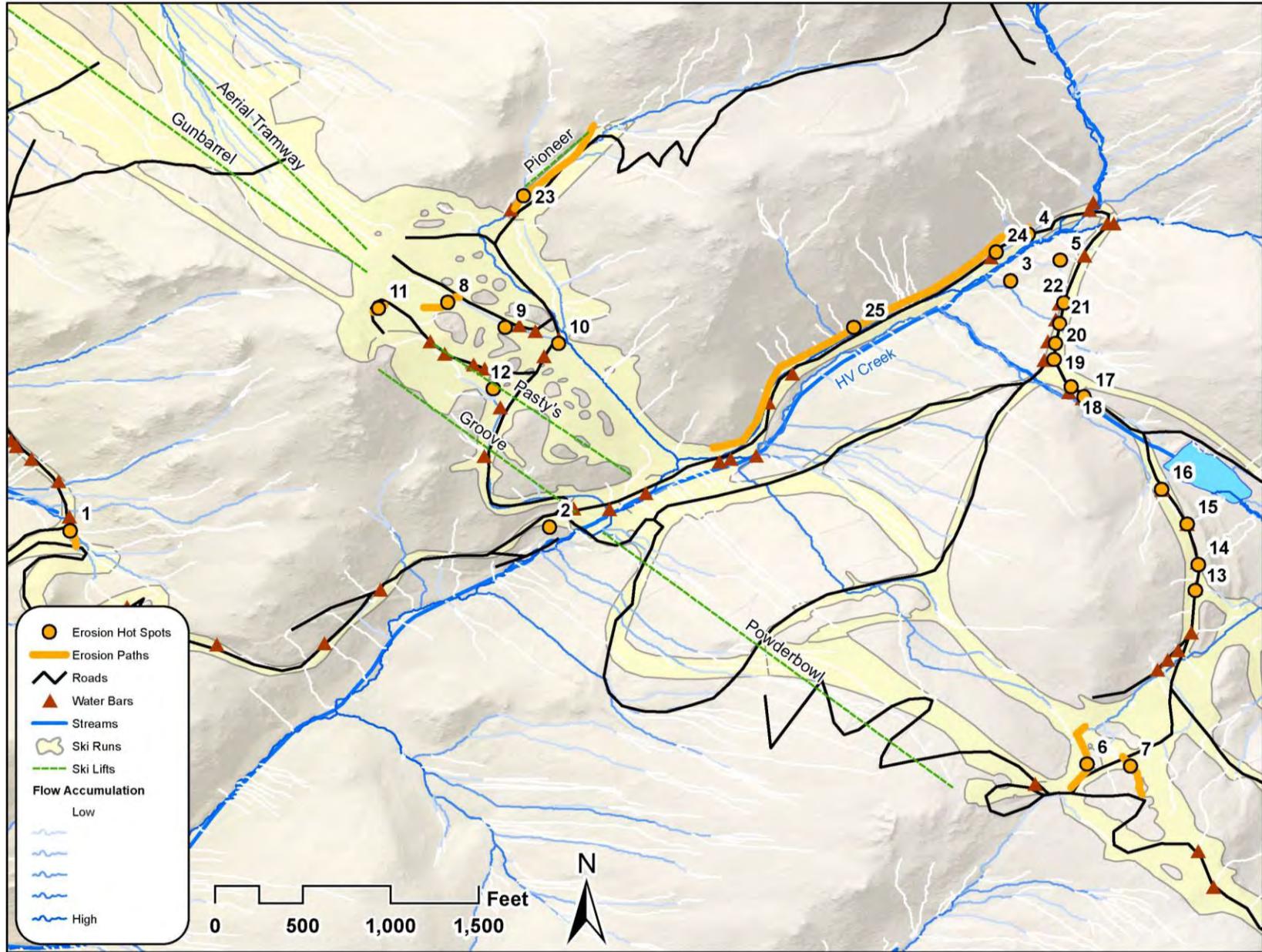


Figure 3. Efra Summary Map showing hot spots in lower Heavenly Creek watershed (CA-1).

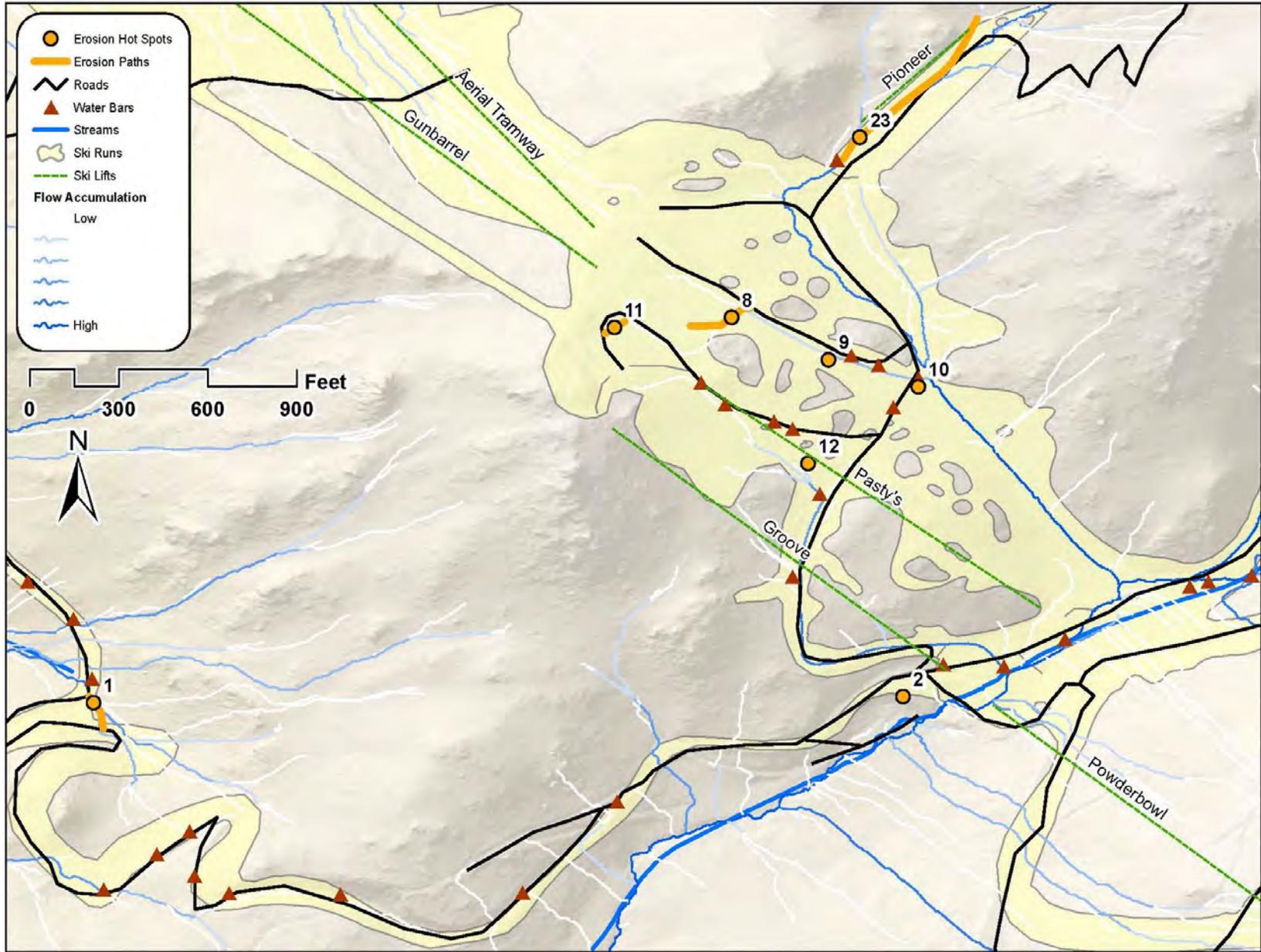


Figure 4. EfRA Summary Map showing hot spots in the Lakeview Lodge area.

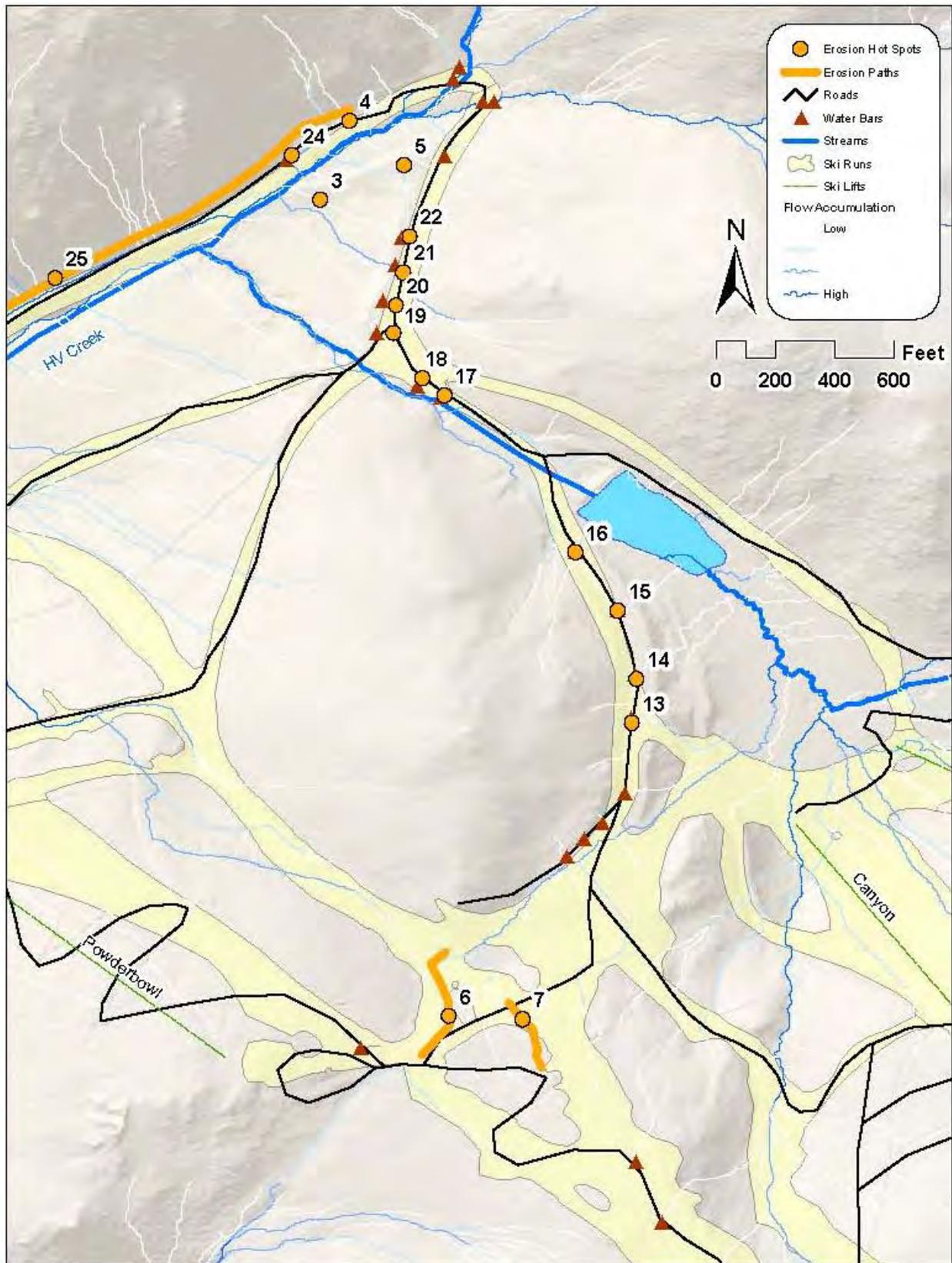


Figure 5. EfRA Summary Map showing hot spots in the Maggie's Run area.

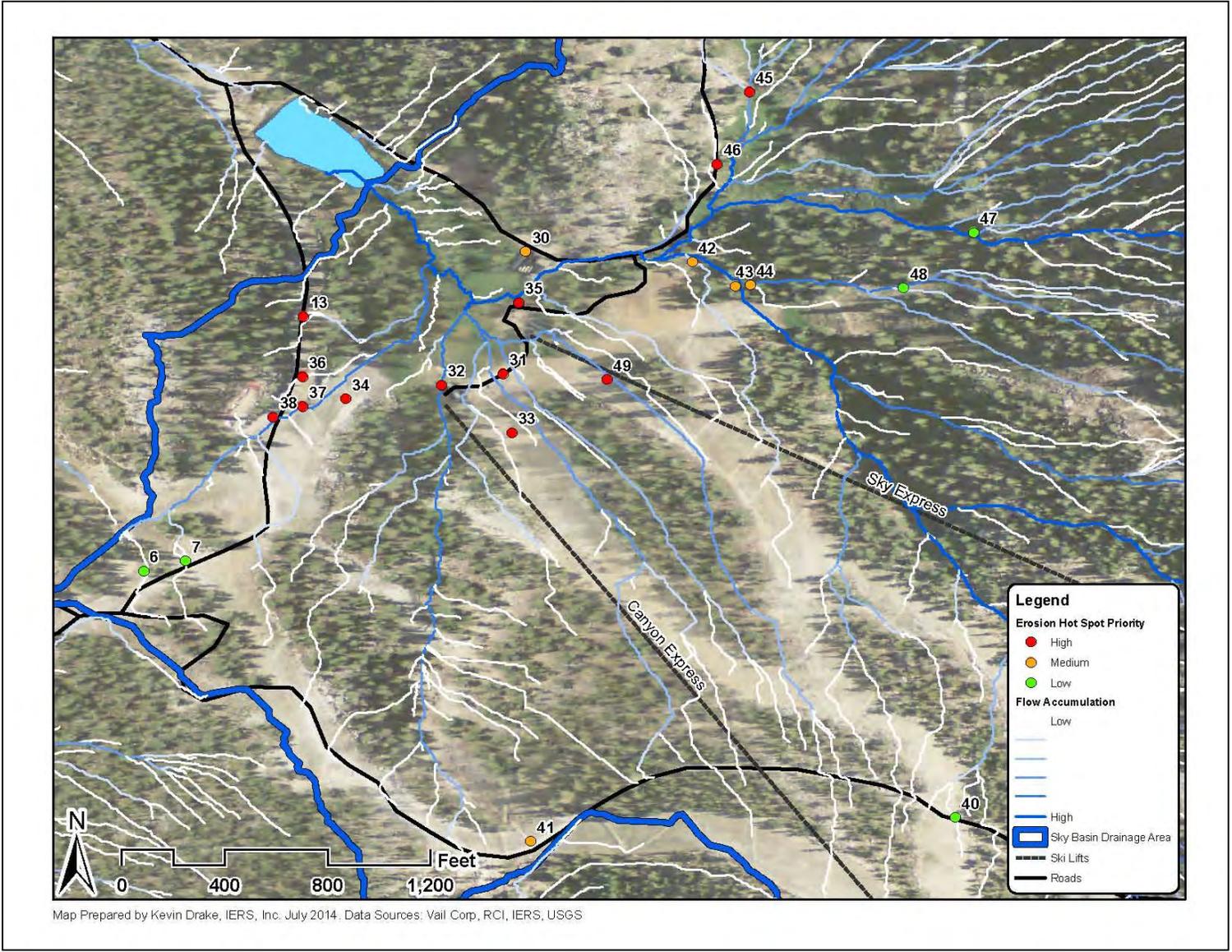


Figure 6. Efra Summary Map showing prioritized hot spots in Sky Basin (CA-1).

NV-1: EROSION HOT SPOT SUMMARY MATRIX

Table 4. Erosion Hot Spot Summary Matrix (NV-1 Watershed)

Hot Spot #	Feature Type	Hot Spot-Proposed Trail Interaction	Erosion Risk	Active Erosion	Active Depos.	Prox to stream or SEZ	Connect. to stream or SEZ	Overall Priority	Problem Description, Notes	Mitigation Recommendations
1	water bar	Y	L	Y	Y	L	M	H	trail crosses old low-gradient water bar	remove/decommission water bar using soil restoration treatment
2	water bar	N	H	Y	Y	L	M	M	water bar overtopped (WB #4 on Orion's); heavy rilling below	rebuild water bars and create infiltration capacity on the upslope side through soil restoration treatment; rake out rills downslope; construct mulch berms or infiltration strips on ski run to prevent further erosion by slowing/disbursing flow
3	rill/gully	Y	M	Y	Y	L	M	H	rilling through depositional area below steep rocky slope where proposed beginner trail crosses	restoration treatment to stabilize rilling area below rocks
4	rill/gully	Y	H	Y	Y	L	M	H	several rills and a big gully down Aries ski run; both beg and adv trails are proposed to cross erosion paths on ski run	address source of runoff (see HS#5); stabilize ski run with full restoration treatment and/or series of infiltration strips or mulch berms
5	ski run/road	Y	M	Y	Y	L	M	H	compacted ski run/old road below Comet lift top terminal sheds water onto Aries ski run, contributing to ski run erosion issues (linked to HS #4)	create infiltration/spreading area at top of Aries ski run (before ski run steepens)
6	rill/gully	Y	M	Y	Y	L	M	H	~4 distinct large rills on ski run at proposed trail crossing	soil restoration treatment to stabilize rilling area below rocks
7	water bar	Y	H	Y	Y	L	M	H	proposed trail crossing at water bar with erosion, which collects runoff from at least 150ft of dirt road	design stable drainage crossing for trail
8	proposed trail	Y	L	N	N	L	H	H	proposed trail switchback very near dipper drainage; lots of bare soil but no visible erosion	shift trail alignment so it doesn't drain to dipper drainage
9	water	Y	M	Y	Y	L	M	H	proposed trail switchback at end of water bar (major depositional area)	shift trail alignment away from water bar depositional area

Hot Spot #	Feature Type	Hot Spot-Proposed Trail Interaction	Erosion Risk	Active Erosion	Active Depos.	Prox to stream or SEZ	Connect. to stream or SEZ	Overall Priority	Problem Description, Notes	Mitigation Recommendations
	bar									
10	proposed trail	Y	M	Y	Y	L	H	H	proposed trail switchback very near dipper drainage with a few rills just upslope of proposed trail and connecting to dipper drainage	shift trail alignment away from dipper drainage and existing rills
11	water bar	Y	M	Y	Y	L	L	H	proposed trail switchback near water bar outlet with visible rilling	shift trail alignment away from water bar drainage area
12	road	N	L	N	N	L	M	L	old road - mitigation opportunity	decommission old road
13	proposed trail	Y	L	N	N	L	H	H	proposed trail switchback close to dipper drainage and in area with heavy Manzanita understory	shift trail alignment away from dipper drainage and out of heavily-vegetated area
14	water bar	N	H	Y	Y	L	H	M	several blown out water bars on Big Dipper ski run; mitigation opportunity - not in proposed trail alignment	rebuild water bars and create infiltration capacity on the upslope sides through soil restoration treatment; rake out rills downslope; construct mulch berms or infiltration strips on ski run to prevent further erosion by slowing/dispersing flow
15	depositional area	N	H	Y	Y	L	M	M	depositional area at lower end of dipper drainage	address erosion through source control upslope
16	drainage	Y	M	Y	Y	L	M	H	proposed trail alignment crosses defined drainage	shift proposed trail alignment (location of switchback) to avoid crossing drainage
17	road	N	M	Y	Y	L	M	L	old road to avalanche gun - mitigation opportunity	Road to avi gun decommissioned in 2015
18	road	N	L	N	N	L	L	L	short loop/turnaround road - mitigation opportunity	Turnaround decommissioned in 2015
19	road-drainage crossing	N	H	Y	Y	M	M	M	lower end of dipper drainage crosses summer road; know to carry moderate flow during spring runoff	Pine needle mulch berms installed across channels that drain to road; still need to create infiltration/spreading area below

Hot Spot #	Feature Type	Hot Spot-Proposed Trail Interaction	Erosion Risk	Active Erosion	Active Depos.	Prox to stream or SEZ	Connect. to stream or SEZ	Overall Priority	Problem Description, Notes	Mitigation Recommendations
										road
20	drainage	Y	L	Y	Y	M	L	H	proposed trail alignment crosses defined drainage (created by concentrated runoff from water bars on Orion's ski run upslope)	realign trail to avoid drainage or design stable drainage crossing
21	drainage	Y	M	Y	Y	M	L	H	proposed trail alignment crosses defined drainage (created by concentrated runoff from water bars on Orion's ski run upslope)	realign trail to avoid drainage or design stable drainage crossing
22	drainage	Y	L	Y	Y	M	L	H	proposed trail alignment crosses defined drainage (created by concentrated runoff from water bars on Orion's ski run upslope)	realign trail to avoid drainage or design stable drainage crossing
23	drainage	Y	H	Y	Y	M	L	H	proposed trail alignment crosses defined drainage (created by concentrated runoff from water bars on Orion's ski run upslope)	realign trail to avoid drainage or design stable drainage crossing
24	drainage	Y	M	Y	Y	M	L	H	proposed trail alignment crosses defined drainage (created by concentrated runoff from water bars on Orion's ski run upslope)	realign trail to avoid drainage or design stable drainage crossing

NV-1: EROSION HOT SPOT PHOTOS

Table 5. Erosion Hot Spot Photo Summary (NV-1 Watershed)

Hot Spot #	Photo 1	Photo 2
1		
2		
3		

<p>4</p>		
<p>5</p>	 <p>Before - compacted area above Aries ski run</p>	 <p>After - deep loosening, chips and mulching used to create infiltration area above Aries ski run</p>
<p>6</p>		

7		
8		
9		
10		

<p>11</p>		
<p>12</p>		
<p>13</p>		
<p>14</p>		

<p>15</p>		
<p>16</p>		
<p>17</p>	 <p>Mott Road – before treatment</p>	 <p>Mott Road – after full decommissioning treatment in 2015</p>

<p>18</p>		
	<p>Before - summer road turnaround</p>	<p>After – turnaround decommissioned in 2015</p>
<p>19</p>		
	<p>Pine needle filter berms installed across surface drainages – Lower Dipper</p>	<p>Pine needle filter berms installed across surface drainages – Lower Dipper</p>
<p>20</p>		

<p>21</p>		
<p>22</p>		
<p>23</p>		
<p>24</p>		

NV-1: EROSION HOT SPOT MAPS

See next page.

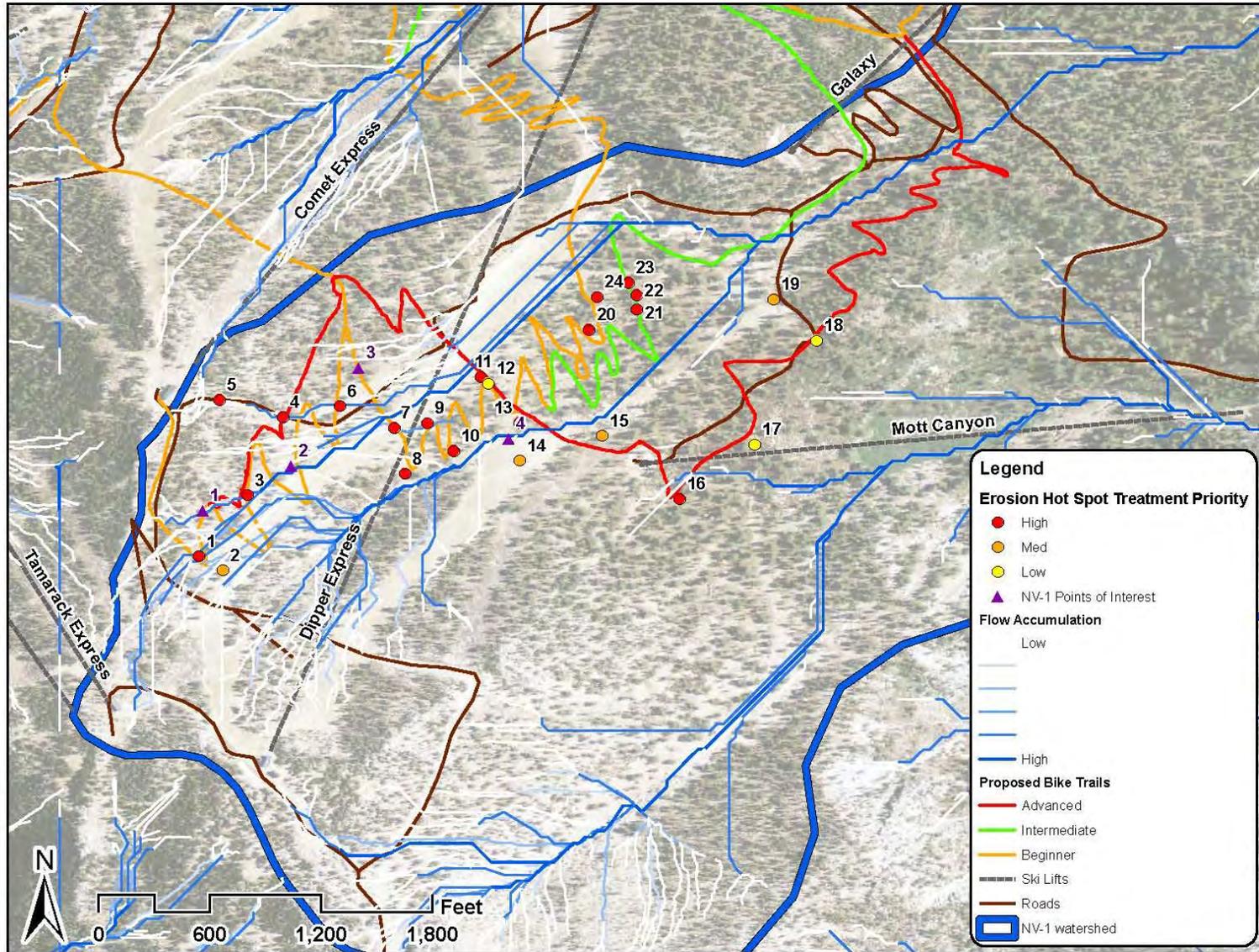


Figure 7. Efra Summary Map showing hot spots in NV-1 watershed, zoomed in to focus on hot spot locations.

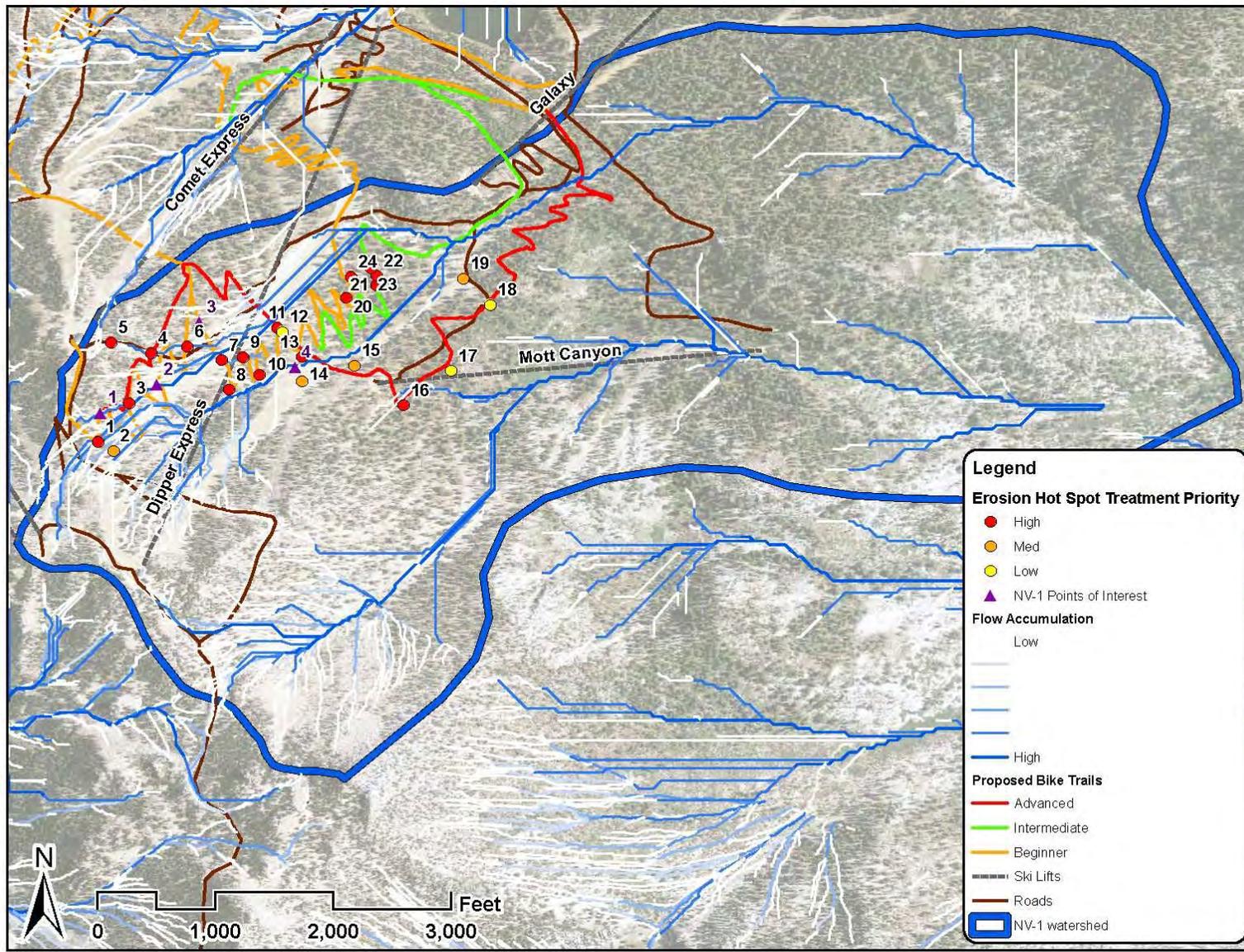


Figure 8. Efra Summary Map showing hot spots in Mott Canyon (NV-1), zoomed out to show entire NV-1 watershed.

KEY PROJECT PERFORMANCE MONITORING SUMMARIES

MAGGIE'S TRAIL (CA-1 HOT SPOTS 17-22)

OVERVIEW

Maggie's Trail is a ski run in the winter and a road with wide shoulders in the summer months. It is located immediately downslope of the mid-mountain reservoir near the base of the Canyon Lift. The shoulder areas alongside the summer road are very compacted and despite many years of efforts to revegetate and stabilize the slopes using primarily seeding and irrigation, the soil is still very compacted and vegetation cover is relatively sparse. Rills are abundant throughout this area and are a likely result of high soil compaction and low surface cover. This area is very steep and has tightly spaced water bars, some of which drain directly to Heavenly Valley Creek. All of these factors combined make Maggie's Trail a high priority from an erosion control standpoint and a good opportunity to test several types of treatments along a long, linear road shoulder/ski run.

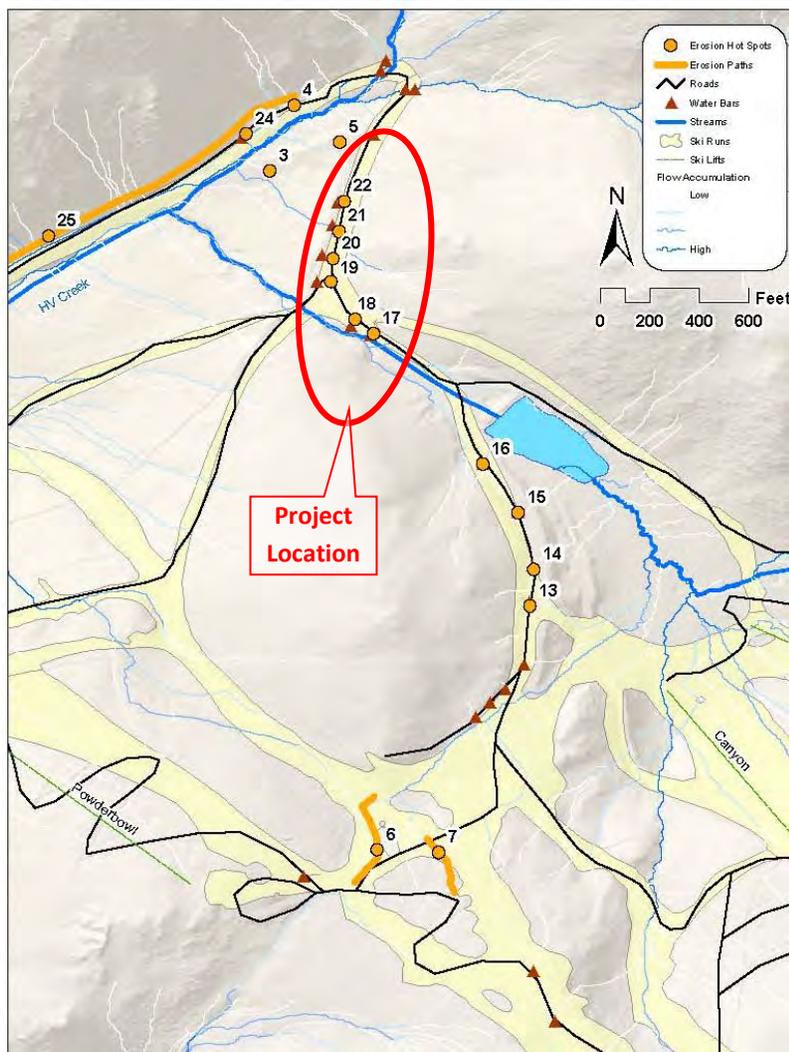


Figure 9. Maggie's Trail project location map.

RESTORATION TREATMENTS

The road shoulders along Maggie's are referred to as "plots", which are delineated by the water bars at the base of each plot (Hot Spots 17-22). The upper three plots drain directly to Heavenly Valley Creek, and were deemed the highest treatment priorities. Plot 1 was mulched with wood chips in 2014. Plots 2 and 3 were mulched with wood chips in 2015. Some of these plots are intended to receive full treatment (soil loosening, seeding, etc) in future years, but applying several inches of mulch is expected to provide immediate sediment reductions with less initial effort. The photos below show Plot 2 before and after mulch application.



Figure 10. Photo of Maggie's Plot 2 before treatment.



Figure 11. Photo of Maggie's Plot 2 after applying wood chips in 2015.

PERFORMANCE MONITORING

In 2013, IERS conducted a baseline assessment of existing conditions at Maggie's Trail. The baseline assessment included photo documenting the site, runoff simulation, penetrometer depth to refusal (DTR) readings, soil moisture readings, ocular estimate of mulch and vegetation cover/composition, visual erosion assessment and documentation of general site characteristics.

Runoff Simulation

Runoff simulation can be used in many different ways to directly assess the erosion resistance of a site. At this site, water was delivered to the slope at a flow rate of 2 gallons per minute and the surface runoff rate (feet per minute) was recorded. Distance of surface flow is measured in feet at 1 minute intervals for up to 10 minutes or until surface runoff has traveled 10 feet – whichever happens first. As illustrated in the graph below, surface runoff reached the end of the plot (10 ft) within 2 minutes before treatment and between 6 and 10 minutes after applying surface mulch. While runoff simulation produced very little rilling in 2013, rills from natural rain and snowmelt were visible throughout the plots. With 3-4 inches of wood chips applied to the surface, runoff still occurred but at a much slower rate than before treatment and with far less erosive force.

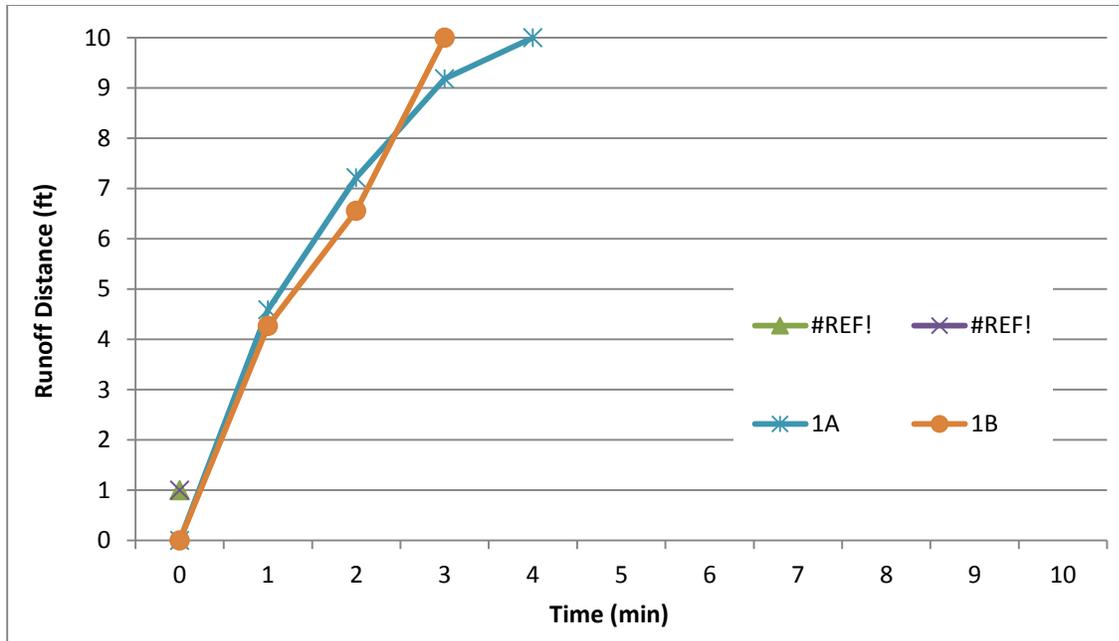


Figure 12. Runoff simulation results before and after mulch application at Maggie’s Trail.



Figure 13. Runoff simulation before treatment with surface runoff and wide wetting front.



Figure 14. Runoff simulation after mulch application. Runoff is dispersed and slowed by the wood chips.

The table below shows the average runoff velocity (runoff distance divided by time), time to rilling, and other characteristics of each plot. Runoff velocity is a new metric that is intended to provide an indication of a given slope’s propensity to generate and transmit surface runoff. As this number decreases, it suggests that the slope is becoming more erosion resistant. Average runoff velocity at Maggie’s Trail decreased by 72% and max runoff velocity decreased by 70% after application of 3-4 inches of wood chips. Soil loosening treatments are likely to lead to even further reductions in runoff velocity, but these results underscore the value of mulch application when more time-intensive treatments are not a feasible option.

Table 6. Comparing runoff velocity and other runoff simulation parameters at Maggie’s Trail.

	2A-untreated	2B-untreated	2A-mulched	2B-mulched
Velocity-AVG (ft/min)	5.0	5.0	1.0	1.8
Velocity-MAX (ft/min)	6.6	6.8	1.5	2.5
Slope (%)	10.8	12.9	11.3	11.1
Time to Rilling (min)	1	none	none	None
Simulator Flow Rate (GPM)	2	2	2	2

Soil Density

The cone penetrometer is used to measure a soil’s resistance to force, which can be used as a surrogate for soil density and infiltration potential. Penetrometer depth to refusal (DTR) at 350 pounds per square inch (PSI) was measured at this site. DTR ranged from 2.0 to 2.5 inches before mulching and 3.0 to 3.2 inches after mulching. While mulch application does not directly reduce soil density, fungal activity generated by high-carbon materials like wood chips has been observed to lead to gradual increased in DTR at other Tahoe Basin sites. The decrease in soil density measured at this site is likely within the margin of error of the cone penetrometer or the higher soil moisture levels, but is a positive sign nonetheless.

Table 7. Penetrometer depth to refusal (DTR) and soil moisture measurements at Maggie’s Trail.

	2A-untreated	2B-untreated	2A-mulched	2B-mulched
Soil Moisture (%)	3.25	3	4	5
Penetrometer DTR (in)	2.0	2.5	3.0	3.2

Surface Cover and Vegetation Composition

Mulch cover increased dramatically from 10-20% before treatment to 100% after treatment. While plant cover was reduced due to thick mulch applications, vegetation will return as the mulch decomposes, or if the area is seeded following future soil loosening treatments. Vegetation cover has been shown to have no correlation to erosion reductions at multiple study sites at Heavenly.

Table 8. Ocular estimates of surface cover at Maggie’s Trail.

	2A-untreated	2B-untreated	2A-mulched	2B-mulched
Litter Depth (in)	0.3	0.3	4.3	3.5
Plant Cover (%)	5	15	5	5
Mulch Cover (%)	10	20	100	100
Total Cover (%)	10	20	100	100

SKY CHUTE SKI RUN AND WATER BARS (CA-1 HOT SPOTS 34 & 36-38)

OVERVIEW

Sky Chute is a large ski run directly above Sky Meadow. The lower portion of this ski run has been a source of erosion to Sky Meadow for many years, but it is very difficult to access for vehicles and equipment and is a very large area (roughly 1 acre), making meaningful erosion reduction treatments difficult. Some of the drainage and erosion issues on Sky Chute stem from road drainage, as water bars upslope concentrated runoff across the ski run. Over many years, the water bars have been filled in by sediment and overtopped in numerous places, creating widespread rills and gullies.

RESTORATION TREATMENTS

In 2015, a mulch blower called a Shred-Vac was used to apply a layer of pine needle mulch to almost 1 acre of ski run. In addition, several large mulch berms were created across the slope to further slow down and disburse surface runoff.



Figure 15. Shred-Vac blowing pine needles through a long canvas hose.



Figure 16. Heavenly staff applying mulch to the Sky Chute ski run using the Shred-Vac.

Upslope of the ski run, several problematic water bars underwent a conversion to infiltration swales. The water bars had wood chips incorporated into the soil, deep soil loosening, reshaping to reduce flow concentration, and seeding/mulching. The goal was to transform the water bars – which were originally designed to concentrate runoff – into sponges able to infiltration the majority of runoff from the summer road.



Figure 17. Heavily eroded water bar (HS #36) before treatment.



Figure 18. Water bar to infiltration swale conversion complete!

PERFORMANCE MONITORING

Runoff Simulation

Runoff simulation was conducted within a week of completing the water bar-to-swale conversion treatments and was compared to pre-treatment (standard water bar) conditions. The results are summarized in the graph and table below. The infiltration swale treatments dramatically reduced runoff rate and total distance. The untreated water bar conveyed surface runoff 13 feet in 3 minutes. Once the water bar was converted to a swale using deep tilling, recontouring and mulching, a 10minute simulation could not produce surface runoff past 2 feet. The immediate hydrologic improvements of this treatment are obvious. Returning to this site in the spring time during snowmelt will help us better understand how these roadside infiltration swales function during periods of higher soil moisture.

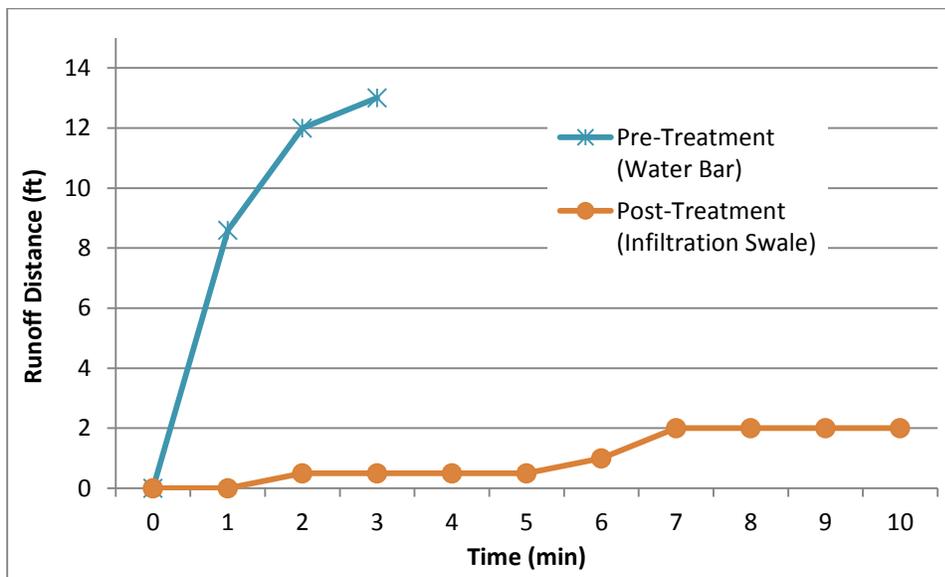


Figure 19. Runoff simulation results before and after treatment (water bar-to-infiltration swale conversion).

Table 9. Comparing runoff velocity and other runoff simulation parameters pre- and post-treatment at Sky Chute water bars.

	Pre-Treatment	Post-Treatment	% Change
Velocity-AVG (ft/min)	4.3	0.2	-95%
Velocity-MAX (ft/min)	8.6	1.0	-88%
Slope (%)	3.8	6.7	
Time to Rilling (min)	1	n/a	-100%
Simulator Flow Rate (GPM)	4	4	

Soil Density and Surface Cover

Depth to refusal – as measured with a cone penetrometer – increased by 320% after deep tilling was completed. This is a key factor that helps explain the surface runoff reductions measured with the runoff simulator. Litter depth, mulch cover and total cover all increased substantially as well. Plant cover was completely eliminated due to deep tilling, but the swales were seeded with Heavenly’s high elevation native grass seed mix, so native vegetation is expected to begin re-establishment this coming spring.

Table 10. Comparing penetrometer depth to refusal and cover conditions pre- and post-treatment at Sky Chute water bars.

	Pre-Treatment	Post-Treatment	% Change
Penetrometer DTR (in)	4.0	12.8	+320%
Litter Depth (in)	0.3	2.3	+930%
Plant Cover (%)	30	0	-100%
Mulch Cover (%)	5	100	+2000%
Total Cover (%)	35	100	+290%

CONCLUSIONS

2015 was a big year for Heavenly's watershed management and restoration program. Not only were many high and medium priority hot spots treated, but several erosion issues caused by isolated storm events fully addressed in the same year they occurred (e.g. Patsy's gully), rather than being added to the next season's work list. Heavenly demonstrated several new out-of-the-box treatment approaches: water bar-to-swale conversation, mulch filter berms, and using the Shred-Vac to apply mulch to very large and/or steep ski run areas that would have otherwise been difficult or impossible to treat. There is a great deal to be learned by revisiting these innovative treatment sites as soon as they are accessible in the spring to assess their effectiveness.

RECOMMENDATIONS

MANAGEMENT AND COMMUNICATION PROCESS

- Create set of maps showing locations of all projects on annual work list and key watershed features such as streams, SEZs, roads and lifts. These maps can support clear communication between management and field staff and provide a simple format for both field-documenting erosion hot spots and reporting/communicating watershed management efforts and completed projects.
- Continue to prioritize annual work list using erosion and water quality risk (among others) as prioritization criteria. This will help Heavenly show that limited resources are achieving maximum water quality benefit.
- Continue to integrate erosion hot spot treatments into the annual work list so that they are scheduled along with other capital and maintenance projects.

TREATMENT IMPLEMENTATION PROCESS

- Expand use of mulch-only treatments (like those completed at Maggie's Trail), especially where it can be a first step toward full restoration treatment in a future season.
- Continue to experiment with creating mulch berms across large ski runs, especially those where equipment access is a big challenge.
- Start aging wood chips for at least one year prior to application whenever possible in order to begin the decomposition process.
- Where irrigation is deemed necessary, use low-flow, deep-cycle irrigation methods in order to minimize water use, eliminate irrigation-caused erosion and establish deeper-rooting plants.
- Utilize a consistent form to document restoration treatments (such as the one provided by IERS). Documentation of site-specific treatments is critical to understanding and improving treatment cost-effectiveness.
- Measure fertilizer and seed application rates - expand use and understanding of simple but standardized measurement protocols to ensure accurate and consistent application rates for seed and fertilizer (such as 5-gallon buckets marked with volumes that correspond to seed or fertilizer weight). Native seed is *very expensive* and measuring application rates will lead to cost savings by not over-seeding.

MONITORING AND ASSESSMENT PROCESS

- Continue to build and expand monitoring/assessment capacity in Heavenly summer reveg crew so that they can play a more active role in tracking the trajectory of treated sites.
- Inspect and photo document recently treated restoration areas during rain events (in addition to road BMPs) so that any minor drainage or erosion issues can be addressed before escalating to larger erosion problems.

- Identify, assess and develop integrated plan to resolve road system drainage issues (such as converting more water bars to infiltration swales). Nearly all erosion issues observed on ski runs are related to concentration of flows from roads and water bars upslope.

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APPENDIX III
2015 CWE WORK LIST

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**HEAVENLY MOUNTAIN RESORT
2015 ANNUAL SUMMER WORK LIST
10/15/2015 Completion Status**

From the EIS:

Phase 1: CA-1 High Priority Erosion Hotspots are # 13, 31-38, 45-46, & 49

Phase 1: NV-1 High Priority Erosion Hotspots are # 1, & 3-6

: Hot Spots to be included in future summer work lists, as required by the EIS

Project #	Source*	Location	Treatment	Status Update as of: 10/15/2015
Watershed: CA-1 Heavenly Valley Creek				
1	B	Cal Dam to Maggie's Corner	Complete stabilization and erosion resistance on road shoulders. Apply wood chips to road shoulders	WC's applied, project completed
2	B	Powderbowl Express Lift Top Station/Mombo Trail (Blue Angel Chute)	Improve erosion resistance and stabilize slope. Apply treatment used on fill slope below lower Powderbowl. Recontour the waterbars at the lower end of Blue Angel Chute, which will improve the capacity for excess sedimentation. Field fit best strategy.	Sediment from lower water bar mechanically removed in June. There is increased capacity now at bottom of run. Infiltration swales at top installed, and "Full Hogan" implemented. PN coverage will be completed by 10-16-15
3	RM	Tubing Run Revisions	Construct revised summer tubing lanes, associated grading and slope stabilization and access road to the top of the tubing lift.	Tubing lanes completed and associated grading and slope stabilization. Decommissioning of old road with pine needle coverage completed.
4	B	Top of Gondola Surface Drainage	Install surface drainage to eliminate standing water at the Top of Gondola/Adventure Peak area.	Construction completed. WC coverage on the disturbed areas applied.
5	P	Alpine Coaster	Construct the Alpine Coaster as part of the 2015 Adventure Peak Epic Discovery Activities.	Construction nearing completion. Winterization BMPs are staged. Grading extension granted until 10-30-15 with LRWQCB, and TRPA
6	P	Climbing Rock	Construct the Climbing Rock Wall adjacent to Tamarack Lodge as part of the 2015 Adventure Peak Epic Discovery Activities.	100% complete. Opened on 9-4-15 to Public. BMPs in place, stable and flat site.
7	P	Complete Waterfall Lift Removal Top Station Regrading (Top of Epic Mix race Course)	Regrade top station area. Fill and stabilize as shown on approved project plans.	Will complete in 2016
8	EH-CA	Sky Chute Ski Run	Treat Hotspot inventory #'s 13, 36, 37, & 38. Restoration includes application of mulch (chips &/or pine needles). Apply small amounts of	Infiltration swales, sky chute shred vac applied full coverage on ski run. PC and PN Materials have been staged at 7 water bars above and

			fertilizer and seed if field fitting deems necessary.	below the wooden sign. Cal Dam to TP Bone Yard. Sky Chute Restorations completed on 9-13-15
9	EH-CA	Hellwinkle's Road	Treat Hotspot inventory #'s 45 & 46. Field fit problem locations by stabilizing existing rills and gullies. Utilize large diameter pine needle wattles and angular rock. In-slope road in key areas, toward the bottom of the road under last water bar, and add a new settling/infiltration area near the right hand side bottom of the road.	Large PN Wattles placed at 3 main WB's on 9-17-15. Field Fit best strategy with Water Board and RCI on 9-15-15. In sloping road was not recommended by Water Board and RCI. Phase I complete. Phase II Plan to be developed before start of 2016 construction season. Phase II to be implemented in 2016.
10	EH-CA	Canyon Express Lift Bottom Terminal Operator's Booth	Treat Hotspot Inventory #32. Install a vegetated swale with coir material matting (coconut fiber) and pine needle check dams in existing rock lined ditch adjacent to the operator's booth. Clean out rock-lined ditch, either by hand or using equipment uphill of the newly installed vegetated swale. Allow run-off from above to infiltrate and settle before making it to the Sky Meadows.	Rock Lined Ditch has been cleaned out and PN Check dams installed. PN check damns need to be build up bigger. 3 Large PN Wattles installed uphill of Hydrant. PN coverage applied to loose DG in meadow. Completed 9-11-15
11	EH-CA	Double Down - bottom of ski run water bar	Treat Hotspot inventory #'s 31 & 33. Water bar has a visible failure point and barren areas. Repair the failure and apply mulch/needles uphill of water bar. Flatten profile of the water bar slightly and install large pine needle berm below water bar to better infiltrate run-off and snow melt before it reaches the maintenance road.	3 large dump trucks loads of PN delivered to below the DD WB on 8-7-15 1 small dump truck load of PC in place just below WB WB was maintained and cleaned out by Trails Crew in late July. 3 PN Berms uphill of bottom WB in Place, and Project is 100% complete.
12	EH-CA	Bottom of Sky Express Road	Treat Hotspot inventory #35. Improve wood chip cover adjacent to vehicle turnaround.	100% Completed 7-20-15
13	EH-CA	Bottom of Ellie's Ski Run	Treat Hotspot Inventory # 49. Repair water bar and convert to an infiltration swale. Cover lower portion of ski run with mulch. Amount of mulch will depend on access and treatment options.	2 large dump truck loads of PN delivered to Lower Liz's below the last WB. WB was maintained during last week of July. Completed 9-13-15
<u>Watershed: CA-6 Bijou Creek</u>				
12	P	Mid Station Canopy Tour	Construct the Mid Station Canopy Tour as part of the 2015 Adventure Peak Epic Discovery	95% complete. Road Corridors are in place, and cables are in the air. Trees have been cut and are

			Activities.	lying on the ground. Site had minimal soil disturbance, and not much disturbance is expected. No excavation work is planned, other than the walking paths. Once completed the Lay down area will likely need a light coating of WC. Walk through with Brownie and FS walkthrough on 10-16-15 for sign off. Grading extension until 10-30-15
<u>Watershed: CA-7 Unnamed Creek - Gondola</u>				
		NONE		
<u>Watershed: NV-1 Mott Canyon Creek</u>				
13	EH-NV	Decommission roads and turnaround areas	Treat Hotspot inventory # 12, 17, 18. Phased over multiple years: Year 1 spread chips on existing construction access roads; Year 2 till and add mulch; Year 3 complete project.	12 PN Loads are being delivered to East Peak Lake/Perimeter run area during week of 8-10-15. This will get us a stockpile of chips/Needles for the Upper NV-1 Erosion Hotspots for 2016.
<u>Watershed: NV-3 Edgewood Creek</u>				
		NONE		
<u>Watershed: NV-2 + 5 Daggett Creek</u>				
14	EH-NV	Top of Aries Ski Run	Treat Hotspot inventory #'s 4 & 5. Eliminate several rills and gullies near the top of the Aries ski run. Stabilize ski run with a series of infiltration strips such as mulch berms at the top of the slope. Add 2-3 inches of mulch ground cover in key areas that lack effective cover, or are prone to rilling. Create infiltration spreading area below the top of Aries ski run, before the run steepens. 1 year Project	Water Bar has been maintained and cleaned out as of 8-6-15. The hand work was done well. Materials like PC and PN should be delivered to area for the full restoration project. Project is completed as of 9-18-15 Some additional PN coverage might be needed in 2016, will check in June 2016
<u>Resort Wide</u>				
15	M	Resort-Wide	Inspect and restore all areas damaged or affected by winter resort operations, including hydrants & pipe failures, and areas affected by snowcat operations; document areas treated.	Top of Patsy's Lift area has a large rill from July storms. It is over 3 feet deep in some areas. Skiers right of the 277 sewer line restoration, due to the concentrated road run off on the access road to 277. Plan should be to rip chips in and create a spongy area for the road run-off, Eliminate/cover up the DI that is no longer

				functioning. IT locates done, Snowmaking in area, Barrett recommends only 12” of chips ripped for this project. Electrical Locates completed from LE Project completed in early October.
16	M	Resort-Wide	Erect and maintain vehicles barriers and/or fences to prevent unauthorized vehicle access off of designated summer roads and facility parking areas.	Completed
17	M	Resort-Wide	Inspect and maintain all drainage structures.	On Going with Trails crew, Heavenly Enviro. and RCI
18	M	Base Areas	Maintain all BMPs and drainage structures. Erect and maintain vehicle barriers and/or fences to prevent unauthorized vehicle access from base areas.	On Going
19	M	Resort-Wide	Road Maintenance Projects based on the annual Heavenly-Forest Service roads maintenance & monitoring agreement.	On Going, Grader at Upper Shop on 8-11-15 .6 miles on Sky Road during August 2015 13N52.9 .7 Miles of Road Base applied and Maintenance occurred on Roundabout Road 12N40.1 during July 2015, Including 3 switchbacks, and roadway, WB’s.
*Source Codes				
	M	BMP Maintenance Needed		<p style="text-align: center;">Key:</p> PC: Pine Chips PN: Pine Needles WB: Water Bars TP: Terrain Park
	B	Project need determined from BMP Effectiveness Monitoring		
	P	Master Plan Implementation Project		
	RM	Resort Maintenance Project		
	MMP	Master Plan Monitoring & Mitigation Plan Requirement		
	EH-CA	Erosion Hotspot Inventory California		
	EH-NV	Erosion Hotspot Inventory Nevada		

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APPENDIX IV
USFS WILDLIFE TRASH MANAGEMENT
AND EDUCATION PROGRAM

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USFS Wildlife Trash Management and Education Program:

As a condition of the approved EIS for the Epic Discovery Program a wildlife trash management and education plan will be implemented annually and reviewed by Heavenly and the US Forest Service LTBMU. The Heavenly Mountain Resort Master Development Plan (2015) includes a number of Operations and Maintenance Measures as part of the Mitigation and Monitoring Plan. 7.5-21 BIO

8: Wildlife Trash Management and Education Program.

A number of the activities at Heavenly Mountain Resort are located at the Top of The Gondola region and are known as Adventure Peak. As part of the Epic Discovery Project implementation the resort shall create and implement a trash management and education program. The goal of this program is for timely removal of refuse from deposit points, education of our guests and staff about proper waste management, and to keep any interactions between humans and wildlife to a minimum.

Deposit points where animal proof receptacles will be implemented at following locations:

1. Bottom of the Gondola steps/Interpretive Welcome Center(1)
2. Base of Tamarack Express lift (1)
3. Top of the Blue Streak Zip Line/ Top of Tamarack Chair (1 small single unit, on hand)
4. The Bottom Big Easy Chair area, gear on area near cowboy fence (1)
5. The Bottom of the Coaster (1)
6. The Base of the Rock Climbing Wall (1)
7. The Base of the Tubing Lift viewing area (1)
8. NW side of Tamarack Lodge (1)
9. Viewing area of the Bear Cave Challenge Course (1)
10. Kiddy Zip area (1)
11. Mid-Station Observation Deck of the Gondola (Existing)

Wildlife Proof receptacles in and around Adventure Peak will be serviced each day of operations. All garbage from the remote receptacles will be consolidated to the Tamarack Lodge loading dock by the Adventure Peak grounds crew, where all refuse is kept inside of the loading dock facility. Daily refuse removal by the F&B Warehouse staff will continue. This is necessary for the success of this program. All garbage, kitchen food waste recycling, and recycling are taken to the California Main Lodge lower parking lot where dedicated dumpsters for the different waste streams are located. There are dumpsters labeled for blue bag recycling, food waste recycling, straight garbage, and construction and demolition materials. All dumpsters at this location are animal proof with lids, doors, and the food waste can is locked.

These dumpsters are serviced by South Tahoe Refuse and are monitored by Heavenly management staff closely for frequency of service. Since 2013 all of these CA Base dumpsters were made animal proof and the wildlife we have seen on property at CA Base has been significantly reduced. Wildlife interactions at the Lower CA Base area parking lot do not appear to be a problem at this time.

Bear Bins will always be deployed before summer Adventure Peak operations and activities begin. These bins will be removed from the TOG area so as to not interfere with winter operations. They will be stored at an off-site location once summer operations cease in late September. These bins might be stored at the Heavenly storage property (Known as KGID, near the top of Kingsbury Grade), or uphill of the summer road near the Big Easy water tank.

Future Expansion into Sky Meadows and East Peak Lake/Lodge to be developed as those regions come online.

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APPENDIX V
2015 WATER USE BALANCE REPORT

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Heavenly Mountain Resort

Water Use Report, 2014-15 Season



Heavenly Mountain Resort is furnishing this report on water usage during the 2014-15 season as per the terms of the existing master plan agreement.

Snowmaking Water Usage

The Heavenly Mountain Resort snowmaking system consumed a total of 156.6 million gallons of water during the 2014-15 season to cover a total of 317 acres of terrain. The distribution of water sources and water consumption is described below:

Total Snowmaking Water Use--California	68.09	million gallons
Total Snowmaking Water Use--Nevada	88.51	million gallons
<hr/>		
Net Total Snowmaking Water Use	156.60	million gallons
Water Supplied in California	72.50	million gallons
Water Used in California	68.09	million gallons
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Net Surplus (flow out of California)	4.42	million gallons
Water Supplied in Nevada	84.10	million gallons
Water Used in Nevada	88.51	million gallons
<hr/>		
Net Deficit (Flow into Nevada)	-4.42	million gallons
Water Supplied In Basin	72.50	million gallons
Water Used in Basin	87.61	million gallons
<hr/>		
Difference (flow out of Basin)	-15.11	million gallons
Water Supplied Out of Basin	84.10	million gallons
Water Used Out of Basin	68.99	million gallons
<hr/>		
Difference (flow into Basin)	15.11	million gallons
Water Purchased--STPUD	64.81	million gallons
Water Purchased--KGID	22.97	million gallons
<hr/>		
TOTAL WATER PURCHASED	87.78	million gallons

Table 1 provides a breakdown of water usage between California and Nevada, along with the net transfer of water between the States.

Table 1...2014-2015 Water Usage Summary--Inter State Transfers					
Pumping Region	MG used	In California		In Nevada	
		% of acre-ft	Water (MG)	% of acre-ft	Water (MG)
Cal Base	31.1	100%	31.1	0%	0.0
Cal Dam	30.4	100%	30.4	0.0%	0.0
E. Peak	95.1	7%	6.6	93%	88.5
Total	156.6		68.1		88.5
Water Supply- (Purchased + Recharge)			72.5		84.1
InterState Water Transfer			-4.4		4.4

Table 2a provides a breakdown of water usage between in-basin and out of basin regions, along with the net inter-basin transfer of water.

Table 2a...2014-2015 Water Usage Summary--Inter Basin					
Pumping Region	MG used	In Basin		Out of Basin	
		% of acre-ft	Water (MG)	% of acre-ft	Water (MG)
Cal Base	31.1	100%	31.1	0%	0.0
Cal Dam	30.4	100.0%	30.4	0.0%	0.0
E. Peak--CA	6.6	0%	0.0	100%	6.6
Total California	68.1		61.5		6.6
E. Peak--NV	88.5	29.5%	26.1	70.5%	62.4
Total Nevada	88.5		26.1		62.4
TOTAL SNOWMAKING	156.6		87.6		69.0
Water Supply			72.5		84.1
Inter Basin Water Transfer			15.1		-15.1

Table 2b further breaks down the Nevada water use within 4 water right quadrants as listed below:

Table 2b...2014-2015 Water Usage Summary--Inter Basin					
Pumping Region	MG used	In Basin		Out of Basin	
		% of acre-ft	Water (MG)	% of acre-ft	Water (MG)
Cal Base	31.1	100%	31.1	0%	0.0
Cal Dam	30.4	100%	30.4	0%	0.0
E. Peak--CA	6.6	0%	0.0	100%	6.6
Total California	68.1		61.5		6.6
Quadrant A	0.0	12.0%	10.6		
Quadrant B				58%	51.3
Quadrant C				13%	11.1
Quadrant D		18%	15.5		
Total Nevada	88.5		26.1		62.4
TOTAL SNOWMAKING	156.6		87.6		69.0
Water Supply			72.5		84.1
Inter Basin Water Transfer			15.1		-15.1

A - Within Tahoe Basin and south of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

B - Outside of Tahoe Basin and south of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

C - Outside of Tahoe Basin and North of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

D - Within Tahoe Basin and North of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

The following attachments provide documentation and calculations procedures used in determining these values:

Attachment 1....Map of Existing Meter Locations

Attachment 2....Schematic of Water Transfers

Attachment 3....California Snowmaking Trails

Attachment 4....Nevada Snowmaking Trails and Water Right Quadrants

Calculation Procedures

Water allocation calculations for Heavenly Mountain Resort are complicated by the fact that snowmaking occurs in both Nevada and California, as well as inside and outside the TRPA boundary. While the snowmaking piping distribution system for the entire resort is interlinked, there are 3 basic sub-regions:

1. Cal Base This region consists of the acreage on the California side falling below Cal Dam. This entire region falls within the State of California and within the Tahoe Basin.
2. Cal Dam This region consists of acreage on the California side that is above Cal Dam. This entire region falls within the State of California and within the Tahoe Basin.
3. East Peak This region consists of acreage above and below East Peak Lake. The region is predominantly in Nevada, though some trails serviced at the top fall inside California. A majority of this terrain is out of the Tahoe Basin, but 25% lies inside the Basin.

Attachment 2 provides a schematic of pumping operations, meter readings, and the calculation procedure for interstate water transfers. These calculations consist of performing a water balance between the STPUD and KGID supplies, water entering and exiting reservoirs, and a flowmeter installed on the existing transfer line between the Cal Dam and East Peak systems.

The methodology used this analysis to track inter-basin water usage involves calculating the total water usage within the 3 major sub-regions (Lower Cal, Cal Dam, and East Peak) and then allocating water proportionally based on snowmaking terrain within that region that falls inside and outside the Tahoe basin. Since different trails require different design depths of snow, the allocation is based on the trail acreage x design depth for each trail, as detailed in Attachments 3 and 4. The same methodology is

used to allocate East Peak water between California and Nevada. No changes have been made in the metering locations, configuration, or calculation procedure from the previous year.

The trail data provided in Attachment 4 indicates that 7% of the East Peak design acre-ft of snow coverage occurs in California. Therefore, 7% of the total 95.1 MG used for snowmaking in the East Peak sub-region is calculated to fall in California (6.6 MG) while 93% is calculated to fall in Nevada (88.5 MG)¹. Of this 88.5 MG of East Peak water that is used in Nevada, 29.5% of the design acre-ft of snow production occurs within the Tahoe Basin. Therefore 29.5% of the 88.5 million gallons of water used in this sub-region are calculated to be used within the Basin (26.1 MG) while 70.5% are calculated to be used outside the basin (62.4 MG)².

Revised Operating Procedures

The calculations indicate that a net of 15.1 million gallons of water was transferred into the basin during the 2014-2015 snowmaking season, while 4.4 MG was transferred from California to Nevada. Future net transfers will be minimized by further balancing water supplies during the season and managing summer irrigation practices.

Respectfully Submitted,

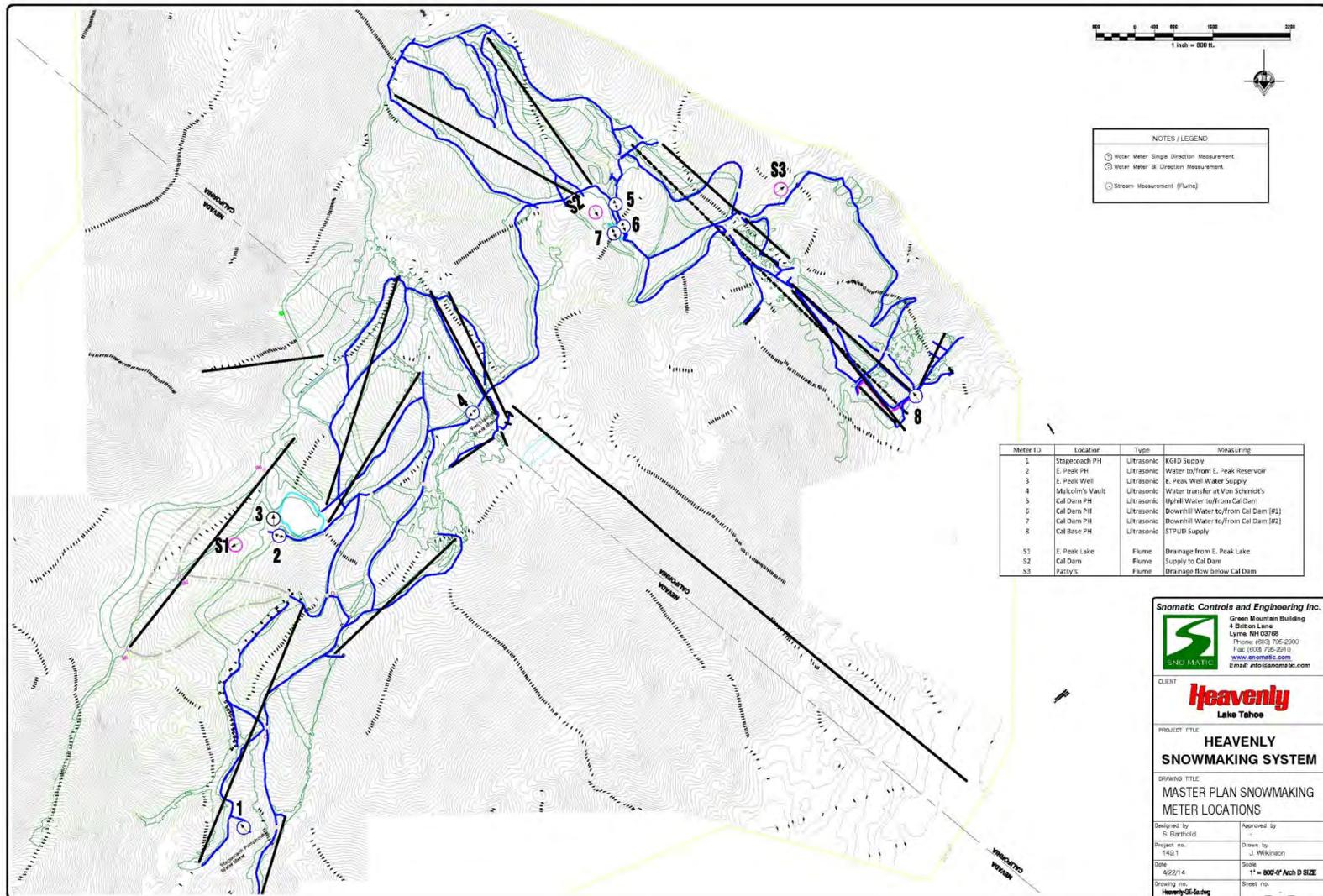
A handwritten signature in black ink that reads "Scott Barthold". The signature is written in a cursive style with a large, sweeping initial "S".

Scott Barthold, PE
Somatic Controls and Engineering, Inc.

¹ Refer to Table 1 for calculation

² Refer to Table 2a/b for calculation

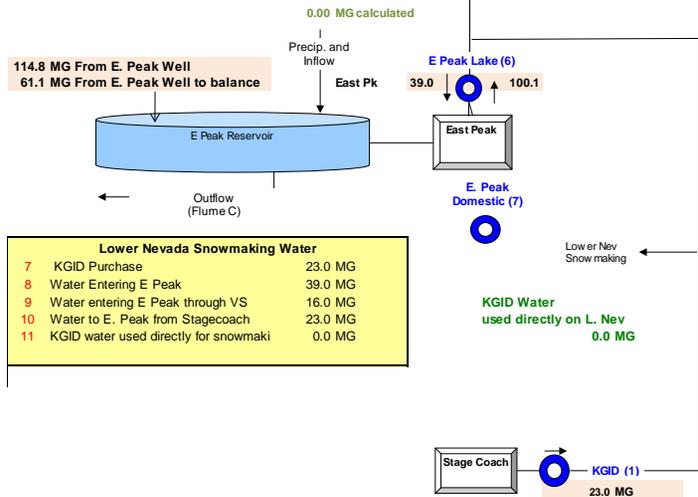
Attachment 1...Existing meter locations



Attachment 2---Schematic

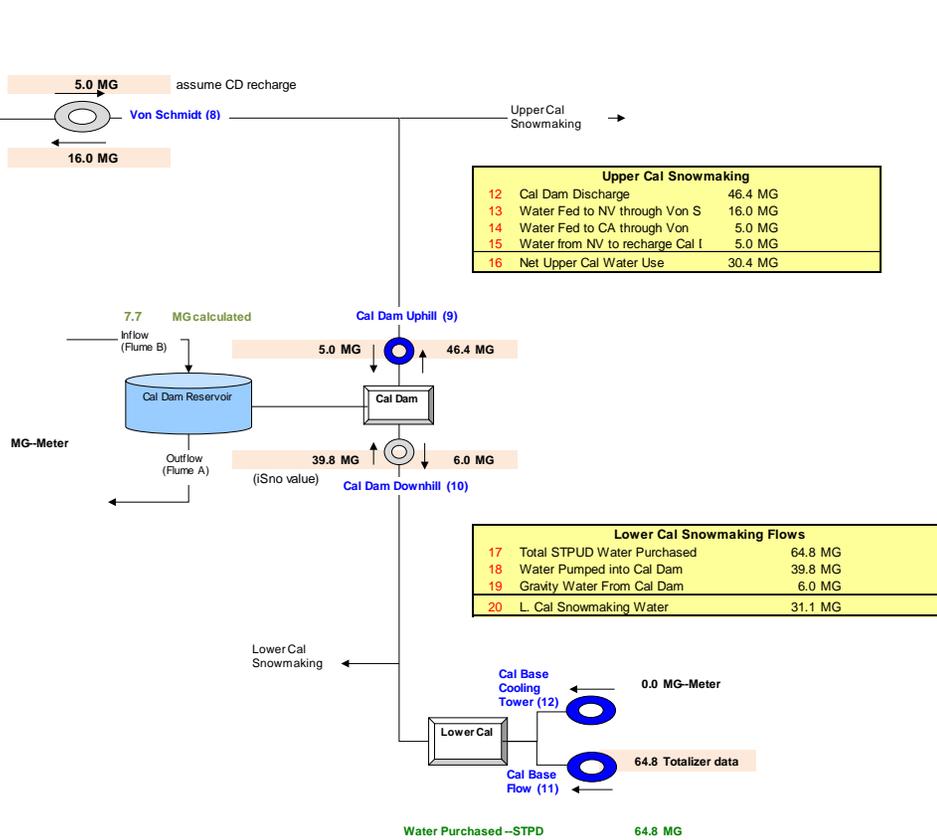
Attachment 2

Nevada Snowmaking Water		
1	Water Pumped by E Peak pumps	100.1 MG
2	Water Sent to Cal Dam via Von Schm	5.0 MG
3	KGID Water used directly for SM	0.0 MG
4 Total Nevada Snowmaking Water		95.1 MG
5	STPUD Water transferred to Nevada	16.0 MG
6	KGID and Inflow water used in NV	79.1 MG



Lower Nevada Snowmaking Water		
7	KGID Purchase	23.0 MG
8	Water Entering E Peak	39.0 MG
9	Water entering E Peak through VS	16.0 MG
10	Water to E. Peak from Stagecoach	23.0 MG
11	KGID water used directly for snowmaki	0.0 MG

Heavenly Mountain Resort Snowmaking Water Usage 2014-2015 Water Transfers



Upper Cal Snowmaking		
12	Cal Dam Discharge	46.4 MG
13	Water Fed to NV through Von S	16.0 MG
14	Water Fed to CA through Von	5.0 MG
15	Water from NV to recharge Cal I	5.0 MG
16 Net Upper Cal Water Use		30.4 MG

Lower Cal Snowmaking Flows		
17	Total STPUD Water Purchased	64.8 MG
18	Water Pumped into Cal Dam	39.8 MG
19	Gravity Water From Cal Dam	6.0 MG
20 L. Cal Snowmaking Water		31.1 MG

Calculation Notes

- | | | | |
|----|---|----|---|
| 1 | From E. Peak Meter | 12 | Read from Cal Dam uphill meter |
| 2 | Based on Cal Dam meter reading (entering pond) | 13 | From Equation 5 |
| 3 | Calculated by Equation 11 | 14 | Cal Dam Uphill meter reading (reverse flow) |
| 4 | Water Pumped by E. Peak - water sent to CA + KGID water used directly for snowmaking = Nevada SM water | 15 | Cal Dam Uphill meter reading (reverse flow) |
| 5 | Water entering E. Peak -(Water Pumped via KGID - KGID water used directly on L. Nevada) | 16 | (Water Pumped from Cal Dam - water transferred to NV) + (Water pumped from E Peak into CA - water entering Cal Dam) |
| 6 | Total Nevada water - transfer to Cal Dam = KGID and Inflow water used in NV | | |
| 7 | Provided by Purchase Records from KGID | 17 | From Purchase records |
| 8 | Based on E. Peak Meter Reading | 18 | From Cal Dam downhill meter |
| 9 | From Equation 5 | 19 | From Cal Dam Downhill Meter |
| 10 | Total Water into E. Peak (from meter) - water transferred to E. Peak from Von Shmidt = water transferred from Stage coach | 20 | Water Pumped from L Cal - Water delivered to Cal Dam + gravity water running back down to lower Cal |
| 11 | Water purchased from KGID - water transferred from KGID to E. Peak = KGID water used directly for snowmaking | | |

ATTACHMENT 3--CALIFORNIA SNOWMAKING ACREAGE

2007 Master Plan Amendment Trail #	Trail Name	2007 Master Plan Amendment Snowmaking Action (1)	Acreage (acres)	Acre ft. (3)
<i>California In-Basin... 'pod' trails</i>				
B1	EAST BOWL -THE FACE	EXISTING	16.3	81.3
B2	GUNBARREL	EXISTING	8.2	40.8
D1	WORLD CUP	EXISTING	6.0	16.1
E1	PATSY'S	EXISTING	7.9	21.4
G1	MAGGIES	EXISTING	8.4	22.7
G2	CAT TRACK	EXISTING	1.0	2.7
G5	MOMBO MEADOWS	EXISTING	4.1	11.1
G6	MOMBO	EXISTING	1.0	2.6
G7	LOWER MOMBO	EXISTING	2.5	6.7
H9	CANYON - SKY CANYON	EXISTING	6.1	16.5
H10	JACKPOT (RUSUTSU)	EXISTING	4.3	11.6
H11	HIGH ROLLER (STEAMBOAT)	EXISTING	3.3	8.9
I1	LIZS	EXISTING	9.6	25.9
I3	UPPER ELLIES / ELLIES	EXISTING	12.4	49.6
K1	PERFECT RIDE (WEST BOWL)	EXISTING	8.7	23.4
*L1	LOWER SKI SCHOOL	EXISTING	2.3	6.2
M1	CHILDRENS SKI CENTER	EXISTING	0.9	2.4
N1	PIONEER PLATTER PULL	EXISTING	2.4	6.5
O1	LEARN TO SKI CENTER	EXISTING	1.4	3.7
*GG1	(UPR.) CALIFORNIA TRAIL	EXISTING	7.4	20.0
**GG2	SAMS DREAM	EXISTING - UNBUILT	4.3	17.1
*GG3	TAMARACK RETURN	EXISTING	0.7	2.0
*GG6	CASCADE	EXISTING	8.0	32.1
*HH1	EASY STREET (1/2)	EXISTING	3.4	9.2
HH2	EASY STREET II (1/2)	RETAIN	2.1	5.6
B3	PISTOL	REMOVE	0.0	0.0
B4	WEST BOWL	REMOVE	0.0	0.0
E2	GROOVE	EXISTING	3.8	10.2
G3	SWING TRAIL	NO ACTION	0.0	0.0
G4	WATERFALL	RETAIN	3.5	17.4
G8	POWDERBOWL	RETAIN	3.5	14.1
G9	NEW - POWDERBOWL 2 (Gladed)	NEW	1.9	5.1
H1	WOODS TRAIL	NO ACTION	0.0	0.0
H2	BETTYS SWING	NO ACTION	0.0	0.0
H3	RIDGE BOWL	NO ACTION	0.0	0.0
H4	RIDGE CHUTE	NO ACTION	0.0	0.0
H5	HIGH ROLLER (BETTYS RUN)	RETAIN	12.7	63.4
H6	DOUBLE DOWN (BETTYS BOWL)	RETAIN	0.0	0.0
H7	LOWER BETTYS	RETAIN	0.0	0.0
H8	BETTYS CUTOFF	NO ACTION	0.0	0.0
H12	NEW - BETTYS CUTOFF	NO ACTION	0.0	0.0
H13	NEW - BETTYS ESCAPE	NO ACTION	0.0	0.0
I2	ELLIE'S SWING - EXTENSION	RETAIN	3.4	9.2
I4	NEW - SKIWAYS 1 (GLADED)	NO ACTION	0.0	0.0
I5	NEW - SKIWAYS 2 (GLADED)	NO ACTION	0.0	0.0
GG5	49ER	RETAIN	1.6	6.3
<i>California In-Basin...non 'pod' transport trails</i>				
1	ROUND-A-BOUT	EXISTING	15.6	42.1
2	RIDGE RUN	EXISTING	1.7	4.5
3	LOWER RIDGE RUN	EXISTING	15.9	42.9
5	CALIFORNIA TRAIL	EXISTING	5.5	14.9
5A	NEW- CAL. TRAIL ALTERNATIVE	NEW	1.7	4.5
10	VON SCHMIDTS (1/4)	RETAIN	1.2	3.3
**11	VON SCHMIDTS - MEADOW	RETAIN	4.1	11.1
1	ROUND-A-BOUT - REALIGNMENT	NEW	1.6	4.2
4	SKYLINE TRAIL	RETAIN	2.8	7.6
12	NEW - MAGGIES CANYON (GLADED)	NO ACTION	0.0	0.0
In Basin Total--Master Plan			212.8	706.7
In Basin Total--Cal Base Existing			57.9	212.4
In Basin Total--Cal Dam Existing			91.2	262.3
In Basin Total--E. Peak Existing			0.0	0.0
<i>California Out of Basin 'pod' trails</i>				
V4	BIG DIPPER (1/5)	EXISTING	3.7	10.0
V8	ORION'S (1/2)	EXISTING	8.4	22.6
*V10	METEOR (1/2) - (GLADED)	EXISTING - UNBUILT	2.9	7.8
**V11	METEOR II (1/3) - (GLADED)	REMOVE	0.0	0.0
V7	DIPPER BOWL (1/2)	NO ACTION	0.0	0.0
GG4	SAND DUNES	RETAIN	3.0	8.0
V1	MILKY WAY BOWL (2/3)	NO ACTION	0.0	0.0
V3	DIPPER KNOB	RETAIN	1.2	3.2
Out of Basin Total--Master Plan			17.9	48.4
Out of Basin Total--Cal Base Existing			0.0	0.0
Out of Basin Total--Cal Dam Existing			0.0	0.0
Out of Basin Total--E. Peak Existing			12.1	32.6
California Total--Master Plan			230.8	755.1
California Total--Existing			161.1	507.3
Cal Base Total Existing			57.9	212.4
Cal Dam Total Existing			91.2	262.3
E Peak Total Existing			12.1	32.6
Cal Base Existing---% In Basin			100%	100%
Cal Dam Existing---% In Basin			100%	0%
E Peak Existing---% In Basin			0%	0%

ATTACHMENT 4--NEVADA SNOWMAKING ACREAGE

2007 Master Plan Amended Facilities - Snowmaking at Buildout

2007		2007		Acreage by Quadrant				Acre-ft by Quadrant				
Master Plan Amendment	Trail Name	Master Plan Amendment Snowmaking Action (1)	Acreage (acres)	Acre ft. (3)	A	B	C	D	A	B	C	D
Nevada In Basin 'pod' trails												
Q1	BOULDER (EDGEWOOD) BOWL	EXISTING	17.2	68.9				17.2				68.9
S1	OLYMPIC DOWNHILL (3/5)	EXISTING	15.5	41.8	15.5				41.8			
X1	BOULDER SKI SCHOOL	EXISTING	2.8	7.6				2.8				7.6
*HH1	EASY STREET (1/2)	EXISTING	3.4	9.2	3.4				9.2			
S2	BOULDER CHUTE (075)	RETAIN	2.7	11.0								
S3	NORTH BOWL	RETAIN	7.8	38.9								
S4	UPPER NORTH BOWL	RETAIN	4.2	21.0								
S8	NEW - NORTH BOWL 2	NEW	5.1	13.8								
S9	NEW - NORTH BOWL 3 (Gladed)	NEW	8.1	22.0								
S10	NEW - NORTH BOWL 4 (Gladed)	NEW	7.8	21.2								
HH2	EASY STREET II (1/2)	NO ACTION	2.1	5.6								
(wasn't on snowmaking plan)												
Nevada In Basin non 'pod' transport trails												
9	STEVES	EXISTING	0.5	1.4	0.5				1.4			
10	VON SCHMIDT'S (1/4)	RETAIN	1.2	3.3								
NV In Basin Total--Master Plan			78.5	265.5								
NV In Basin Existing Total (all E. Peak)			39.4	128.8								
Nevada Out of Basin 'pod' trails												
R2	(UPPER) STAGECOACH	EXISTING	4.2	16.6			4.2					16.6
S1	OLYMPIC DOWNHILL (2/5)	EXISTING	10.3	27.9		3.8	6.5			10.4		17.5
S5	CROSSOVER	EXISTING	6.7	18.1			6.7			18.1		
V4	BIG DIPPER (4/5)	EXISTING	14.8	40.0			14.8			40.0		
V6	ORION'S BELT	EXISTING	1.1	2.9			1.1			2.9		
V8	ORION'S (1/2)	EXISTING	8.4	22.6			8.4			22.6		
V9	LOWER ORIONS	EXISTING	2.9	7.8			2.9			7.8		
*V10	METEOR (1/2) - (GLADED)	EXISTING - UNBUILT	2.9	7.8								
W3	LITTLE DIPPER	EXISTING	10.4	52.2		10.4				52.2		
W4	COMET	EXISTING	14.2	38.3		14.2				38.3		
Z1	NEW - WELLS FARGO 1	NEW	5.4	14.5								
Z2	NEW - WELLS FARGO 2	RETAIN	8.3	22.4								
Z3	NEW - WELLS FARGO 3	NEW	11.4	30.7								
Z4	NEW - WELLS FARGO 4	RETAIN	12.8	34.6								
Z5	NEW - WELLS FARGO 5	NEW	2.8	7.5								
Z7	NEW - WELLS FARGO 7	NEW	6.9	18.7								
R1	STAGECOACH	EXISTING	12.4	49.6		10.8	1.6			43.2		6.3
R3	NEW - STAGECOACH 2	NO ACTION	7.1	35.6								
R4	NEW - STAGECOACH 3	NO ACTION	0.0	0.0								
R5												
S6	PONDEROSA (BONANZA BOWL)	RETAIN	4.0	15.9								
S7	EAST PEAK	RETAIN	3.9	15.8								
U1	PERIMETER	RETAIN	13.5	36.4								
U2	GALAXY	RETAIN	10.1	27.3								
U3	NEW - GALAXY 1	NEW	8.7	23.4								
U4	NEW - GALAXY 2	NEW	2.7	7.3								
V5	LOWER BIG DIPPER	RETAIN	3.7	9.9								
V12	NEW - ORION'S II	NEW	3.4	9.3								
W1	ARIES	RETAIN	1.3	3.4								
W2	JACK'S	NEW	3.0	8.0								
*HH3	SILVER SPUR	NO ACTION	0.5	1.4								
Nevada Out of Basin Non 'pod' transport trails												
7	LOWER WAY HOME	EXISTING	5.2	14.1			5.2					14.1
8	PEPIS	EXISTING	4.0	10.8		4.0				10.8		
10	VON SCHMIDT'S (1/2)	EXISTING	2.4	6.5		2.4				6.5		
14	NEW - GALAXY ACCESS	NEW	6.4	17.3								
15	NEW - SCORPION	NEW	6.3	17.1								
6	NEW - NEVADA TRAIL (WAY HOME)	NEW	5.9	16.0								
16	NEW - FARGO TO GALAXY	NEW	1.1	2.9								
NV-Out of Basin Total MP			229.1	690.8								
NV Out of Basin Existing Total (all E. Peak)			97.0	307.5								
					Acreage by Quadrant				Acre-ft by Quadrant			
Acreage total by Quadrant					19.4	79.5	17.5	20.0	52.4	252.8	54.6	76.5
% of Total Acreage					14.2%	58.3%	12.8%	14.7%	12.0%	58.0%	12.5%	17.5%
					TOTAL				TOTAL			
					136.4				436.3			
Nevada Total--Master Plan			307.6	956.3								
Nevada Total--Existing			136.4	436.3								
% In Basin--Existing			29%	30%								
% Out of Basin			71%	70%								
Grand Total--2007 Master Plan			538.4	1,711.4								
Cal Base Total			57.9	212.4								
% in CA			100%	100%								
% In Basin			100%	100%								
Cal DamTotal			91.2	262.3								
% in CA			100%	100%								
% in Basin			100%	100%								
E. Peak Total			148.5	468.9								
% in CA			8%	7%								
E. Peak in CA			12.1	32.6								
% of E. Peak in CA-in Basin			0%	0%								
E. Peak in NV			136.4	436.3								
% of E. Peak in NV-in Basin			29%	30%								

Mitigation and Monitoring Plan Annual
Report (October 2014 – September 2015)

APPENDIX VI
DAGGETT CREEK MEMORANDUM

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Heavenly Mountain Resort

Water Use Report, 2014-15 Season



Heavenly Mountain Resort is furnishing this report on water usage during the 2014-15 season as per the terms of the existing master plan agreement.

Snowmaking Water Usage

The Heavenly Mountain Resort snowmaking system consumed a total of 156.6 million gallons of water during the 2014-15 season to cover a total of 317 acres of terrain. The distribution of water sources and water consumption is described below:

Total Snowmaking Water Use--California	68.09	million gallons
Total Snowmaking Water Use--Nevada	88.51	million gallons
<hr/>		
Net Total Snowmaking Water Use	156.60	million gallons
Water Supplied in California	72.50	million gallons
Water Used in California	68.09	million gallons
<hr/>		
Net Surplus (flow out of California)	4.42	million gallons
Water Supplied in Nevada	84.10	million gallons
Water Used in Nevada	88.51	million gallons
<hr/>		
Net Deficit (Flow into Nevada)	-4.42	million gallons
Water Supplied In Basin	72.50	million gallons
Water Used in Basin	87.61	million gallons
<hr/>		
Difference (flow out of Basin)	-15.11	million gallons
Water Supplied Out of Basin	84.10	million gallons
Water Used Out of Basin	68.99	million gallons
<hr/>		
Difference (flow into Basin)	15.11	million gallons
Water Purchased--STPUD	64.81	million gallons
Water Purchased--KGID	22.97	million gallons
<hr/>		
TOTAL WATER PURCHASED	87.78	million gallons

Table 1 provides a breakdown of water usage between California and Nevada, along with the net transfer of water between the States.

Table 1...2014-2015 Water Usage Summary--Inter State Transfers					
Pumping Region	MG used	In California		In Nevada	
		% of acre-ft	Water (MG)	% of acre-ft	Water (MG)
Cal Base	31.1	100%	31.1	0%	0.0
Cal Dam	30.4	100%	30.4	0.0%	0.0
E. Peak	95.1	7%	6.6	93%	88.5
Total	156.6		68.1		88.5
Water Supply- (Purchased + Recharge)			72.5		84.1
InterState Water Transfer			-4.4		4.4

Table 2a provides a breakdown of water usage between in-basin and out of basin regions, along with the net inter-basin transfer of water.

Table 2a...2014-2015 Water Usage Summary--Inter Basin					
Pumping Region	MG used	In Basin		Out of Basin	
		% of acre-ft	Water (MG)	% of acre-ft	Water (MG)
Cal Base	31.1	100%	31.1	0%	0.0
Cal Dam	30.4	100.0%	30.4	0.0%	0.0
E. Peak--CA	6.6	0%	0.0	100%	6.6
Total California	68.1		61.5		6.6
E. Peak--NV	88.5	29.5%	26.1	70.5%	62.4
Total Nevada	88.5		26.1		62.4
TOTAL SNOWMAKING	156.6		87.6		69.0
Water Supply			72.5		84.1
Inter Basin Water Transfer			15.1		-15.1

Table 2b further breaks down the Nevada water use within 4 water right quadrants as listed below:

Table 2b...2014-2015 Water Usage Summary--Inter Basin					
Pumping Region	MG used	In Basin		Out of Basin	
		% of acre-ft	Water (MG)	% of acre-ft	Water (MG)
Cal Base	31.1	100%	31.1	0%	0.0
Cal Dam	30.4	100%	30.4	0%	0.0
E. Peak--CA	6.6	0%	0.0	100%	6.6
Total California	68.1		61.5		6.6
Quadrant A	0.0	12.0%	10.6		
Quadrant B				58%	51.3
Quadrant C				13%	11.1
Quadrant D		18%	15.5		
Total Nevada	88.5		26.1		62.4
TOTAL SNOWMAKING	156.6		87.6		69.0
Water Supply			72.5		84.1
Inter Basin Water Transfer			15.1		-15.1

A - Within Tahoe Basin and south of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

B - Outside of Tahoe Basin and south of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

C - Outside of Tahoe Basin and North of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

D - Within Tahoe Basin and North of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

The following attachments provide documentation and calculations procedures used in determining these values:

Attachment 1....Map of Existing Meter Locations

Attachment 2....Schematic of Water Transfers

Attachment 3....California Snowmaking Trails

Attachment 4....Nevada Snowmaking Trails and Water Right Quadrants

Calculation Procedures

Water allocation calculations for Heavenly Mountain Resort are complicated by the fact that snowmaking occurs in both Nevada and California, as well as inside and outside the TRPA boundary. While the snowmaking piping distribution system for the entire resort is interlinked, there are 3 basic sub-regions:

1. Cal Base This region consists of the acreage on the California side falling below Cal Dam. This entire region falls within the State of California and within the Tahoe Basin.
2. Cal Dam This region consists of acreage on the California side that is above Cal Dam. This entire region falls within the State of California and within the Tahoe Basin.
3. East Peak This region consists of acreage above and below East Peak Lake. The region is predominantly in Nevada, though some trails serviced at the top fall inside California. A majority of this terrain is out of the Tahoe Basin, but 25% lies inside the Basin.

Attachment 2 provides a schematic of pumping operations, meter readings, and the calculation procedure for interstate water transfers. These calculations consist of performing a water balance between the STPUD and KGID supplies, water entering and exiting reservoirs, and a flowmeter installed on the existing transfer line between the Cal Dam and East Peak systems.

The methodology used this analysis to track inter-basin water usage involves calculating the total water usage within the 3 major sub-regions (Lower Cal, Cal Dam, and East Peak) and then allocating water proportionally based on snowmaking terrain within that region that falls inside and outside the Tahoe basin. Since different trails require different design depths of snow, the allocation is based on the trail acreage x design depth for each trail, as detailed in Attachments 3 and 4. The same methodology is

used to allocate East Peak water between California and Nevada. No changes have been made in the metering locations, configuration, or calculation procedure from the previous year.

The trail data provided in Attachment 4 indicates that 7% of the East Peak design acre-ft of snow coverage occurs in California. Therefore, 7% of the total 95.1 MG used for snowmaking in the East Peak sub-region is calculated to fall in California (6.6 MG) while 93% is calculated to fall in Nevada (88.5 MG)¹. Of this 88.5 MG of East Peak water that is used in Nevada, 29.5% of the design acre-ft of snow production occurs within the Tahoe Basin. Therefore 29.5% of the 88.5 million gallons of water used in this sub-region are calculated to be used within the Basin (26.1 MG) while 70.5% are calculated to be used outside the basin (62.4 MG)².

Revised Operating Procedures

The calculations indicate that a net of 15.1 million gallons of water was transferred into the basin during the 2014-2015 snowmaking season, while 4.4 MG was transferred from California to Nevada. Future net transfers will be minimized by further balancing water supplies during the season and managing summer irrigation practices.

Respectfully Submitted,

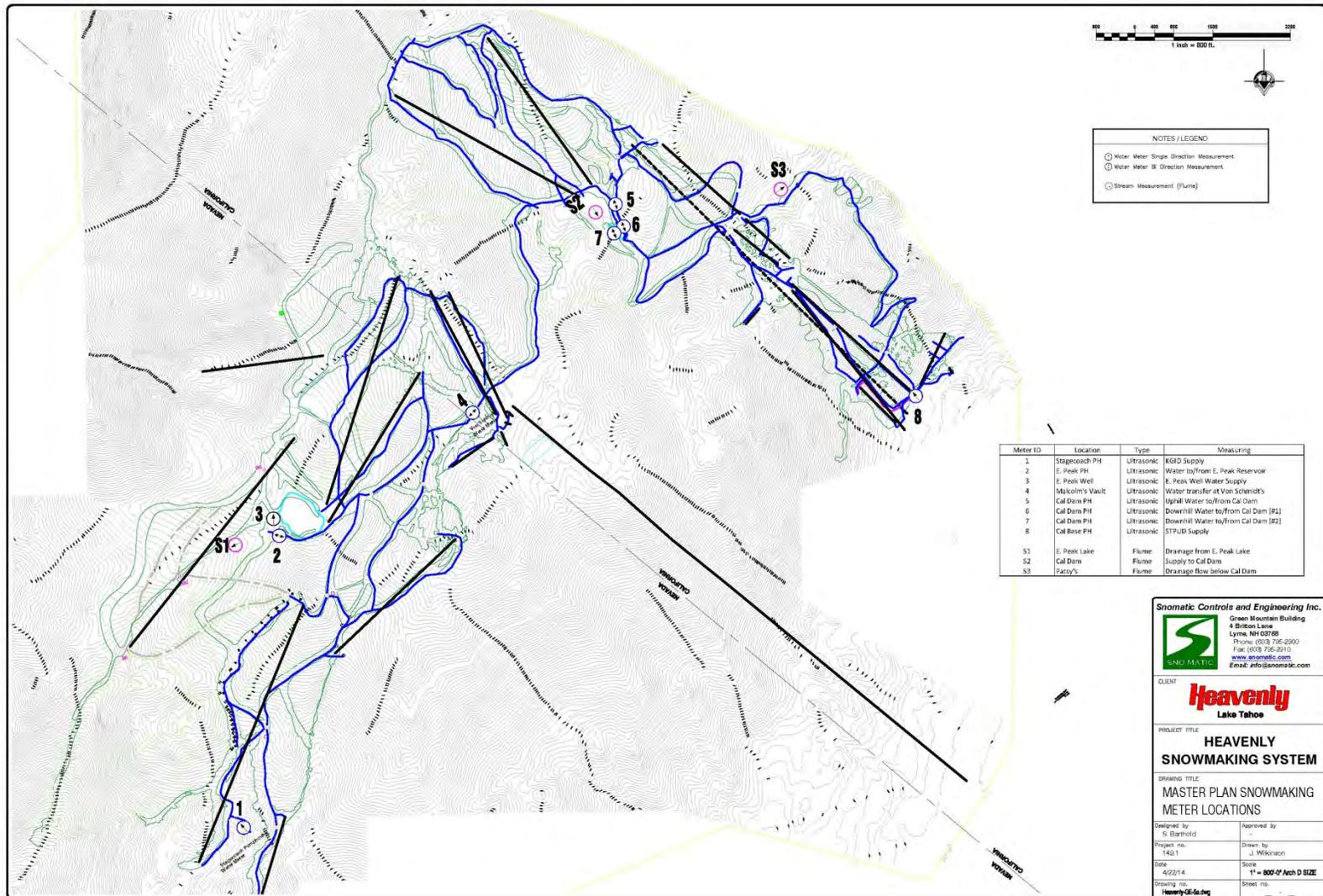
A handwritten signature in black ink that reads "Scott Barthold". The signature is written in a cursive, flowing style.

Scott Barthold, PE
Somatic Controls and Engineering, Inc.

¹ Refer to Table 1 for calculation

² Refer to Table 2a/b for calculation

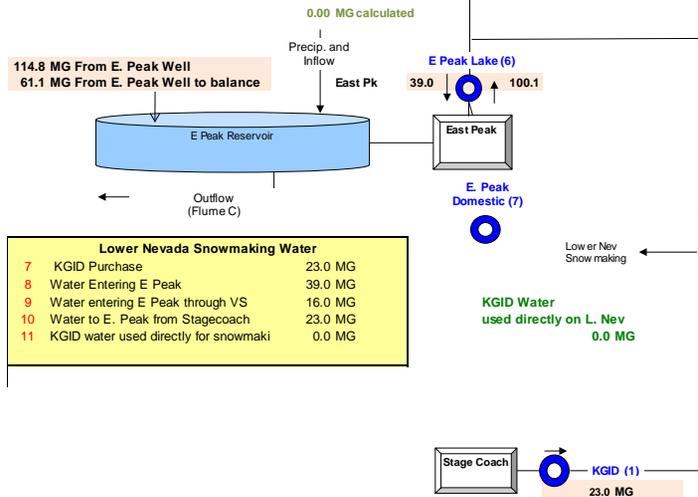
Attachment 1...Existing meter locations



Attachment 2---Schematic

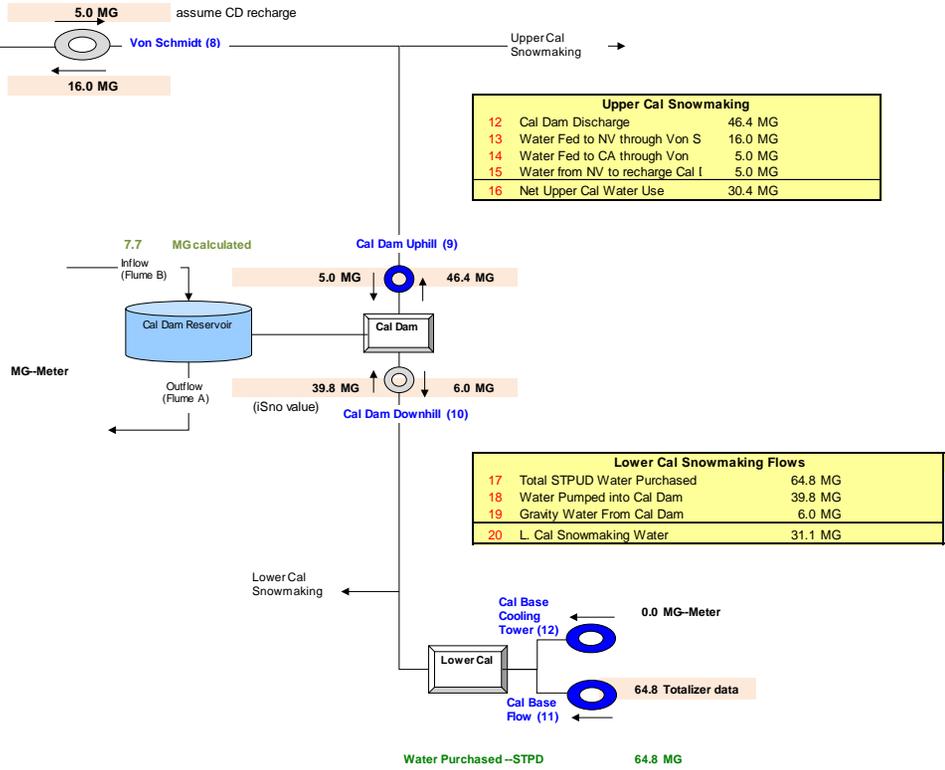
Attachment 2

Nevada Snowmaking Water		
1	Water Pumped by E Peak pumps	100.1 MG
2	Water Sent to Cal Dam via Von Schm	5.0 MG
3	KGID Water used directly for SM	0.0 MG
4 Total Nevada Snowmaking Water		95.1 MG
5	STPUD Water transferred to Nevada	16.0 MG
6	KGID and Inflow water used in NV	79.1 MG



Lower Nevada Snowmaking Water		
7	KGID Purchase	23.0 MG
8	Water Entering E Peak	39.0 MG
9	Water entering E Peak through VS	16.0 MG
10	Water to E. Peak from Stagecoach	23.0 MG
11	KGID water used directly for snowmaki	0.0 MG

Heavenly Mountain Resort Snowmaking Water Usage 2014-2015 Water Transfers



Upper Cal Snowmaking		
12	Cal Dam Discharge	46.4 MG
13	Water Fed to NV through Von S	16.0 MG
14	Water Fed to CA through Von	5.0 MG
15	Water from NV to recharge Cal I	5.0 MG
16 Net Upper Cal Water Use		30.4 MG

Lower Cal Snowmaking Flows		
17	Total STPUD Water Purchased	64.8 MG
18	Water Pumped into Cal Dam	39.8 MG
19	Gravity Water From Cal Dam	6.0 MG
20 L. Cal Snowmaking Water		31.1 MG

Calculation Notes

- | | | | |
|----|---|----|---|
| 1 | From E. Peak Meter | 12 | Read from Cal Dam uphill meter |
| 2 | Based on Cal Dam meter reading (entering pond) | 13 | From Equation 5 |
| 3 | Calculated by Equation 11 | 14 | Cal Dam Uphill meter reading (reverse flow) |
| 4 | Water Pumped by E. Peak - water sent to CA + KGID water used directly for snowmaking = Nevada SM water | 15 | Cal Dam Uphill meter reading (reverse flow) |
| 5 | Water entering E. Peak -(Water Pumped via KGID - KGID water used directly on L. Nevada) | 16 | (Water Pumped from Cal Dam - water transferred to NV) + (Water pumped from E Peak into CA - water entering Cal Dam) |
| 6 | Total Nevada water - transfer to Cal Dam = KGID and Inflow water used in NV | 17 | From Purchase records |
| 7 | Provided by Purchase Records from KGID | 18 | From Cal Dam downhill meter |
| 8 | Based on E. Peak Meter Reading | 19 | From Cal Dam Downhill Meter |
| 9 | From Equation 5 | 20 | Water Pumped from L Cal - Water delivered to Cal Dam + gravity water running back down to lower Cal |
| 10 | Total Water into E. Peak (from meter) - water transferred to E. Peak from Von Shmidt = water transferred from Stage coach | | |
| 11 | Water purchased from KGID - water transferred from KGID to E. Peak = KGID water used directly for snowmaking | | |

ATTACHMENT 3--CALIFORNIA SNOWMAKING ACREAGE

2007 Master Plan Amendment Trail #	Trail Name	2007 Master Plan Amendment Snowmaking Action (1)	Acreage (acres)	Acre ft. (3)
<i>California In-Basin... 'pod' trails</i>				
B1	EAST BOWL -THE FACE	EXISTING	16.3	81.3
B2	GUNBARREL	EXISTING	8.2	40.8
D1	WORLD CUP	EXISTING	6.0	16.1
E1	PATSY'S	EXISTING	7.9	21.4
G1	MAGGIES	EXISTING	8.4	22.7
G2	CAT TRACK	EXISTING	1.0	2.7
G5	MOMBO MEADOWS	EXISTING	4.1	11.1
G6	MOMBO	EXISTING	1.0	2.6
G7	LOWER MOMBO	EXISTING	2.5	6.7
H9	CANYON - SKY CANYON	EXISTING	6.1	16.5
H10	JACKPOT (RUSUTSU)	EXISTING	4.3	11.6
H11	HIGH ROLLER (STEAMBOAT)	EXISTING	3.3	8.9
I1	LIZS	EXISTING	9.6	25.9
I3	UPPER ELLIES / ELLIES	EXISTING	12.4	49.6
K1	PERFECT RIDE (WEST BOWL)	EXISTING	8.7	23.4
*L1	LOWER SKI SCHOOL	EXISTING	2.3	6.2
M1	CHILDRENS SKI CENTER	EXISTING	0.9	2.4
N1	PIONEER PLATTER PULL	EXISTING	2.4	6.5
O1	LEARN TO SKI CENTER	EXISTING	1.4	3.7
*GG1	(UPR.) CALIFORNIA TRAIL	EXISTING	7.4	20.0
**GG2	SAMS DREAM	EXISTING - UNBUILT	4.3	17.1
*GG3	TAMARACK RETURN	EXISTING	0.7	2.0
*GG6	CASCADE	EXISTING	8.0	32.1
*HH1	EASY STREET (1/2)	EXISTING	3.4	9.2
HH2	EASY STREET II (1/2)	RETAIN	2.1	5.6
B3	PISTOL	REMOVE	0.0	0.0
B4	WEST BOWL	REMOVE	0.0	0.0
E2	GROOVE	EXISTING	3.8	10.2
G3	SWING TRAIL	NO ACTION	0.0	0.0
G4	WATERFALL	RETAIN	3.5	17.4
G8	POWDERBOWL	RETAIN	3.5	14.1
G9	NEW - POWDERBOWL 2 (Gladed)	NEW	1.9	5.1
H1	WOODS TRAIL	NO ACTION	0.0	0.0
H2	BETTYS SWING	NO ACTION	0.0	0.0
H3	RIDGE BOWL	NO ACTION	0.0	0.0
H4	RIDGE CHUTE	NO ACTION	0.0	0.0
H5	HIGH ROLLER (BETTYS RUN)	RETAIN	12.7	63.4
H6	DOUBLE DOWN (BETTYS BOWL)	RETAIN	0.0	0.0
H7	LOWER BETTYS	RETAIN	0.0	0.0
H8	BETTYS CUTOFF	NO ACTION	0.0	0.0
H12	NEW - BETTYS CUTOFF	NO ACTION	0.0	0.0
H13	NEW - BETTYS ESCAPE	NO ACTION	0.0	0.0
I2	ELLIE'S SWING - EXTENSION	RETAIN	3.4	9.2
I4	NEW - SKIWAYS 1 (GLADED)	NO ACTION	0.0	0.0
I5	NEW - SKIWAYS 2 (GLADED)	NO ACTION	0.0	0.0
GG5	49ER	RETAIN	1.6	6.3
<i>California In-Basin...non 'pod' transport trails</i>				
1	ROUND-A-BOUT	EXISTING	15.6	42.1
2	RIDGE RUN	EXISTING	1.7	4.5
3	LOWER RIDGE RUN	EXISTING	15.9	42.9
5	CALIFORNIA TRAIL	EXISTING	5.5	14.9
5A	NEW- CAL. TRAIL ALTERNATIVE	NEW	1.7	4.5
10	VON SCHMIDTS (1/4)	RETAIN	1.2	3.3
**11	VON SCHMIDTS - MEADOW	RETAIN	4.1	11.1
1	ROUND-A-BOUT - REALIGNMENT	NEW	1.6	4.2
4	SKYLINE TRAIL	RETAIN	2.8	7.6
12	NEW - MAGGIES CANYON (GLADED)	NO ACTION	0.0	0.0
In Basin Total--Master Plan			212.8	706.7
In Basin Total--Cal Base Existing			57.9	212.4
In Basin Total--Cal Dam Existing			91.2	262.3
In Basin Total--E. Peak Existing			0.0	0.0
<i>California Out of Basin 'pod' trails</i>				
V4	BIG DIPPER (1/5)	EXISTING	3.7	10.0
V8	ORION'S (1/2)	EXISTING	8.4	22.6
*V10	METEOR (1/2) - (GLADED)	EXISTING - UNBUILT	2.9	7.8
**V11	METEOR II (1/3) - (GLADED)	REMOVE	0.0	0.0
V7	DIPPER BOWL (1/2)	NO ACTION	0.0	0.0
GG4	SAND DUNES	RETAIN	3.0	8.0
V1	MILKY WAY BOWL (2/3)	NO ACTION	0.0	0.0
V3	DIPPER KNOB	RETAIN	1.2	3.2
Out of Basin Total--Master Plan			17.9	48.4
Out of Basin Total--Cal Base Existing			0.0	0.0
Out of Basin Total--Cal Dam Existing			0.0	0.0
Out of Basin Total--E. Peak Existing			12.1	32.6
California Total--Master Plan			230.8	755.1
California Total--Existing			161.1	507.3
Cal Base Total Existing			57.9	212.4
Cal Dam Total Existing			91.2	262.3
E Peak Total Existing			12.1	32.6
Cal Base Existing---% In Basin			100%	100%
Cal Dam Existing---% In Basin			100%	0%
E Peak Existing---% In Basin			0%	0%

ATTACHMENT 4--NEVADA SNOWMAKING ACREAGE

2007 Master Plan Amended Facilities - Snowmaking at Buildout

2007		2007		Acreage by Quadrant				Acre-ft by Quadrant				
Master Plan Amendment	Trail Name	Master Plan Amendment	Acreage	Acre	A	B	C	D	A	B	C	D
Trail #		Snowmaking Action (1)	(acres)	ft. (3)								
Nevada In Basin 'pod' trails												
Q1	BOULDER (EDGEWOOD) BOWL	EXISTING	17.2	68.9				17.2				68.9
S1	OLYMPIC DOWNHILL (3/5)	EXISTING	15.5	41.8	15.5				41.8			
X1	BOULDER SKI SCHOOL	EXISTING	2.8	7.6				2.8				7.6
*HH1	EASY STREET (1/2)	EXISTING	3.4	9.2	3.4				9.2			
S2	BOULDER CHUTE (075)	RETAIN	2.7	11.0								
S3	NORTH BOWL	RETAIN	7.8	38.9								
S4	UPPER NORTH BOWL	RETAIN	4.2	21.0								
S8	NEW - NORTH BOWL 2	NEW	5.1	13.8								
S9	NEW - NORTH BOWL 3 (Gladed)	NEW	8.1	22.0								
S10	NEW - NORTH BOWL 4 (Gladed)	NEW	7.8	21.2								
HH2	EASY STREET II (1/2)	NO ACTION	2.1	5.6								
(wasn't on snowmaking plan)												
Nevada In Basin non 'pod' transport trails												
9	STEVES	EXISTING	0.5	1.4	0.5				1.4			
10	VON SCHMIDT'S (1/4)	RETAIN	1.2	3.3								
NV In Basin Total--Master Plan			78.5	265.5								
NV In Basin Existing Total (all E. Peak)			39.4	128.8								
Nevada Out of Basin 'pod' trails												
R2	(UPPER) STAGECOACH	EXISTING	4.2	16.6			4.2					16.6
S1	OLYMPIC DOWNHILL (2/5)	EXISTING	10.3	27.9		3.8	6.5		10.4		17.5	
S5	CROSSOVER	EXISTING	6.7	18.1		6.7			18.1			
V4	BIG DIPPER (4/5)	EXISTING	14.8	40.0		14.8			40.0			
V6	ORION'S BELT	EXISTING	1.1	2.9		1.1			2.9			
V8	ORION'S (1/2)	EXISTING	8.4	22.6		8.4			22.6			
V9	LOWER ORIONS	EXISTING	2.9	7.8		2.9			7.8			
*V10	METEOR (1/2) - (GLADED)	EXISTING - UNBUILT	2.9	7.8								
W3	LITTLE DIPPER	EXISTING	10.4	52.2		10.4			52.2			
W4	COMET	EXISTING	14.2	38.3		14.2			38.3			
Z1	NEW - WELLS FARGO 1	NEW	5.4	14.5								
Z2	NEW - WELLS FARGO 2	RETAIN	8.3	22.4								
Z3	NEW - WELLS FARGO 3	NEW	11.4	30.7								
Z4	NEW - WELLS FARGO 4	RETAIN	12.8	34.6								
Z5	NEW - WELLS FARGO 5	NEW	2.8	7.5								
Z7	NEW - WELLS FARGO 7	NEW	6.9	18.7								
R1	STAGECOACH	EXISTING	12.4	49.6		10.8	1.6		43.2		6.3	
R3	NEW - STAGECOACH 2	NO ACTION	7.1	35.6								
R4	NEW - STAGECOACH 3	NO ACTION	0.0	0.0								
R5												
S6	PONDEROSA (BONANZA BOWL)	RETAIN	4.0	15.9								
S7	EAST PEAK	RETAIN	3.9	15.8								
U1	PERIMETER	RETAIN	13.5	36.4								
U2	GALAXY	RETAIN	10.1	27.3								
U3	NEW - GALAXY 1	NEW	8.7	23.4								
U4	NEW - GALAXY 2	NEW	2.7	7.3								
V5	LOWER BIG DIPPER	RETAIN	3.7	9.9								
V12	NEW - ORION'S II	NEW	3.4	9.3								
W1	ARIES	RETAIN	1.3	3.4								
W2	JACK'S	NEW	3.0	8.0								
*HH3	SILVER SPUR	NO ACTION	0.5	1.4								
Nevada Out of Basin Non 'pod' transport trails												
7	LOWER WAY HOME	EXISTING	5.2	14.1			5.2				14.1	
8	PEPI'S	EXISTING	4.0	10.8		4.0			10.8			
10	VON SCHMIDT'S (1/2)	EXISTING	2.4	6.5		2.4			6.5			
14	NEW - GALAXY ACCESS	NEW	6.4	17.3								
15	NEW - SCORPION	NEW	6.3	17.1								
6	NEW - NEVADA TRAIL (WAY HOME)	NEW	5.9	16.0								
16	NEW - FARGO TO GALAXY	NEW	1.1	2.9								
NV-Out of Basin Total MP			229.1	690.8								
NV Out of Basin Existing Total (all E. Peak)			97.0	307.5								
					Acreage by Quadrant				Acre-ft by Quadrant			
Acreage total by Quadrant					19.4	79.5	17.5	20.0	52.4	252.8	54.6	76.5
% of Total Acreage					14.2%	58.3%	12.8%	14.7%	12.0%	58.0%	12.5%	17.5%
					TOTAL				TOTAL			
					136.4				436.3			
Nevada Total--Master Plan			307.6	956.3								
Nevada Total--Existing			136.4	436.3								
% In Basin--Existing			29%	30%								
% Out of Basin			71%	70%								
Grand Total--2007 Master Plan			538.4	1,711.4								
Cal Base Total			57.9	212.4								
% in CA			100%	100%								
% In Basin			100%	100%								
Cal DamTotal			91.2	262.3								
% in CA			100%	100%								
% in Basin			100%	100%								
E. Peak Total			148.5	468.9								
% in CA			8%	7%								
E. Peak in CA			12.1	32.6								
% of E. Peak in CA-in Basin			0%	0%								
E. Peak in NV			136.4	436.3								
% of E. Peak in NV-in Basin			29%	30%								

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Report (October 2014 – September 2015)

APPENDIX VII
2016 WATERSHED MAINTENANCE
RESTORATION PROGRAM (WMRP)
WORK LIST

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**HEAVENLY MOUNTAIN RESORT
2016 ANNUAL SUMMER WORK LIST**

4/25/16

Final

Phase 1: CA-1 High Priority Hotspots #45, 46

Phase 2: CA-1 Medium Priority Erosion Hotspots #30, 41-46, 48

Phase 2: NV-1 High Priority Erosion Hotspot #6

Phase 2: NV-1 Medium Priority Erosion Hotspots # 2, 14

Note: Erosion Hotspots are included in summer work lists, as required by the Epic Discovery EIR/EIS/EIS

Project #	Source*	Location	Treatment
Watershed: CA-1 Heavenly Valley Creek			
1	P	Family Loop Trail and Animal Abilities Exhibits	Construct trail and exhibits and permanent BMPs per plans.
2	P	Gondola Top Station Enclosure	Enclose bottom of Gondola Top Station for storage. Install permanent BMPs per plans.
3	P	Gondola Top Station to Tamarack Lodge Trail	Repave existing walking path from Gondola Top Station to Tamarack Lodge. Refurbish effective cover around walking path.
4	EH-CA	Gully at Lower Cal Trail	Treat Low Priority Hotspot # 48. Well-established gully at lower Cal Trail. Restoration treatment along gully to slow and infiltrate surface runoff. Install pine needle filter berms cross slope for uphill protection and stabilization.
5	EH-CA	Heavenly Valley Creek Stream Bank Stabilization and Restoration on South Fork	Treat Medium Hotspots #42, 43. Multiple sites need addressed above the culverts in Sky Meadows. ~5,000 sf of bare soil along steep banks to be hand loosened, mulched, and seeded. No fabric to be used on this restoration per IERS.
6	EH-CA	Hellwinkle's Road	Treat Hotspot #'s 45 & 46. Choose option from Hellwinkle's Road Segment Alternatives, potentially dust palliative and water bar adjustments per plans.
7	EH-CA	Rock Lined Ditch Decommission above Sky Meadows Culverts	Treat Medium Hotspot #44. Decommission rock-lined swale, which appears to unnecessarily collect dispersed run-off from steep rocky slopes above.
8	EH-CA	Sky Deck Restoration Under Deck	Treat Hotspot #30. Restoration includes application of shade tolerant meadow/riparian species. Cover with a thin layer of pine needles to protect the seeds.
9	P	Tamarack Express Lift to Adventure Peak Hiking Trail	Construct trail from Tamarack Express to Adventure Peak and East Peak Lodge (out of Basin segment).
10	P	Tubing Run Revisions	Construction complete on revised tubing lanes. Complete seeding and soil loosening on decommissioned road.

11	EH-CA	Upper Ridge Bowl	Treat Medium Erosion Hotspot #41. Rehab approximately 5 water bars at failure points, convert to infiltration swales by soil loosening and wood chip incorporation.
12	P	Waterfall Lift Removal Top Station Regrading (Top of Epic Mix Race Course)	Regrade top station area. Fill and stabilize as shown on approved project plans.
13	P	Welcome Area at Gondola Top Station	Construct Welcome Area at base of stairs at Gondola Top Station, remove existing Adventure Peak Grill seating area and restore paved area with wood chips.
<u>Watershed: CA-6 Bijou Creek</u>			
		NONE	
<u>Watershed: CA-7 Unnamed Creek - Gondola</u>			
14	P	Mid Station Canopy Tour Weather Shelter	Construct Mid Station Canopy Tour Weather Shelter and permanent BMPs.
<u>Watershed: NV-1 Mott Canyon Creek</u>			
15	EH-NV	Big Dipper Lower Ski Run Water Bar	Treat Medium Hotspot #14. Rebuild water bars on Big Dipper Ski Run and create infiltration capacity upslope of the water bars through soil restoration treatment. Construct mulch berms/infiltration strips to prevent erosion and disperse flow.
16	EH-NV	Orion's Middle Ski Run	Pine needle coverage to reduce chronic erosion and vegetation loss at Orion's Middle Ski Run. Located to the lookers left of the Dipper Express Lift line near towers 7-11.
<u>Watershed: NV-3 Edgewood Creek</u>			
		NONE	
<u>Watershed: NV-2 + 5 Daggett Creek</u>			
17	P	East Peak Canopy Tour	Construct East Peak Canopy Tour along with connecting trails, weather shelter and permanent BMPs per plans.
<u>Resort Wide</u>			
18	M	Resort-Wide	Inspect & restore all areas damaged or affected by winter resort operations, including hydrants & pipe failures, & areas affected by snowcat operations; document treatment.
19	M	Resort-Wide	Erect and maintain vehicle barriers and/or fences to prevent unauthorized vehicle access off of designated summer roads and facility parking areas.
20	M	Resort-Wide	Inspect and maintain all drainage structures.
21	M	Base Areas	Maintain all BMPs and drainage structures. Erect and maintain vehicle barriers and/or fences to prevent unauthorized vehicle access from base areas.
22	M	Resort-Wide	Road Maintenance Projects based on the annual Heavenly-Forest Service roads maintenance & monitoring agreement.

***Source Codes**

	M	BMP Maintenance	
	P	Master Plan Implementation Project/Epic Discovery Project	
	RM	Resort Maintenance Project	
	EH-CA	Erosion Hotspot Inventory California Project	
	EH-NV	Erosion Hotspot Inventory Nevada Project	

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APPENDIX VIII
2015 BIOLOGICAL SURVEY RESULTS

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25 November 2014

Mr. Andrew Strain
Heavenly Mountain Resort
P.O. Box 2180
Stateline, NV 89449

SUBJECT: HEAVENLY MOUNTAIN RESORT 2015 BIOLOGICAL SURVEY RESULTS SUMMARY

Dear Mr. Strain,

In order to comply with US Forest Service LTBMU requirements and to allow for preparation of environmental documentation for future construction and implementation of projects, Sierra Ecotone Solutions LLC has performed wildlife and plant surveys in suitable habitat within the Special Use Permit Boundary in 2015. Surveys for both northern goshawk and California spotted owl were completed to protocol. Additional surveys were performed for nesting bird species in the areas surrounding 2015 capital projects. Tahoe draba (*Draba asterophera asterophera*) surveys were performed for 2015 capital projects. A summary of each species surveys is provided below:

Tahoe Draba

Surveys for Tahoe draba were performed in the vicinity of the top terminal at Sky chair that was proposed for panting, the proposed lookout tower location and the Mott Canyon Avalauncher. All data collected was recorded by GPS and taken to LTBMU staff for use in future environmental documents.

California Spotted Owl

Methods: Surveys were conducted and completed in potentially suitable habitat within and surrounding the project area. Surveys were conducted according to the United States Forest Service "Protocol for Surveying for Spotted Owls in Proposed Management Activity Areas and Habitat Conservation Areas" (March 12, 1991, Revised February 1993). The survey points used since the 2007 field season were utilized again in 2015 to provide continuity of data collected. Data sheets for 2015 surveys are attached to this letter.

Results: No auditory or visual detections of California spotted owls were documented within the survey area during 2015.

Northern Goshawk

Methods: Surveys were conducted and completed in suitable habitat within and adjacent to the project area for northern goshawk based on the updated habitat map generated by the US Forest Service for the environmental analysis of the Master Plan Amendment. In 2015, both dawn acoustical and broadcast survey methods were utilized and were completed to protocol. All surveys were conducted according

to “Survey Methodology for Northern Goshawks in the Pacific Southwest Region, U.S. Forest Service” (14 May 2002). Data sheets for 2015 dawn acoustical and broadcast surveys are submitted with this letter.

Results: No auditory or visual detections of northern goshawk were documented within the survey area in 2015.

The completion of the 2015 field surveys for northern goshawk and California spotted owl results in meeting the two-year protocol for these species. Based on Appendix A of the California spotted owl survey protocol, since no detections were documented, and the two year protocol was met, “the negative results may be considered accurate for two additional years without conducting additional surveys.” The two-year timeline starts on the last day of the last survey, which would be 14 August 2015. Therefore, if implementation of projects would commence prior to 14 August 2017, no further surveys for California spotted owl would be necessary. However, if construction does not commence prior to this date, two-year protocol surveys must be conducted. The northern goshawk protocol does not include any discussion as to validity of surveys for any duration of time after protocol has been met. However, since northern goshawks have been detected in previous years, it is recommended surveys for northern goshawks are continued to determine if goshawks are nesting within the special use permit boundary.

A northern goshawk detection was recorded by USFS wildlife staff (plucking post) to the north of the Daggett and Ridge polygons in 2014. Due to this detection, a new polygon was created to cover the additional habitat that was previously not surveyed. Additionally, the Von Schmidt Flat survey polygon was not surveyed in 2015. The Von Schmidt Flat polygon remained in the survey area due to past incidental detections from non-biologists, and due to the fact the area did not reveal any detections over the years, and the relative low suitability of the habitat, the area was dropped from further surveys. The new polygon labeled Lower Daggett is now shown on the attached northern goshawk polygon map. No detections in this new polygon were observed or recorded.

If you should have any questions regarding the surveys performed for the 2015 season, please do not hesitate to contact me at (530) 416-2440.

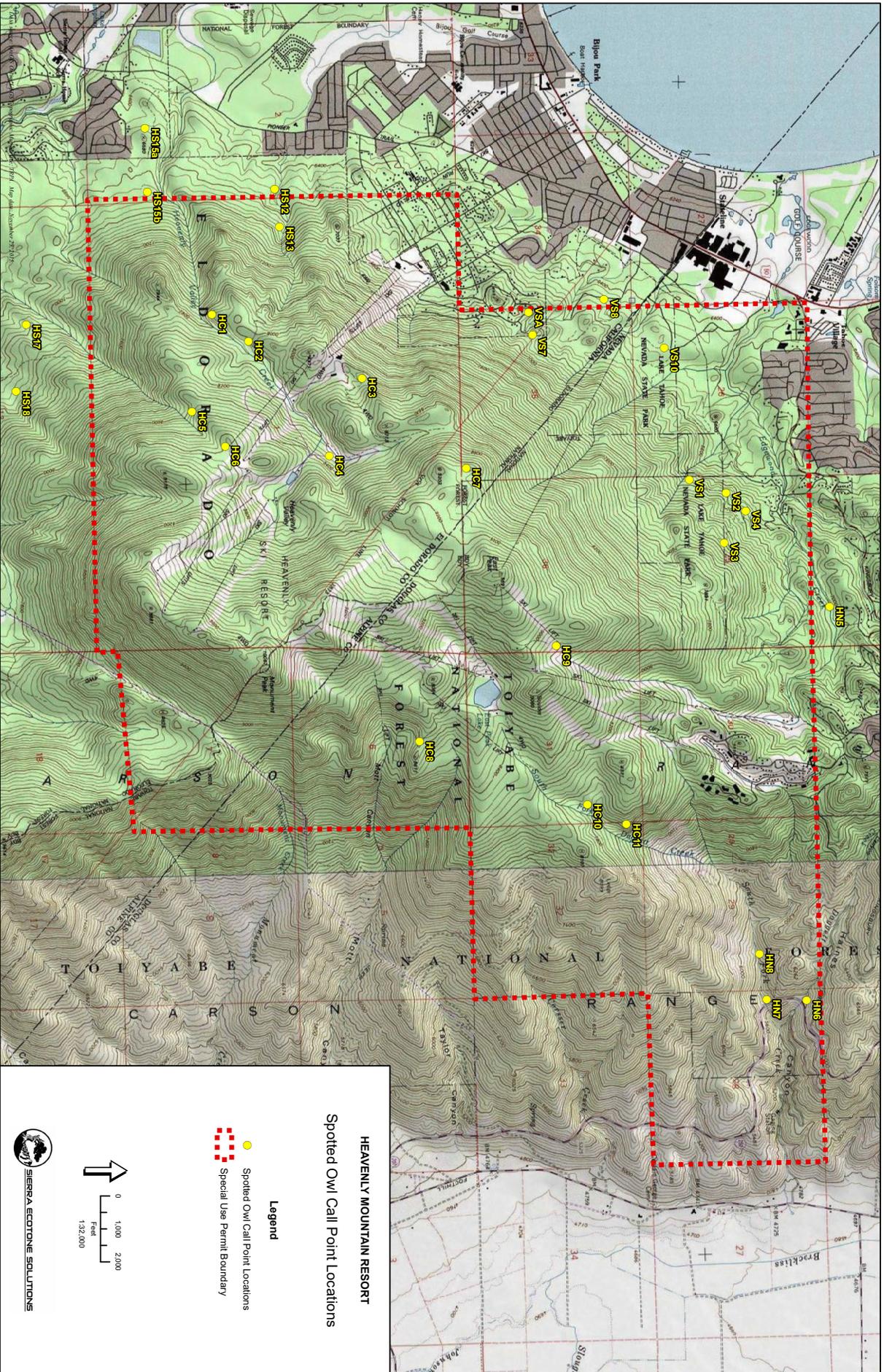
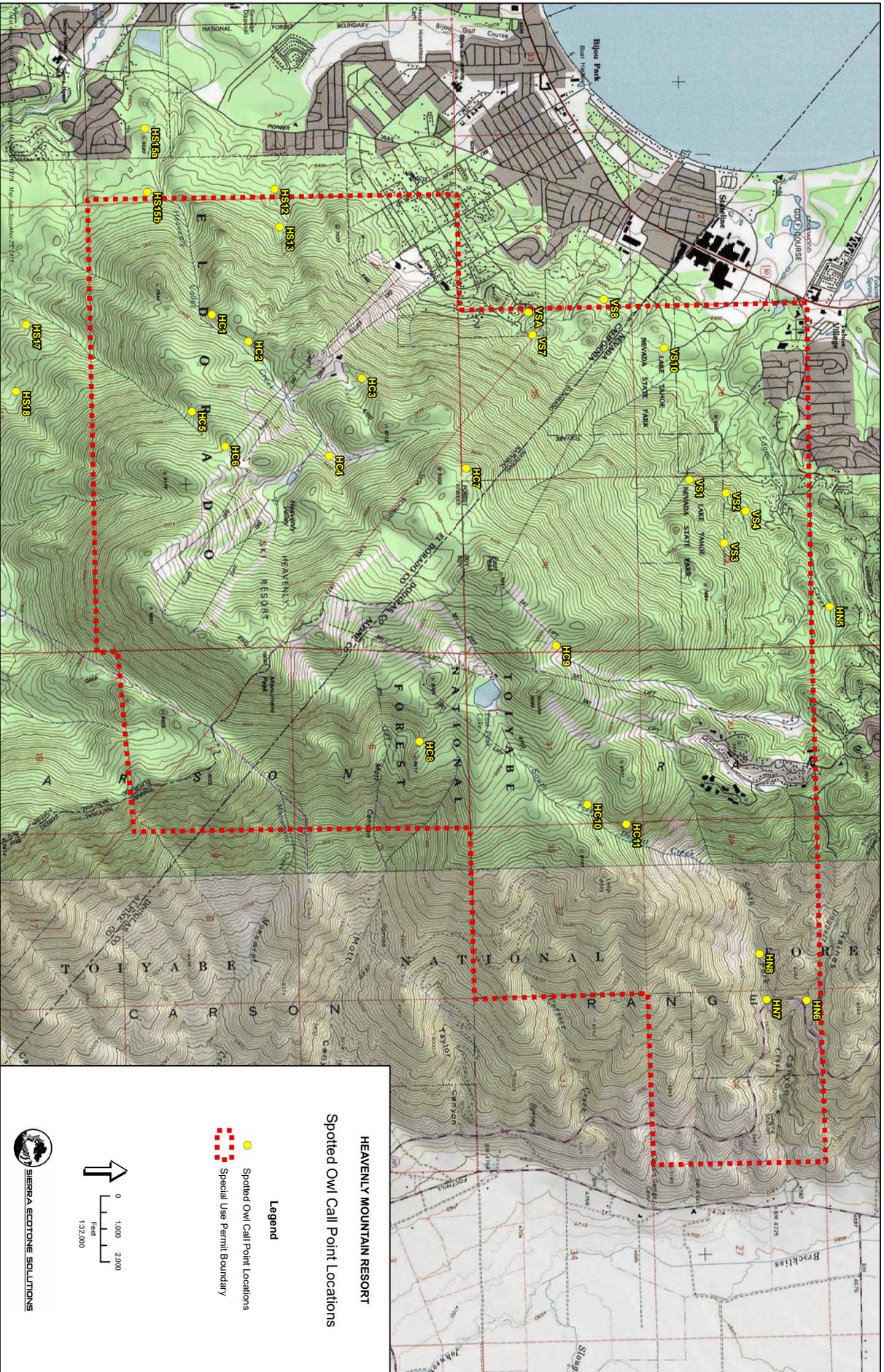
Regards,

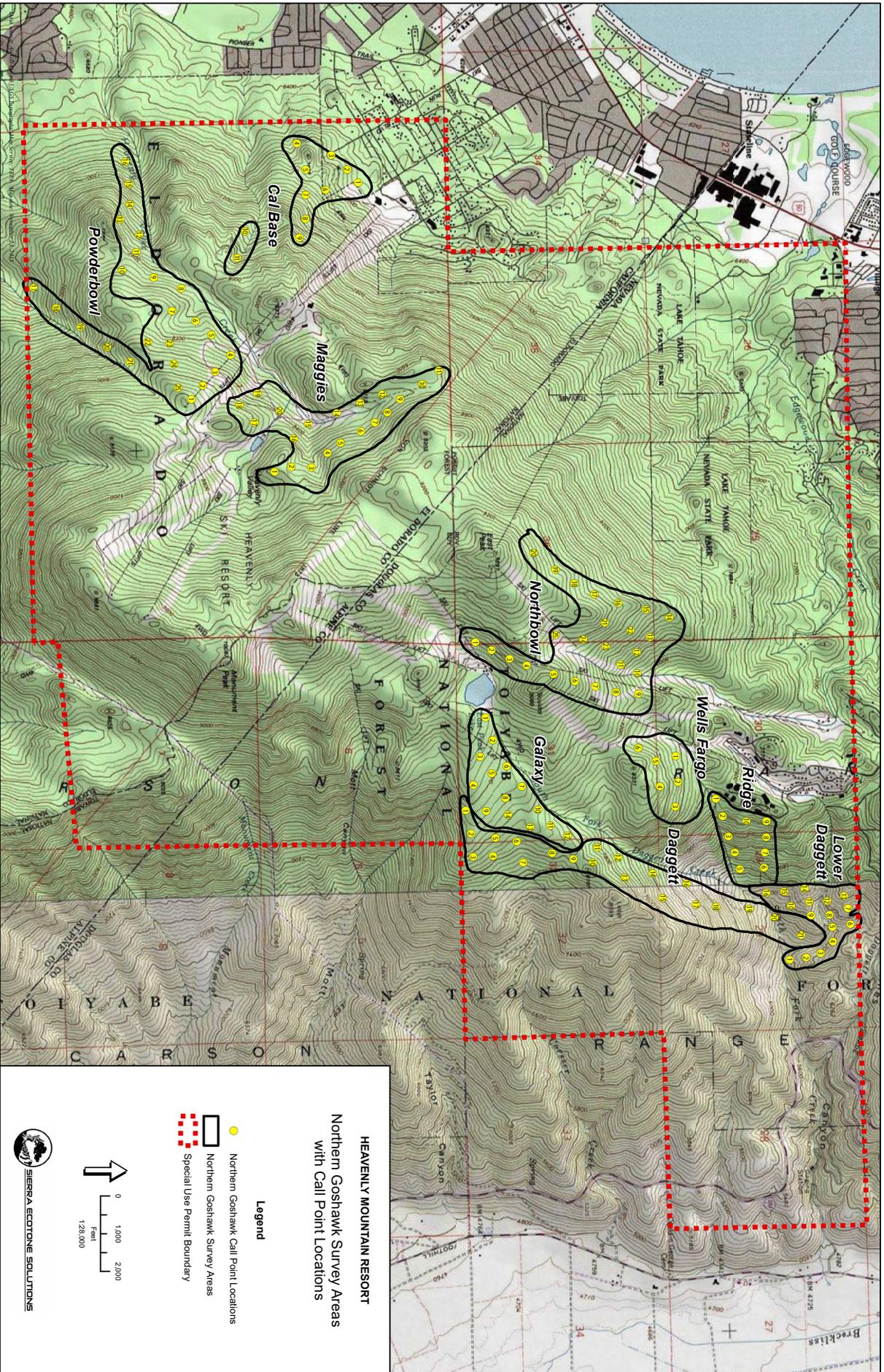


Garth Alling
Principal Biologist

Enclosures

CC: Shay Zanetti , USFS LTBMU
Chris Donley, Cardno





HEAVENLY MOUNTAIN RESORT
Northern Goshawk Survey Areas
with Call Point Locations

Legend

- Northern Goshawk Call Point Locations
- Northern Goshawk Survey Areas
- Special Use Permit Boundary



California Spotted Owl Visit Form-USFS-Lake Tahoe Basin Management Unit

Route Name/Territory: HEAVENLY NORTH LTB- _____ Visit# 2 Outing# 1 Date: 25 JULY 15

Observers (and affiliation): G. ALLING (SIERRA ECOTONOME SOLUTIONS)

Type of Survey (spot calling SC, follow-up FO, additional visit AD): SC Sunset/Sunrise: 2013 10540 Quad: SLT

Weather: % cloud cover: 35% precip: 0 temp: start 52 °F end 45 °F Beaufort wind speed: start 2 end 3

Summary of Survey Results and Comments:

NO RESPONSE

CS #	Start/Finish	V, A or B- sex (M,F,U)	Dir.	Dis.(m)	UTMs		GPS	Comments (include legals and elevation for detections)
					Northing	Easting		
xc1	2015-2025							NO RESPONSE
xc2	2032-2047							
xc3	2108-2118							
xc4	2127-2137							
xc6	2154-2204						G-3	
xc5	2221-2231							
xc7	2316-2336							
xc9	2359-0009						G-3	
xc8	0020-0030							
xc10	0053-0103						G-3	
xc11	0119-0129						G-3	

Travel to Area Survey of Area Travel from Area Totals

Beg. Time _____
 End Time _____
 Total _____
 Mil. Beg _____
 Mil. End _____
 Totals _____

Beaufort #	Wind Speed	Indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

* do not survey in wind conditions >4 Beaufort

California Spotted Owl Visit Form-USFS-Lake Tahoe Basin Management Unit

Route Name/Territory: HEAVENLY SOUTH LTB- _____ Visit# 2 Outing# 1 Date: 26 MAY 15

Observers (and affiliation): R. ALLING (SFS)

Type of Survey (spot calling SC, follow-up FO, additional visit AD): SC Sunset/Sunrise: 2041 10540 Quad: SCT

Weather: % cloud cover: 30% precip: 0 temp: start 55 °F end 50 °F Beaufort wind speed: start 2 end 2

Summary of Survey Results and Comments:

NO RESPONSE

CS #	Start/Finish	V, A or B- sex (M,F,U)	Dir.	Dis.(m)	UTMs		GPS	Comments (include legals and elevation for detections)
					Northing	Easting		
198	7020-7030							NO RESPONSE
197	7042-7052							
5153	7130-7140							
515	7153-7203							
513	7227-7237							
512	7230-7250							
511	7327-7337							
51A	7342-7352							
519	0019-0029							
510	0041-0051							

Travel to Area Survey of Area Travel from Area Totals

Beg. Time	_____	_____	_____	_____
End Time	_____	_____	_____	_____
Total	_____	_____	_____	_____
Mil. Beg	_____	_____	_____	_____
Mil. End	_____	_____	_____	_____
Totals	_____	_____	_____	_____

Beaufort #	Wind Speed	indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

*do not survey in wind conditions >4 Beaufort

California Spotted Owl Visit Form-USFS-Lake Tahoe Basin Management Unit

Route Name/Territory: HEAVENLY CURVE LTB- _____ Visit# 1 Outing# 1 Date: 27 MAY 15

Observers (and affiliation): A ALLING (SECS)

Type of Survey (spot calling SC, follow-up FO, additional visit AD): SC Sunset/Sunrise: 2015 16539 Quad: SCT

Weather: % cloud cover: 10% precip: 0 temp: start 59 °F end 52 °F Beaufort wind speed: start 3 end 2

Summary of Survey Results and Comments:

NO RESPONSE

CS #	Start/Finish	V, A or B- sex (M,F,U)	Dir.	Dis.(m)	UTMs		GPS	Comments (include legals and elevation for detections)
					Northing	Easting		
201	2015-2025							<div style="font-size: 2em;">NR</div> <div style="font-size: 4em; margin-top: 20px;">}</div> <div style="font-size: 2em; margin-top: 20px;">↓</div> <div style="font-size: 1.5em; margin-top: 10px;">G140 @ 110° ≈ 200m →</div>
202	2036-2046							
203	2100-2110							
204	2117-2127							
205	2140-2150							
206	2202-2212							
207	2248-2258							
209	2326-2336							
208	2351-0001							
2010	0045-0055							
2011	0107-0117							

Travel to Area Survey of Area Travel from Area Totals

Beg. Time _____

End Time _____

Total _____

Mil. Beg _____

Mil. End _____

Totals _____

Beaufort #	Wind Speed	Indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

* do not survey in wind conditions >4 Beaufort

California Spotted Owl Visit Form-USFS-Lake Tahoe Basin Management Unit

Route Name/Territory: HEAVENLY CORGE LTB- _____ Visit# 2 Outing# 1 Date: 16 JUN 15

Observers (and affiliation): G. ALLING (SOC)

Type of Survey (spot calling SC, follow-up FO, additional visit AD): SC Sunset/Sunrise: 2027 10534 Quad: SCT

Weather: % cloud cover: 5% precip: 0 temp: start 61 °F end 52 °F Beaufort wind speed: start 3 end 2

Summary of Survey Results and Comments:

NO RESPONSE

STARS STARS STARS! DARK

CS #	Start/Finish	V, A or B- sex (M,F,U)	Dir.	Dis.(m)	UTMs		GPS	Comments (include legals and elevation for detections)	
					Northing	Easting			
1011	2027-2057							GUST @ 3 NR	
1010	2050-2051							GUST @ 3 NR	
1008	2126-2136							NR	
1009	2151-2201								
1007	2237-2147								
1005	2222-2232								
1006	2245-2255								
1004	2317-2327								
1003	2356-2006								
1002	0031-0041								
1001	0057-0107								

Travel to Area Survey of Area Travel from Area Totals

Beg. Time _____

End Time _____

Total _____

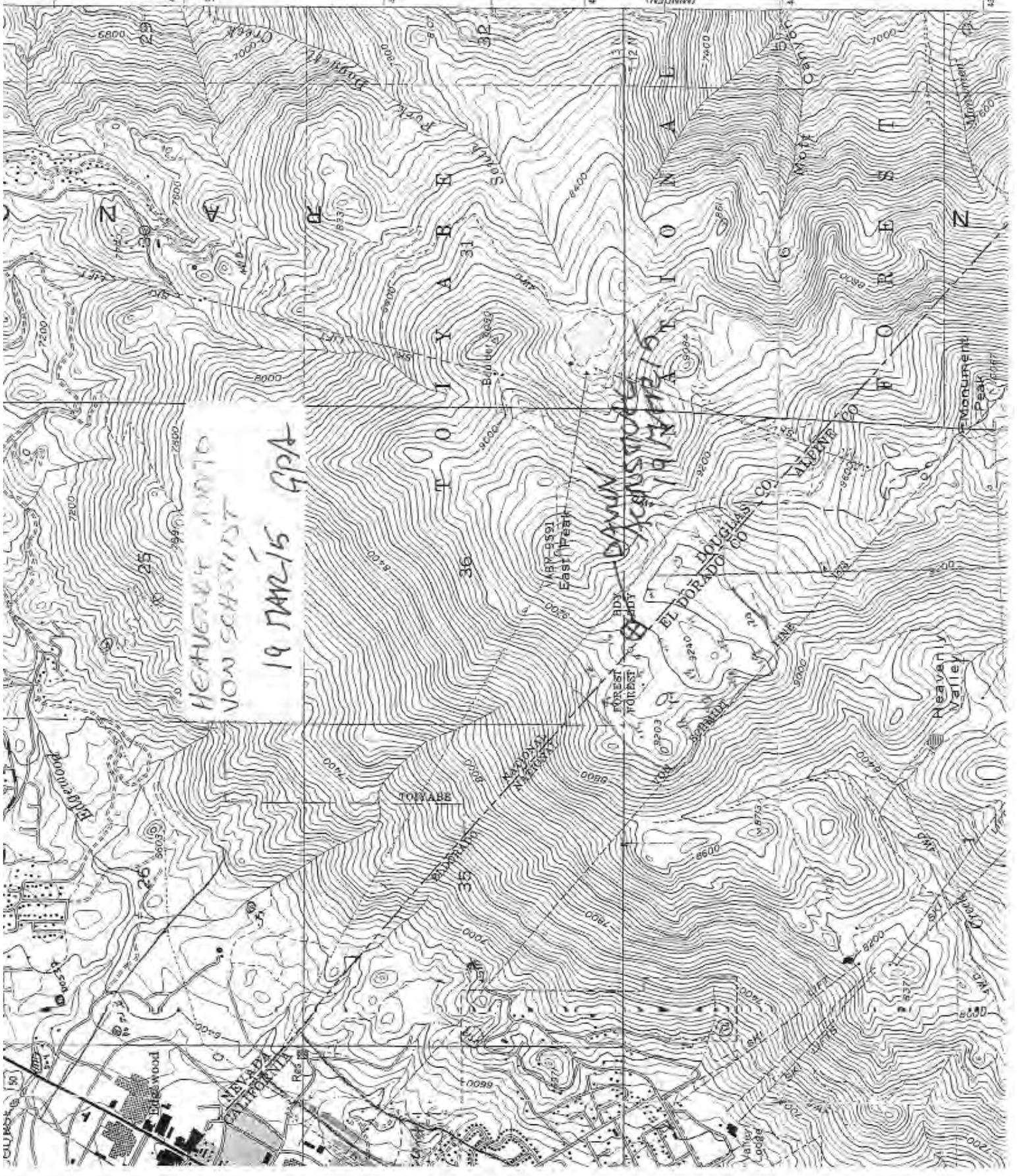
Mil. Beg _____

Mil. End _____

Totals _____

Beaufort #	Wind Speed	Indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

* do not survey in wind conditions >4 Beaufort



HEAVENLY MOUNTAINS
VON SCHWIST
19 MARZ 15 GPA

TOIYABE

HEAVENLY MOUNTAINS
EL DORADO CO
DOUGLAS CO

Heavenly Valley

El Dorado
Nevada
California

Valley Lodge

Monarch Peak

416

57 30"

415

414

MINNEN
2981 N NE
12 N

413

412

25

26

36

35

3000

6000

6000

3200

3200

3200

3200

3200

3200

3200

3200

3200

3200

7000

6000

5000

4000

3000

2000

1000

1200

5000

4000

3000

2000

1000

500

0

1200



15 May 2015

Mr. Andrew Strain
Heavenly Mountain Resort
PO Box 2180
Stateline, NV 89449
-via e-mail-

**SUBJECT: 2015 EPIC DISCOVERY PROJECT PRECONSTRUCTION
BIOLOGICAL SURVEYS RESULTS**

Mr. Strain:

This memorandum is to inform you of the completion of preconstruction surveys for nesting bird species, marten den sites and bat roost surveys. The following project areas were surveyed for the presence of the above wildlife species/types: Mid-Station Canopy Tour, Forest Flyer Alpine Coaster and the Kids Zipline. These areas were surveyed for marten den locations, the presence of bat roost sites and for nesting birds in accordance with the design features identified in the Biological Evaluation and the Epic Discovery EIR/EIS/EIS. The subject area was surveyed on 3 April, 4 April, 13 April, 12 and 13 May 2015.

Bat Roost Survey: The project areas were surveyed for the presence of bat roosts in rock crevices, snags and within dense trees (clumps of whitebark pine and lodgepole). No evidence of bat roosts was observed during the surveys.

Marten Den Site Survey: The project area was surveyed for the presence of marten den sites during the above dates. A trace amount of snow fell on 2 April that allowed for the area to be surveyed using snow-tracking methods. One set of tracks was observed crossing the project area on the west side of the project area above Maggie's Canyon with no evidence of denning activity. No other evidence of marten was observed in the project area.

Nesting Bird Survey: The project area was surveyed for nesting birds on all of the above dates. No active nests were observed. It should be noted a few snags exist within the project area that contain cavities (none of which were active) that are suitable nesting locations for a variety of bird species present. Efforts should be made to retain these snags within the project area where feasible in order to maintain suitable nesting locations for cavity nesters.

Species observed: Avian species: mountain chickadee (*Poecile gambeli*), dark-eyed junco (*Junco hyemalis*), common raven (*Corvus corax*), Stellar's Jay (*Cyanocitta stelleri*), northern flicker (*Colaptes auratus*), white-headed woodpecker (*Picoides albolarvatus*), Williamson's sapsucker (*Sphyrapicus thyroideus*), red-breasted nuthatch (*Sitta canadensis*), pygmy nuthatch (*Sitta pygmaea*), mourning dove (*Zenaida macroura*), American robin (*Turdus migratorius*), Canada goose (*Branta canadensis*), yellow-rumped warbler (*Setophaga coronata*), brewers blackbird (*Euphagus cyanocephalus*), red tailed hawk (*Buteo jamaicensis*), pine siskin (*Carduelis pinus*), Cassin's finch (*Haemorhous cassinii*). Mammals: Raccoon (*Procyon lotor*), Douglas squirrel (*Tamiasciurus douglasii*), least chipmunk (*Tamias minimus*).

Regards,

A handwritten signature in black ink, appearing to read 'Garth Alling', is written over a light gray rectangular background.

Garth Alling
Principal Biologist

Attachment: survey area shape file (electronic)

CC: Rena Escobedo, LTBMU
Holly Eddinger, LTBMU
Matt Dickinson, LTBMU
Jonathan Cook-Fisher, LTBMU
James Grant, Heavenly Mountain Resort

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APPENDIX IX
2015 BOUNDARY MANAGEMENT PLAN

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BOUNDARY MANAGEMENT

A. In perimeter areas, where it is likely for the skiing public to ski out of the patrolled area, Heavenly may utilize a gated boundary system consisting of the following elements:

1. Gates located in areas that people have traditionally gone through in order to reach an area out-of-bounds.

2. Appropriate signage will be placed at the gates, informing users this is true backcountry access. Heavenly will place signs indicating that terrain is not patrolled or maintained beyond this point. Avalanche danger exists. You are responsible for your own safety and survival. Searches may or may not be conducted due to hazardous conditions. Skiers who enter the Backcountry areas will do so knowingly and will accept full responsibility for property loss, injury and/or death. Gate postings will also include the Back Country Checklist, the North American Public Avalanche Danger Scale, USDAFS Access Point Notice and other signage. They may also be cited by local authorities and charged for the cost of their rescue.

3. Gated entries will be a well identified vertical structures through which a skier must pass. A steel gate will hang horizontally from one post and be held against the other by a self-closing mechanism.

For someone to enter the area they must pull the gate in front of them as they pass through, the gate will automatically close behind them. The bar will be height adjustable to allow it to remain at waist-height for a normal adult. The intent in doing this is to require a physical action beyond merely going through the posts to enter the area.

4. Due to the fact that this experience would be the same as any other backcountry experience, Heavenly will rarely “close” access into the terrain. these gates would be closed when Heavenly staff is actively performing avalanche control with explosives in the adjacent permit area.

There are other rare instances where a back country gate may be closed by the operating ski resort in order to halt access to the terrain by none authorized individuals.

5. “Closed Ski Area Boundary, Exit Through Gates Only” signage will be placed along perimeter ropes. These signs are placed at appropriate intervals so that individuals have the opportunity to read the warning from inside the area perimeter ropes. The signage will indicate that some routes may access private property.

6. Heavenly will provide and maintain counters at each of the gates for the entire ski season. Gate use will be monitored and reported to Forest Service

7. Heavenly will assist county search and rescue efforts when possible. Back Country Access gates will be monitored throughout the winter season to ensure signage is in place, the gates are functioning properly, and that they are at the appropriate height. The gates are installed at the following locations:

1. Fire Break : This gate is located to the north of the top of Olympic Chair. It accesses north/northwest terrain locally termed “The Palisades” continuing down towards lower 207 Kingsbury grade (lake side).

2. Raley's Gulch: This gate is located off the California Trail at the perimeter rope of Maggie's Canyon. It accesses north/northwest terrain that continues down the front side of the mountain towards Lake Tahoe.
3. Fulstone Canyon: This gate is located above the existing Gate "A" of Killebrew Canyon. It accesses east/northeast terrain to the southeast of Killebrew Canyon and continues down to the Foothill side of 207 Kingsbury grade.
4. Stateline Gate: This gate is located at the top of Red Fir Handle tow lift above and behind Tamarack Lodge. This gate accesses north/northwest terrain that continues down the front side of the mountain and areas under the gondola.
5. The Beach: This gate is located off of the upper area of the Skyline Trail. It accesses east facing terrain that continues down to Monument Pass and the lower Fullstone terrain.

6. Broad Daylight: This gate is located at the end of "The Cut" on upper Roundabout trail. It accesses north/northwest terrain that continues down to the "Powerline Trail", Pioneer Trail, and upper Ski Run areas.

Mitigation and Monitoring Plan Annual
Report (October 2014 – September 2015)

APPENDIX X
2015 ANNUAL NOISE MONITORING
REPORT

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Heavenly Ski Resort Master Plan Noise Monitoring Survey 2014-2015 Ski Season



 j.c. brennan & associates
consultants in acoustics



P.O. Box 6748 • Auburn, California 95604
1287 High Street • Auburn, California 95603
p.530.823.0960 • f.530.823.0961 • www.jcbrennanassoc.com

December 10, 2015

Mr. Chris Donley
Senior Project Engineer
Cardno, Inc.
701 University Avenue, Suite 200
Sacramento, CA 95825

Subject: Submittal of the Heavenly Ski Area Mitigation Monitoring Report for Noise - 2014/2015 Ski Season

Dear Mr. Donley:

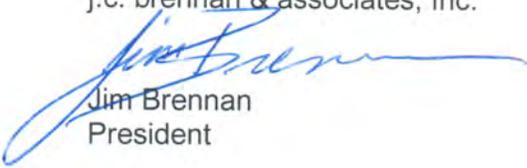
The acoustical consulting firm of j.c. brennan & associates, Inc. is pleased to submit the results of the 2014/2015 Heavenly Ski Area Mitigation Monitoring Noise Report. The results of the report are very similar to previous years. Snowmaking noise levels at the California and Nevada base areas continue to show slight reductions in overall noise levels. Continued implementation of newer technology quiet snowmaking equipment on the mountain is expected to continue this trend.

We have made some recommendations with regards to the snowmobile mitigation monitoring and rock busting mitigation monitoring requirements. It is our recommendation that these two monitoring requirements are removed. We have provided discussions on the reasoning for these recommendations within the report.

Please feel free to call if you have questions.

Respectfully submitted,

j.c. brennan & associates, Inc.



Jim Brennan
President

I INTRODUCTION

j.c. brennan & associates, Inc. is providing a final report for the Heavenly Master Plan Noise Mitigation Monitoring Plan, and analysis of noise measurement data collected during the 2014/2015 snowmaking operations at Heavenly Ski Resort. The noise measurements and analysis of data are required as a condition of approval for the Heavenly Master Plan EIS/EIR. This is the nineteenth annual analysis of snowmaking operations noise levels.

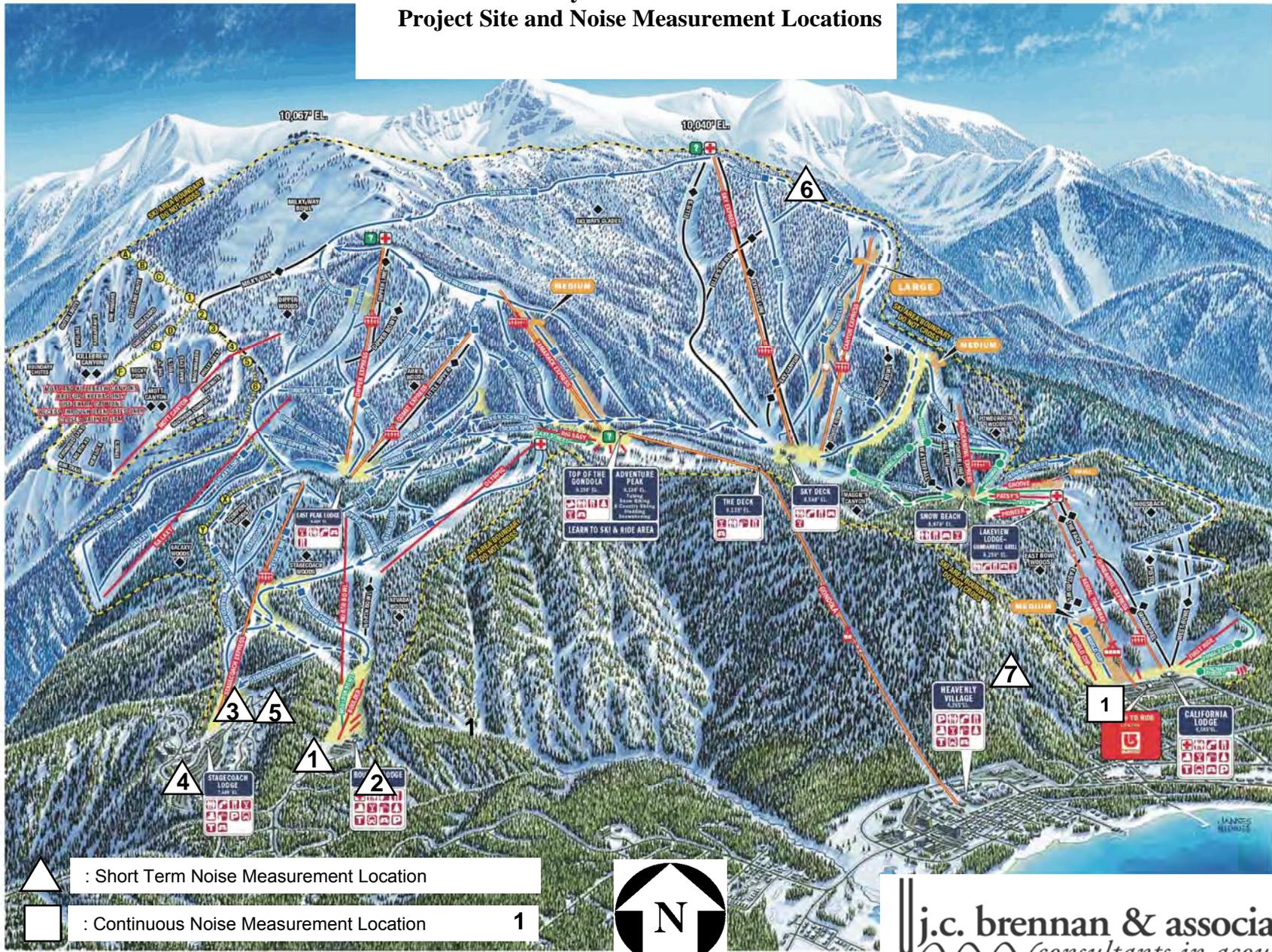
j.c. brennan & associates, Inc. staff have been involved in conducting the annual snowmaking operations noise analyses since the 1996/1997 ski seasons. The previous ten noise analyses for the 2004/2005 through the 2013/2014 ski seasons were prepared by j.c. brennan & associates, Inc.

The conditions of approval for the Heavenly Master Plan EIS/EIR include instituting a comprehensive noise monitoring program, the replacement of older and louder air/ water nozzles with quiet model snowmaking equipment, sound control devices for snowmaking equipment, and participation with the snowmaking industry in the research and development of quiet snowmaking equipment and sound control devices for snowmaking equipment. The current technology considers quiet snowmaking equipment to include both fan guns and more efficient air/water nozzles (sometimes referred to as "stick guns"). Based upon noise measurement data collected for the various types of snowmaking equipment, fan guns are generally 10 or more dBA quieter than older model air/water nozzles. In recent years, significant reductions in noise have been realized from newer designs of some air/water nozzles. Generally, lower air pressure during the mixing process at the nozzle results in lower noise emissions. In addition, fan guns which receive air pressure from a central compressor located within a building and are not equipped with individual air compressors also result in reduced noise emissions.

Since the 1996/1997 ski season, Heavenly Ski Resort has committed to the installation of a permanent noise monitoring site at the base of the ski area near the California lodge, and to establishing the existing snowmaking noise levels at the Boulder Base and Stagecoach Base. Refer to Figure 1 for locations of noise monitoring sites.

According to the previous snowmaking noise reports, during the 1996/1997 ski season some quiet snowmaking equipment was installed and used at the California Base facilities. However, the use of quiet equipment was limited. During the 1997/1998 ski season, additional quiet snowmaking equipment was introduced into the fleet of snowmaking operations. During the 1998/1999 snowmaking operations, no additional quiet snowmaking equipment was implemented. Based upon review of the log of snowmaking activities provided by Heavenly, fan guns have been used in both the lower and upper locations of the California Base since the 1999/2000 ski season. Beginning with the 2008/2009 ski season, fan guns have been used extensively on the lower portion of the California Base area. Based upon the snowmaking logs, there has been limited use of air/water nozzles on the lower portion of the California side as an effort to reduce overall snowmaking noise levels.

Figure 1
Heavenly at Tahoe Ski Resort
Project Site and Noise Measurement Locations



-  : Short Term Noise Measurement Location
-  : Continuous Noise Measurement Location



II PURPOSE AND NEED

The purpose and need for the Annual Noise Monitoring Report, is to address the attainment of performance standards contained within the Heavenly Master Plan and to address progress toward attainment of the TRPA noise level criteria.

TRPA Criteria

The Tahoe Regional Planning Agency (TRPA) has adopted Environmental Thresholds for the Lake Tahoe Region. The noise standards, or Thresholds as they are commonly referred to, are numerical Community Noise Equivalent Level (CNEL)¹ values for various land use categories and transportation corridors.

As a form of zoning, the TRPA has divided the Lake Tahoe Region into more than 175 separate Plan Areas. Boundaries for each of the Plan Areas have been established based upon similar land uses and the unique character of each geographic area. For each Plan Area, a Statement is made as to how that particular area should be regulated to achieve regional environmental and land use objectives. As a part of each Statement an outdoor CNEL standard is established based upon the Thresholds. Table 1 shows the existing CNEL standards for the Heavenly Plan Areas and adjacent Plan Areas.

Table 1 Plan Area Statement (PAS) CNEL Criteria		
PAS	Description	CNEL Criterion
087	Heavenly Valley California	55 dBA
085	Lakeview Heights (Location of California Base noise monitoring location)	55 dBA
094	Glenwood	50 dBA
095	Trout/Cold Creek	50 dBA
086	Heavenly Valley Nevada	55 dBA
082	Upper Kingsbury	55 dBA
080	Kingsbury Drainage	50 dBA
088	Tahoe Village	55 dBA

¹ For an explanation of these terms, see Appendix A: "Acoustical Terminology"

III COMPLIANCE REPORTING

III.1 Snow Grooming Noise

III.1a Master Plan Mitigation Methods

The Master Plan mitigation methods for snow grooming operations are to maintain an 85 foot setback from Plan Area boundaries that are adjacent to Heavenly. Operations of snow grooming equipment would not exceed Plan Area noise standards with a minimum of 85 feet of separation.

III.1.b Master Plan Milestone/Product

Snow grooming machines are not operated within 85 feet of PAS boundaries. Portions of the fleet are replaced continually with newer technology equipment

III.1c Responsible Party

Heavenly is responsible for educating snow groomers to maintain the 85 foot setback.

III.1d PAS Criteria

PAS 080 – 50 dB CNEL

PAS 082, 085, 086, 087, 088 – 55 dB CNEL

PAS 095, PAS 121 – 45 dB CNEL

III.1.e Results of Reporting and Determination of Compliance

In previous years this measure was included in the Cardno compliance report.

III.2 Snowmobile Noise

III.2.a Master Plan Mitigation Methods

Replace all snowmobiles with 4-stroke technology. This would ensure that snowmobiles would comply with the 82 dBA single event noise level standard. Currently, Heavenly only uses 4-stroke engine snowmobiles.

III.2.b Master Plan Milestone/Product

Snowmobile equipment is maintained and operated within 85 feet of PAS boundaries. Portions of the fleet are replaced with newer technology equipment on an annual basis.

III.2.c Responsible Party

Heavenly is responsible for replacing the fleet of snowmobiles with 4-stroke technology machines.

III.2.d Criteria

The TRPA single event noise level standard for snowmobiles is 82 dBA Lmax, at a distance of 50 feet.

III.2.e Results of Reporting and Determination of Compliance

Heavenly staff reported in 2008 that all snowmobiles in the fleet are 4-stroke engine technology. Noise measurement data collected for the snowmobiles indicate that they comply with the noise level criterion of 82 dBA Lmax. Therefore, this is in compliance with the TRPA thresholds.

Since the Heavenly snowmobile fleet has been converted to 4-stroke technology and the technology continues to focus attention on quiet operations, the Heavenly snowmobile fleet is expected to continue to become quieter over time. It is acknowledged within this report that this mitigation measure has attained compliance and can be removed from the master plan mitigation measures.

III.3 Snow Removal Noise

III.3.a Master Plan Mitigation Methods

Mitigation methods for snow removal noise impacts are to minimize nighttime snow removal operations, and by constructing noise barriers along the perimeters of the parking lots. At the California Base area, the upper parking lot should be cleared first, and clearing of the lower parking lot should be conducted during the daytime and evening hours.

III.3.b Master Plan Milestone/Product

Snow removal equipment is operated consistent with the measures listed above.

III.3.c Responsible Party

Heavenly is responsible for operating snow removal equipment consistent with the measures listed above.

III.3.d Criteria

PAS 080 – 50 dB CNEL

PAS 082, 085, 086, 087, 088 – 55 dB CNEL

PAS 095, PAS 121 – 45 dB CNEL

Results of Reporting and Determination of Compliance

To be provided in Cardno compliance report.

III.4 Snowmaking California Base Area Noise

III.4.a Master Plan Mitigation Methods

1. Use of fans in place of air/water nozzles or air/water guns which are low noise;
2. Re-direction of nozzles and fans to minimize noise exposures at PAS boundaries;
3. Reduction in the numbers of nozzles and/or fans;
4. Use of setbacks to reduce noise exposures at PAS boundaries;
5. Use of noise reduction housings for air/water nozzles;
6. Use of barriers at low-mounted air/water nozzles;
7. Reduction in snowmaking activities at nighttime;
8. Sponsor research into reducing noise produced by snowmaking. This may include support of industry-wide research activities, specific studies concerning nozzle design sponsored directly by Heavenly, and the study of alternatives in placement of guns and fans at Heavenly.

III.4.b Master Plan Milestone/Product

Heavenly has installed the long-term noise monitoring station at the California Base area. The annual noise monitoring occurs from approximately November 1st, and generally through March 31st, depending on the snowmaking activities. Heavenly has completely replaced the air-water snowmaking nozzles at the base of California with fan guns. Heavenly has not implemented items 4 through 6 listed above. However, Heavenly staff has closely monitored the snowpack produced through winter storms and snowmaking operations to determine the appropriate time for discontinuing snowmaking operations and reduce nighttime snowmaking noise levels. In addition, Heavenly continues to invest in conducting noise measurements of varying types of snowmaking equipment to determine the feasibility of introducing more quiet technology snowmaking equipment.

III.4.c Responsible Party

Heavenly is responsible for implementing the mitigation measures.

III.4.d PAS Criteria

PAS 080 – 50 dB CNEL
PAS 082, 085, 086, 087, 088 – 55 dB CNEL
PAS 095, PAS 121 – 45 dB CNEL

III.4.e Results of Reporting and Determination of Compliance

1996/1997 - 2014/2015 Snowmaking Noise Levels Summary:

Previous reports provide details on the analysis of past and present snowmaking seasons. Results of all noise monitoring surveys are provided in Tables 2 and 3.

2014/2015 Snowmaking Noise Levels Summary:

The ski season during the 2014/2015 spanned a total of approximately 151 days. Continuous snowmaking noise level measurements were conducted between November 1, 2014 and March 28, 2015 at the permanent noise monitoring site, located on the USFS property located directly east of Heavenly Ski Area, and across Keller Road (PAS 085). The monitoring site is located on the southeast corner of the intersection of Keller Road and Saddle Road, with a direct line of sight to the California Base snowmaking operations. As mentioned in previous reports, the location of the noise monitor was at the northeast corner of Keller Road and Saddle Road, and adjacent to the Tahoe Seasons Resort. That monitoring location was reaching the limitations of its usefulness. Traffic noise from the intersection of Keller Road and Saddle Road was influencing the overall measured noise levels. The current location has sufficient setback to reduce the amount of noise associated with the traffic as it affected the overall measured noise levels and the noise levels associated with the snowmaking operations.

The equipment used for the noise level measurements was a Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meter which was calibrated with an LDL Model CAL 200 acoustical calibrator. The sound level meter is powered by a solar panel with a deep cell battery back-up. The sound level meter was downloaded once per month, and was checked for calibration.

During the 2014/2015 ski season the Heavenly snowmaking staff continued the log of snowmaking operations, also noting the use and location of snowmaking equipment, during the hours of operation when snowmaking activity occurred. Upon review of the snowmaking activities log provided by Heavenly snowmaking personnel, the measured CNEL values during snowmaking activities was determined at the noise monitoring location. Noise associated with snowmaking activities was a function of the number and location of snowmaking nozzles and/or fans guns in operation. Table 2 summarizes the previous eighteen years of snowmaking levels at the Tahoe Seasons Resort (PAS 085), as well as the 2014/2015 season.

Table 2 Summary of Measured Noise Levels at the Heavenly Base Area (Average Measured CNEL Values) Noise Monitoring Site GPS Coordinates (38° 56' 17.43" N - 119° 56' 18.43" W)					
Year	CNEL on Days with Snowmaking	CNEL on Days without Snowmaking	CNEL During Measurement Period	Total # of Monitoring Days	Total # of Snowmaking Days
1996/1997	74.1 dBA	61.7 dBA	71.6 dBA	--	--
1997/1998	73.5 dBA	61.8 dBA	70.2 dBA	--	--
1998/1999	73.0 dBA	62.0 dBA	69.5 dBA	--	--
1999/2000	74.3 dBA	62.0 dBA	73.0 dBA	141	101
*2000/2001	74.1 dBA	60.0 dBA	72.2 dBA	140	89
*2001/2002	73.9 dBA	60.3 dBA	72.1 dBA	145	93
*2002/2003	72.0 dBA	63.1 dBA	68.3 dBA	150	61
*2003/2004	67.4 dBA	62.3 dBA	65.7 dBA	104	56
*2004/2005	65.3 dBA	61.5 dBA	63.1 dBA	149	51
*2005/2006	61.0 dBA	60.9 dBA	61.4 dBA	151	41
*2006/2007	63.7 dBA	58.1 dBA	62.6 dBA	149	75
*2007/2008	62.4 dBA	58.2 dBA	61.6 dBA	140	62
*2008/2009	62.4 dBA	59.7 dBA	61.2 dBA	119	75
**2009/2010	59.8 dBA	55.5 dBA	58.1 dBA	150	72
**2010/2011	57.9 dBA	55.6 dBA	56.5 dBA	150	52
**2011/2012	59.3 dBA	55.5 dBA	58.1 dBA	148	86
**2012/2013	60.1 dBA	55.9 dBA	58.6 dBA	143	77
**2013/2014	57.9 dBA	55.2 dBA	56.7 dBA	136	62
**2014/2015	58.7 dBA	52.5 dBA	57.0 dBA	148	86
*The 2000/2001 - 2008/2009 measurement site was moved to the ground level of the Tahoe Seasons Resort. Previously this site was located at the roof-top of the Tahoe Seasons Resort. ** Noise measurement site moved to USFS property @ northeast corner of Keller and Saddle. Year 2003-2004 Heavenly began Fan Gun Technology					

The average measured CNEL value at the monitoring site for the 2014/2015 season was 58.7 dBA when snowmaking operations occurred. This is consistent with the lowest measured CNEL values since the reporting began. There continues to be significant progress in reducing snowmaking noise since the introduction of the Fan Technology and improved noise reduction associated with air/water guns. In addition, the measured CNEL values on days without snowmaking operations was 52.2 dBA, and was in compliance with the 085 and 087 Plan Area CNEL standards. It was still

noted that when snowmaking did not occur there was influence from roadway traffic, wind and individuals recreating on the USFS property where the sound level meter is located. Figures 2 through 6 graphically show the results of the noise monitoring, as they compare to the TRPA CNEL criterion of 55 dBA for PAS 085 and 087.

Snowmaking can occur over a significant portion of the California side of the mountain. In addition, the array of snowmaking at the California Base can include air/water nozzle and fan-gun type snowmaking equipment. The fan-guns have been found to produce noise levels which are a minimum of 10 dBA less than the traditional air-water nozzle guns. Table 3 summarizes the last twelve years of CNEL values for varying types of snowmaking operations.

Table 3 Summary of Measured Noise Levels at the Heavenly Base Area Based upon Varying Arrays of Snowmaking Operations at the California Base					
Year	Days with Lower Snowmaking Only	Days with Upper Snowmaking Only	Days with Lower Air/Water Nozzles Only	Days with Upper Air/Water Nozzles Only	Days with Lower Fan-Guns Only
	Logarithmic CNEL				
2001-2002	74.7 dBA	63.7 dBA	72.2 dBA	63.7 dBA	NA ²
2002-2003	73.0 dBA	63.0 dBA	NA ³	62.8 dBA	NA ²
2003-2004	61.7 dBA	60.9 dBA	NA ³	60.3 dBA	61.1 dBA
2004-2005	64.1 dBA	60.3 dBA	66.1 dBA	NA ¹	NA ²
2005-2006	63.4 dBA	57.6 dBA	NA ³	NA ¹	63.4 dBA
2006-2007	65.4 dBA	60.2 dBA	NA ³	59.3 dBA	65.2 dBA
2007-2008	60.6 dBA	61.2 dBA	NA ³	62.0 dBA	60.1 dBA
2008-2009	64.3 dBA	58.1 dBA	NA ³	63.3 dBA	63.4 dBA
2009-2010	57.9 dBA	55.7 dBA	NA ³	58.4 dBA	57.9 dBA
2010-2011	58.8 dBA	52.7 dBA	NA ³	51.9 dBA	58.8 dBA
2011-2012	59.8 dBA	56.1 dBA	NA ³	53.4 dBA	58.5 dBA
2012-2013	60.2 dBA	55.5 dBA	NA ³	55.5 dBA	60.3 dBA
2013-2014	62.7 dBA	56.5 dBA	NA ³	55.3 dBA	62.7 dBA
2014-2015	62.1 dBA	54.2 dBA	NA ³	51.8 dBA	62.1 dBA
¹ NA - No snowmaking occurred with strictly Upper Air-Water Nozzles operating. ² NA - No snowmaking occurred with strictly Fan Guns operating. ³ NA - No snowmaking occurred with strictly Lower Air-Water Nozzles Only					

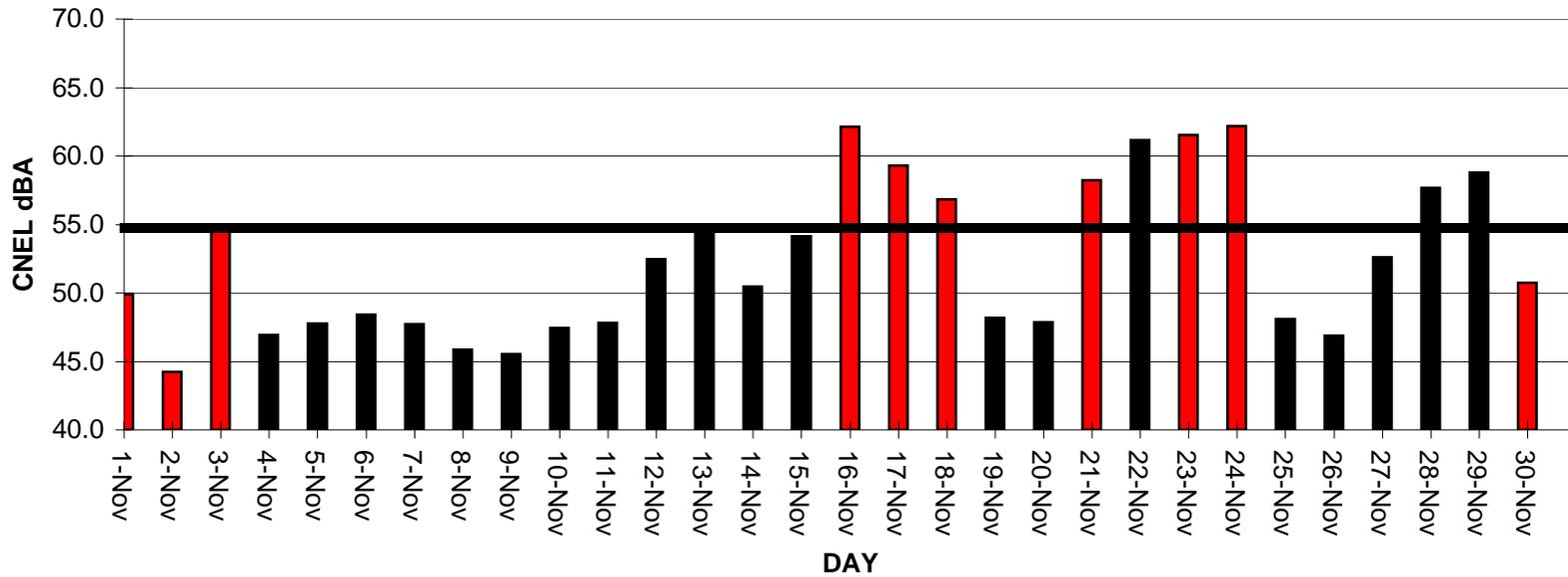
Figure 2

2015-101

Heavenly California Base Area Snowmaking Monitoring

Annual Snowmaking Report
Summary of CNEL
November, 2014

NOVEMBER 2014



NO SNOWMAKING ON CALIFORNIA SIDE 

SNOWMAKING ON CALIFORNIA SIDE 

CNEL Criterion 55 dBA



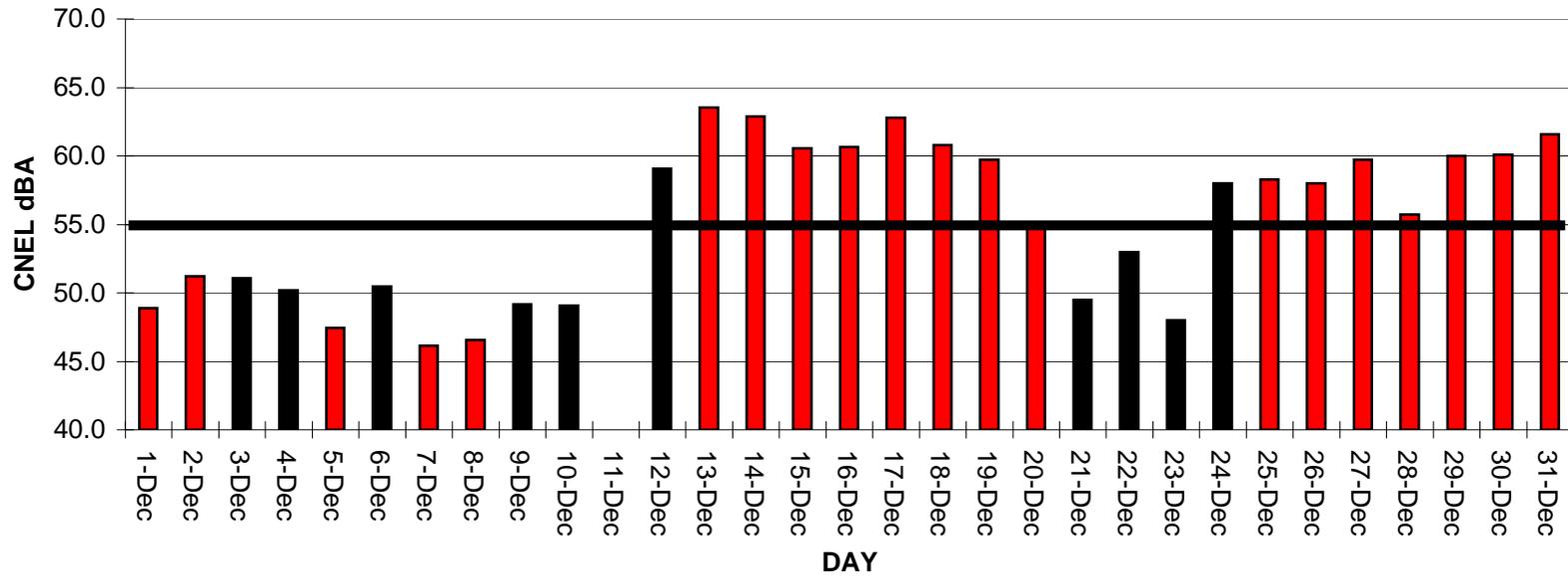
Figure 3

2015-101

California Base Area Heavenly Snowmaking Monitoring

Annual Snowmaking Report
Summary of CNEL
December, 2014

DECEMBER 2014



NO SNOWMAKING ON CALIFORNIA SIDE 

SNOWMAKING ON CALIFORNIA SIDE 

CNEL Criterion 55 dBA



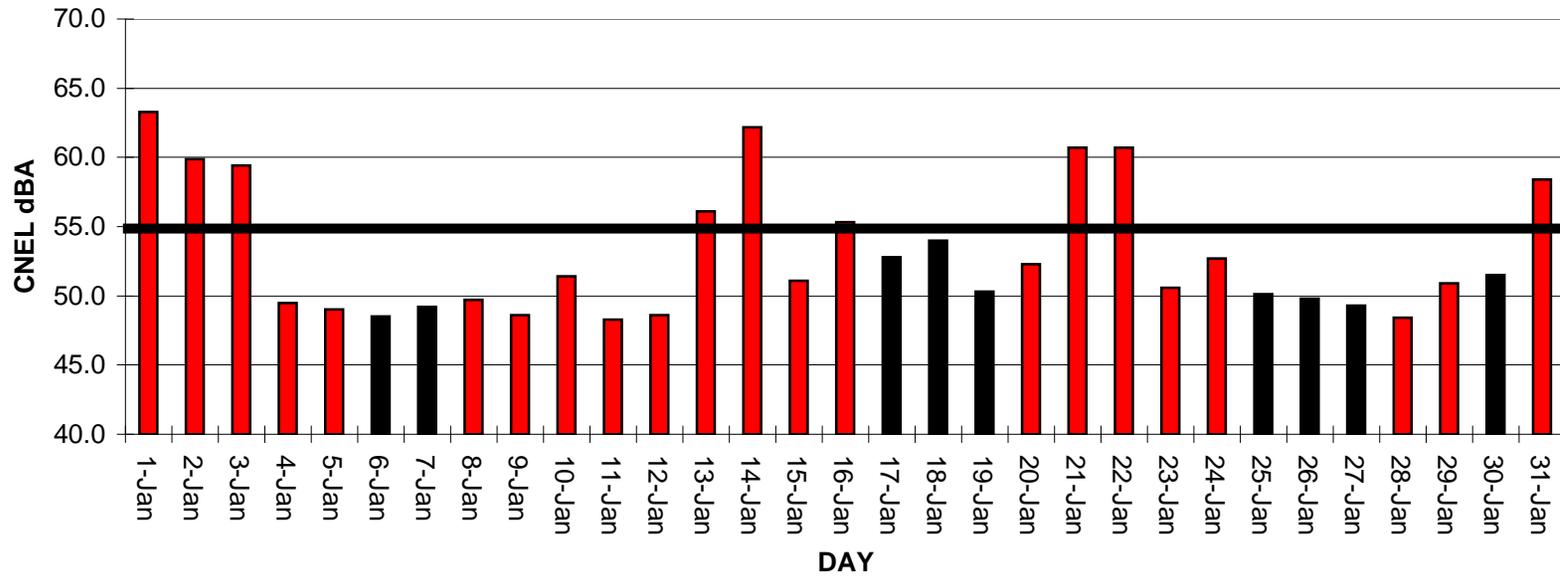
Figure 4

2015-101

California Base Area Heavenly Snowmaking Monitoring

Annual Snowmaking Report
Summary of CNEL
January, 2015

JANUARY 2015



NO SNOWMAKING ON CALIFORNIA SIDE 

SNOWMAKING ON CALIFORNIA SIDE 

CNEL Criterion 55 dBA

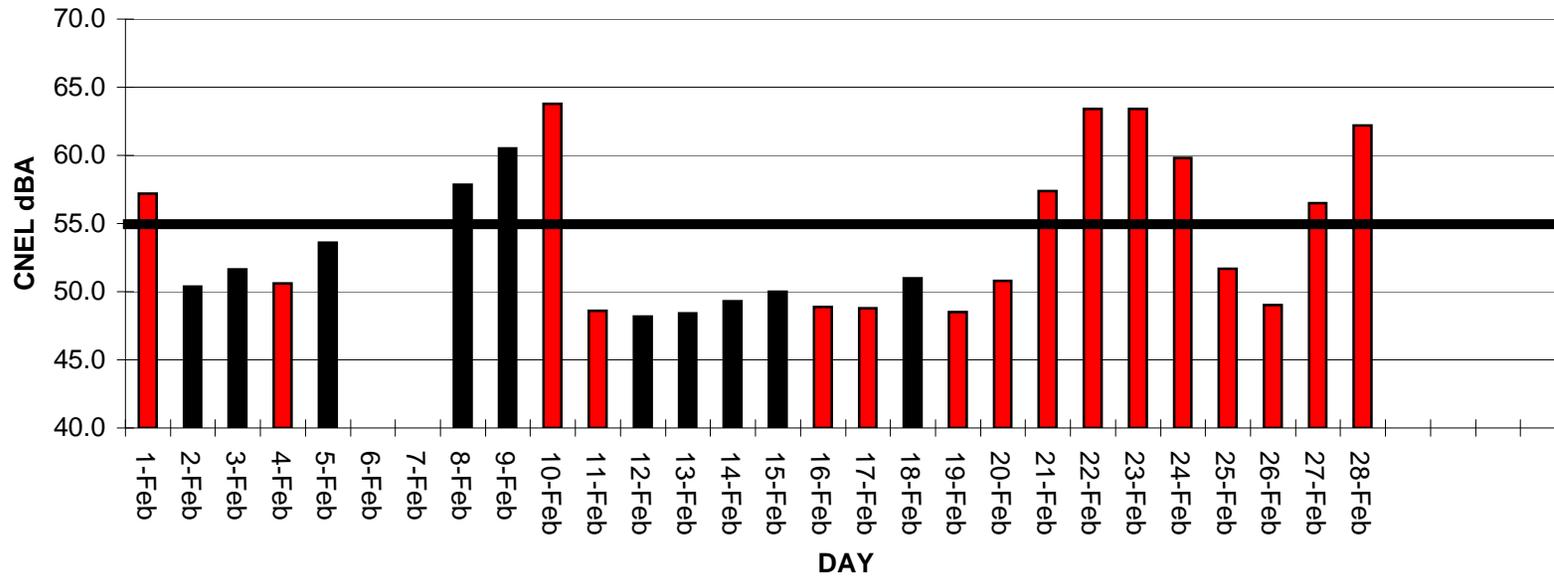
Figure 5

2015-101

California Base Area Heavenly Snowmaking Monitoring

Annual Snowmaking Report
Summary of CNEL
February, 2015

FEBRUARY 2015



NO SNOWMAKING ON CALIFORNIA SIDE 

SNOWMAKING ON CALIFORNIA SIDE 

CNEL Criterion 55 dBA

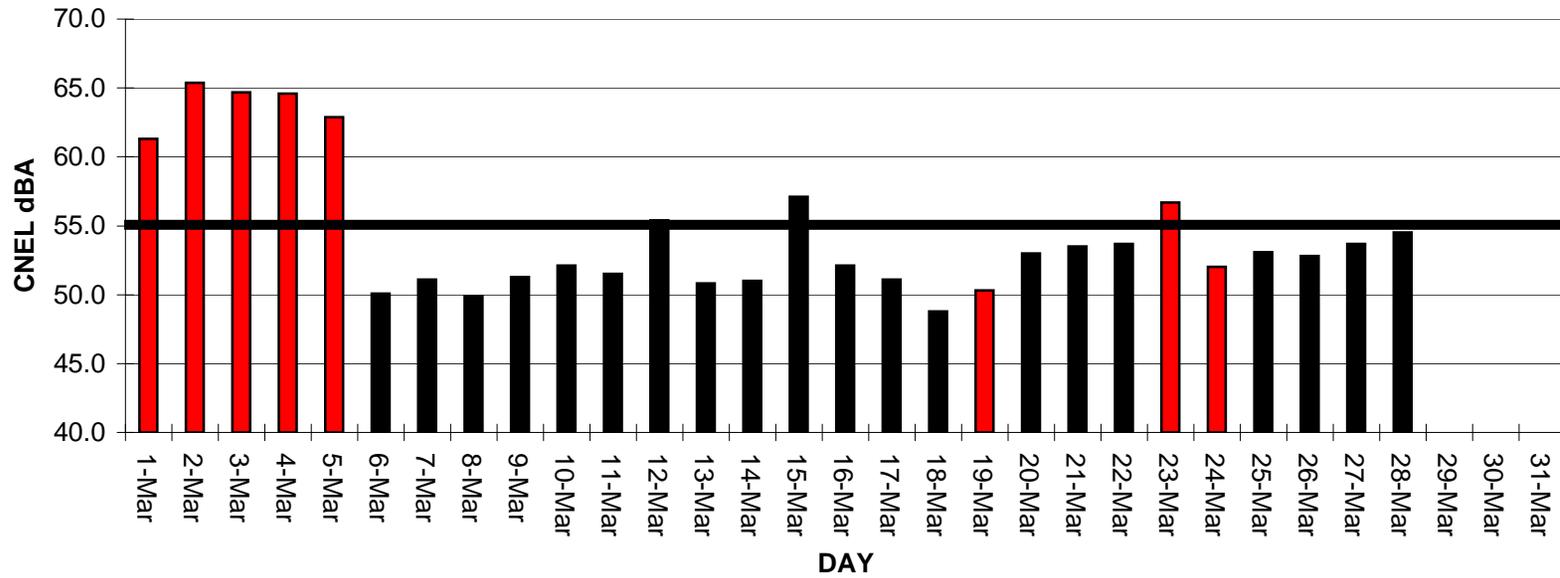
Figure 6

2015-101

California Base Area Heavenly Snowmaking Monitoring

Annual Snowmaking Report
Summary of CNEL
March, 2015

MARCH 2015



NO SNOWMAKING ON CALIFORNIA SIDE 

SNOWMAKING ON CALIFORNIA SIDE 

CNEL Criterion 55 dBA

The CNEL levels show a small decrease in noise levels at the California base. This could be the result of an increase in use of fan guns compared to the previous year.

Fan Gun Noise Levels

Heavenly has completed the process of converting the California Base snowmaking operations to the use of fan-guns. However, portions of the lower mountain which include the ski runs named Round About and Lower Gun Barrel continue to utilize air/water nozzles. The types of fan guns which Heavenly is currently using include SMI Super Polecat. The air/water nozzle snowmaking guns are currently newer technology and produce lower noise levels than the older technology air/water nozzle snowmaking guns.

As Heavenly continues to introduce lower noise emission technology snowmaking equipment to the lower California snowmaking fleet, it is expected that a minimum noise level reduction of 3 dBA to 5 dBA can be achieved for all snowmaking operations. During the 2014/2015 ski season, Heavenly reported consistent use of fan guns for snowmaking at the lower portion of the California side. As the lower mountain converts to fan guns, it is expected that a reduction in snowmaking noise levels can be realized at the base areas.

The determining factors on overall noise from the snowmaking system include the types of snowmaking equipment, the number of air/water nozzles or fans operating at any time, and the total hours of operations. If fan gun technology is not capable of producing the amount of snow that the air/water nozzles produce, then snowmaking operations may require an increase in the number of fan guns operating at any one time and/or an increase in hours of operation.

III.5 Snowmaking at Boulder Base Area Noise

III.5.a Master Plan Mitigation Methods

1. Use of fans in place of air/water nozzles or using air/water nozzles which are low noise;
2. Re-direction of nozzles and fans to minimize noise exposures at PAS boundaries;
3. Reduction in the numbers of nozzles and/or fans;
4. Use of setbacks to reduce noise exposures at PAS boundaries;
5. Use of noise reduction housings for air/water nozzles;
6. Use of barriers at low-mounted air/water nozzles;
7. Reduction in snowmaking activities at nighttime;
8. Sponsor research into reducing noise produced by snowmaking. This may include support of industry-wide research activities, specific studies concerning nozzle design sponsored directly by Heavenly, and the study of alternatives in placement of guns and fans at Heavenly.
9. At the Stagecoach and Boulder Bases, Heavenly will strive to replace all air/water nozzles with fans.

III.5.b Master Plan Milestone/Product

During the 2014/2015 ski season, j.c. brennan & associates, Inc. has conducted short-term noise monitoring at the Boulder Base area. The noise monitoring occurs for short periods of time since the snowmaking only occurs for between 2 and 4 days per year. Heavenly anticipates replacing the air/water nozzles after complete replacement of nozzles with fan guns on the entire California face.

Heavenly is investing in low noise technology fan gun and air/water nozzles and anticipates this is the next area for replacement of noisy air/water nozzles. Heavenly has not implemented any of the other mitigation measures listed above.

III.5.c Responsible Party

Heavenly is responsible for implementing the mitigation measures.

III.5.d PAS Criteria

PAS 080 – 50 dB CNEL

PAS 082, 085, 086, 087, 088 – 55 dB CNEL

PAS 095, PAS 121 – 45 dB CNEL

III.5.e Results of Reporting and Determination of Compliance

Short-term noise level measurements of snowmaking operations were conducted during the 2014/2015 ski season at the Boulder Base on December 18, 2014. Measured noise levels at this location were approximately 68 dBA Leq during snowmaking operations. Measurements were also conducted at the corner of Jack Circle and Bonnie Court. The measured noise levels were approximately 62 dBA Leq. The results of the ambient noise measurements for the 2014/2015 ski season and previous ski seasons are shown in Table 4. The predicted CNEL value at the Boulder Base is 75 dBA. The predicted CNEL value at the Jacks Circle location is 69 dBA.

The CNEL calculations assume snowmaking operations occur continually for a 24-hour period.

Table 4 Ambient Noise Level Measurements for the Boulder Base Area				
Year	Date	Measured Sound Level, Leq		
		Boulder Base Site 1	Corner of Jack Cir. & Bonnie Ct. - Site 2	
			Measured	Measured for Master Plan
1999-2000	December 14, 1999	70 dBA	63 dBA	65 dBA
2000-2001	December 14, 2000	73 dBA	65 dBA	
2001-2002	NA ¹	NA ¹	NA	
2002-2003	February 4, 2003	71 dBA	53 dBA	
2003-2004	December 8, 2003	60 dBA	NA ¹	
2004-2005	December 3, 2004	66 dBA	58 dBA	
2005-2006	December 13, 2005	71 dBA	64 dBA	
2006-2007	December 28, 2006	68 dBA	63 dBA	
2007-2008	December 31, 2007	67 dBA	65 dBA	
2008-2009	December 24, 2008	67 dBA	65 dBA	
2009-2010	December 15, 2009	68 dBA	62 dBA	
2010-2011	December 15, 2010	67 dBA	64 dBA	
2011-2012	December 22, 2011	68 dBA	65 dBA	
2012-2013	December 17, 2012	67 dBA	63 dBA	
2013-2014	January 15, 2014	69 dBA	64 dBA	
2014-2015	December 18, 2014	68 dBA	62 dBA	
¹ Snowmaking operations did not occur at this location during this season. Boulder Base GPS Coordinates (38° 58.3' 3.98" N - 119° 53' 25.81"W) Jack Circle/Bonnie Ct. GPS Coordinates (38° 58' 5.14" N - 119° 53' 34.76" W)				

Currently, the snowmaking operations are out of compliance with the TRPA criteria.

III.6 Snowmaking at Stagecoach Base Area Noise

III.6.a Master Plan Mitigation Methods

1. Use of fans in place of air/water nozzles or air/water guns which are low noise;
2. Re-direction of nozzles and fans to minimize noise exposures at PAS boundaries;
3. Reduction in the numbers of nozzles and/or fans;
4. Use of setbacks to reduce noise exposures at PAS boundaries;
5. Use of noise reduction housings for air/water nozzles;
6. Use of barriers at low-mounted air/water nozzles;
7. Reduction in snowmaking activities at nighttime;
8. Sponsor research into reducing noise produced by snowmaking. This may include support of industry-wide research activities, specific studies concerning nozzle design sponsored directly by Heavenly, and the study of alternatives in placement of guns and fans at

Heavenly.

9. At the Stagecoach and Boulder Bases, Heavenly will strive to replace all air/water nozzles with fans.

III.6.b Master Plan Milestone/Product

During the 2014/2015 ski season, Heavenly has conducted short-term noise monitoring at the Stagecoach Base area. The noise monitoring occurs for short periods of time since the snowmaking only occurs for between 2 and 4 days per year. Heavenly anticipates replacing the air/water nozzles after complete replacement of nozzles with fan guns on the entire California face. Heavenly has not implemented any of the mitigation measures listed above.

III.6.c Responsible Party

Heavenly is responsible for implementing the mitigation measures.

III.6.d PAS Criteria

This area is located outside of the TRPA area of influence.

III.6.e Results of Reporting and Determination of Compliance

Short-term noise level measurements of snowmaking operations were conducted during the 2014/2015 ski season at three locations of the Stagecoach Base, on December 14, 2014. The noise levels during snowmaking operations were 77 dBA Leq at 460 Quaking Aspen, 61 dBA Leq at the entrance to the Eagles Nest, and 55 dBA Leq at the entrance to the Ridge. The average hourly noise levels at the Quaking Aspen location conducted for the development of the Master Plan were between 82 dBA and 92 dBA Leq in 1996. The results of the ambient noise measurements for the 2014/2015 ski season and previous ski seasons are shown in Table 5.

Table 5 Ambient Noise Level Measurements Stage Coach Base Area					
Year	Date	Measured Sound Level, L _{eq}			
		460 Quaking Aspen Rd. Site 3		Entrance to The Ridge Site 4	Eagles Nest Site 5
		Measured	Measured for Master Plan		
1999-2000	December 4, 1999	87 dBA	82-92 dBA	62 dBA	78 dBA
2000-2001	December 11, 2000	86 dBA		56 dBA	72 dBA
2001-2002	November 30, 2001	57 dBA		55 dBA	59 dBA
2002-2003	February 2, 2003	83 dBA		--	70 dBA
2003-2004	December 8, 2003	87 dBA		58 dBA	74 dBA
2004-2005	November 30, 2004	81 dBA		58 dBA	68 dBA
2005-2006	December 5, 2005	81 dBA		63 dBA	73 dBA
2006-2007	December 18, 2006	88 dBA		62 dBA	72 dBA
2007-2008	December 20, 2007	82 dBA		60 dBA	68 dBA
2008-2009	December 17, 2008	78 dBA		55 dBA	65 dBA
2009-2010	December 8, 2009	78 dBA		56 dBA	62 dBA
2010-2011	November 29, 2010	78 dBA		58 dBA	65 dBA
2011-2012	December 9, 2011	75 dBA		57 dBA	62 dBA
2012-2013	December 14, 2012	78 dBA		57 dBA	60 dBA
2013-2014	December 9, 2013	77 dBA		56 dBA	60 dBA
2014-2015	December 14, 2014	77 dBA	55 dBA	61 dBA	
Quaking Aspen GPS Coordinates (38° 57' 37.52" N - 119° 53' 16.57" W) Entrance to Ridge GPS Coordinates (38°57' 46.68" N - 119° 56' 3.68" W) Eagles Nest GPS Coordinates (38° 57' 35.04" N - 119° 53' 23.63" W)					

Using the data collected on December 14, 2014 shown in Table 5, a 24 hour CNEL was calculated for each of the three locations at the Stage Coach Base Area. With continuous snowmaking operations for 24 hours, The calculated CNEL at Eagle Nest is 68 dBA CNEL. The 24 hour operations at 460 Quaking Aspen resulted in a CNEL of 84 dBA. The 24 hour operations at the entrance to The Ridge resulted in a 62 dBA CNEL.

III.7 Snowmaking Upper Mountain Noise

III.7.a Master Plan Mitigation Methods

In order to reduce overall snowmaking noise levels, Heavenly shall use fan guns or other similar noise reduction measures for all new snowmaking areas. In addition, where new snowmaking is placed adjacent to existing ski trails with snowmaking, Heavenly shall convert the existing air/water snowmaking nozzles with fan guns or use other similar noise reduction measures to maintain or reduce existing noise levels in that area.

III.7.b Master Plan Milestone/Product

Snowmaking noise from the upper mountain areas is monitored and evaluated from the California Base Area permanent noise monitor, and through Remote Plan Area monitoring. The analysis to date indicates that upper mountain snowmaking does not exceed the ambient noise when snowmaking is not occurring. New snowmaking installations are fan guns.

III.7.c Responsible Party

Heavenly is the responsible party.

III.7.d PAS Criteria

PAS 080 – 50 dB CNEL
PAS 082, 085, 086, 087, 088 – 55 dB CNEL
PAS 095, PAS 121 – 45 dB CNEL

III.7.e Results of Reporting and Determination of Compliance

See the reporting for the California Base Area. The following provides results of the Remote Plan Area Noise Measurements

j.c. brennan & associates, Inc., conducted noise level measurements of snowmaking operations at one remote Plan Area location on February 10, 2015. The noise measurement location, which is known as the area identified as “Party Rock” (Noise Measurement Site 7) is located within Plan Area 080. During this year, noise measurements were not conducted at the upper mountain remote area in Plan Area 095, which is generally located adjacent to the ski area boundary, and southeast of Liz’s and Canyon Runs (Noise Measurement Site 6). The noise level measurements at Party Rock (Site 7) were conducted to determine if snowmaking operations at the lower mountain and base areas (which included 22 fan guns) would exceed the applicable standards.

The results of the noise measurements and field observations were that the snowmaking operations were audible and was approximately 38 dBA Leq.

GPS coordinates for the Remote Plan Area measurements sites are as follows:

Party Rock (38° 56’ 27.63” N - 119° 56’ 1.35” W);
Liz’s / Canyon Run (38° 54’ 47.5” N - 119° 54’ 43” W).

Noise levels do not exceed the Plan Area 080 criteria.

III.8 Rock Busting Noise

III.8.a Master Plan Mitigation Methods

Rock busting generally occurs through the use of explosives and blasting. Control the number, size and location of Rock Busting blasts.

III.8.b Master Plan Milestone/Product

None

III.8.c Responsible Party

Heavenly is the responsible party.

III.8.d PAS Criteria

PAS 080 – 50 dB CNEL

PAS 082, 085, 086, 087, 088 – 55 dB CNEL

PAS 095, PAS 121 – 45 dB CNEL

III.8.e Results of Reporting and Determination of Compliance

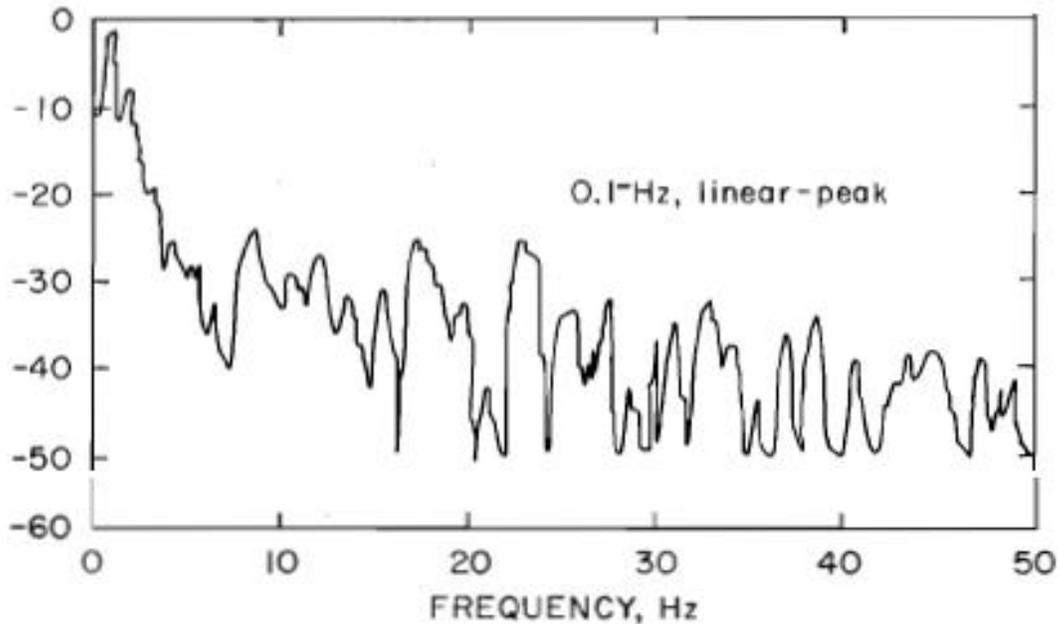
Heavenly has not contacted j.c. brennan & associates, Inc. to conduct noise measurements of blasting or rock busting. It is assumed that this activity has not occurred.

The process associated with rock busting includes setting explosive charges. The process includes drilling holes in the rock to set the charges. In general, blasting is controlled using micro delays between charges and by limiting charge size to minimize dispersal of the rock fragments, and to ensure the safety of the workers. Blasting is also controlled to prevent damage to nearby structures.

Airborne overpressures produced by blasting are typically measured in terms of the overall peak sound pressure level, without applying the A-weighting filter. The dominant frequencies of sound pressures associated with blasting lie in the very low frequency ranges of 2 Hz to 25 Hz, and the acoustical energy is concentrated below about 5 Hz. The figure below depicts a typical blast acoustical spectrum, which shows that the acoustical energy is concentrated well below 5 Hz.

Typical Blast Acoustical Spectrum

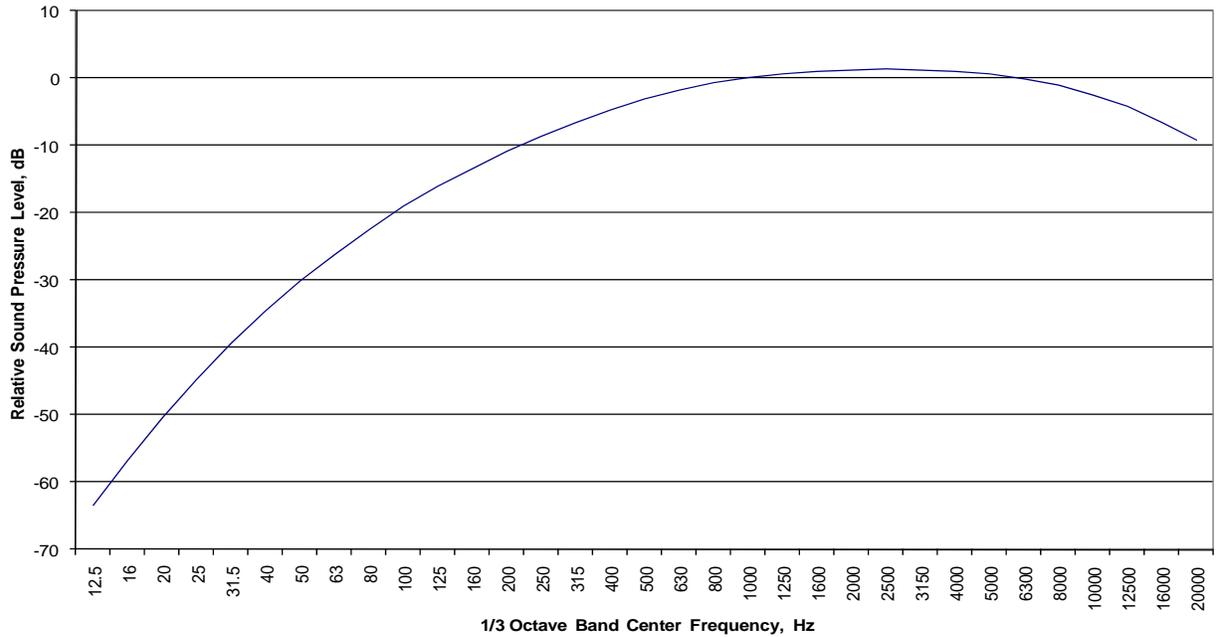
Relative Amplitude, dB



Source: "Airblast Instrumentation and Measurement Techniques for Surface Mine Blasting"
U.S. Dept. of the Interior Report of Investigations 8508.

Audible sound, in contrast, is usually assumed to begin at 20 Hz, ranging up to 20,000 Hz. People hear best at frequencies in the range of 1,000 Hz to 4,000 Hz, and people hear poorly at the low frequencies associated with blast overpressures. As a result, the A-weighting curve is usually applied to other environmental noise measurements. The A-weighting curve is shown by Figure 7 below.

**Figure 7
A-Weighting Filter Response**



The A-weighting adjustment factor for sound at 25 Hz (the upper limit of the dominant blast frequencies) is -44.7 dB. There are no published A-weighting correction factors below 12.5 Hz (where the A-weighting correction factor is -63.4 dB). These factors indicate that very high blast overpressures would be required to generate sound pressure levels that would be audible in an outdoor environment.

The audible sound associated with blasting is the result of escaping gases and falling (slumping) rock. Subjectively, audible blasting sound has been described as similar to the closing of a car trunk, or to rolling thunder. While these terms are subjective rather than quantitative, the described sounds are relatively benign. Audible noise due to blasting is not commonly considered to be a significant source of annoyance if blasting is controlled to meet safety standards on the project site.

Since rock busting is such an infrequent event, and is not considered to be a significant noise source, it is recommended that this mitigation monitoring measure is removed.

III.9 Amphitheater Operations Noise

III.9.a Master Plan Mitigation Methods

Restrict hours of concert noise to the daytime and early evening hours. This is consistent with the hours of operations assumed for the amphitheater noise study. In addition, concerts should not extend more than 6 hours in duration.

III.9.b Master Plan Milestone/Product

Heavenly has conducted a concert simulation and amphitheater noise study.

III.9.c Responsible Party

Heavenly is the responsible party

III.9.d PAS Criteria.

PAS 080 – 50 dB CNEL
PAS 082, 085, 086, 087, 088 – 55 dB CNEL
PAS 095, PAS 121 – 45 dB CNEL

III.9.e Results of Reporting and Determination of Compliance

No concerts were monitored.

Appendix A

Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three (+5 dB for TRPA calculations) and nighttime hours weighted by a factor of 10 (or +10 dB) prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	The highest root-mean-square (RMS) sound level measured over a given period of time.
L(n)	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L50 is the sound level exceeded 50% of the time during the one hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
Noise	Unwanted sound.
Peak Noise	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the "Maximum" level, which is the highest RMS level.
RT₆₀	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
Simple Tone	Any sound which can be judged as audible as a single pitch or set of single pitches.

Appendix B

2015-101

Heavenly Snowmaking Monitoring

Annual Snowmaking Report
 Summary of CNEL
 November, 2014

Day	CNEL dB	Snow	California				Nevada				York	CNEL Average		
			Upper		Lower		Upper		Lower	Base				
			A	F	A	F	A	F	A	F	F			
1-Nov	49.9	Y	27	6									No Snowmaking	50.8
2-Nov	44.2	Y	30	5			18	7					Snowmaking	57.1
3-Nov	54.8	Y		5			48	14					Total	55.9
4-Nov	47.0	Y					19	9						
5-Nov	47.8	N												
6-Nov	48.4	N											# of No Snowmaking Days	10
7-Nov	47.7	N											# of Snowmaking Days	20
8-Nov	45.9	N											Total Days of Monitoring	30
9-Nov	45.5	N												
10-Nov	47.5	N												
11-Nov	47.8	N												
12-Nov	52.5	Y					29	16						
13-Nov	54.3	Y					48	16						
14-Nov	50.5	Y					40	17						
15-Nov	54.2	Y					39	18						
16-Nov	62.1	Y	5	1			40	15						
17-Nov	59.3	Y	7	1			42	15						
18-Nov	56.8	Y	5	1			40	13						
19-Nov	48.2	Y					35	16						
20-Nov	47.9	Y					15	4						
21-Nov	58.2	Y	1	1		4	36	14						
22-Nov	61.2	Y					20	8						
23-Nov	61.6	Y	1	1		9	50	13						
24-Nov	62.2	Y	1	1		7	52	16						
25-Nov	48.1	Y					40	10						
26-Nov	46.9	N												
27-Nov	52.6	N												
28-Nov	57.7	N												
29-Nov	58.8	Y					30							
30-Nov	50.7	Y		3			40	10						

* A- Air Nozzles

F- Fan Guns

No Snowmaking Log Available

Snowmaking

Meter Downtime/Incomplete Data



Appendix B

2015-101

Heavenly Snowmaking Monitoring

Annual Snowmaking Report

Summary of CNEL

December, 2014

Day	CNEL dB	Snow	California				Nevada				York	CNEL Average	
			Upper	Lower	Upper	Lower	Base	York					
			A	F	A	F	A	F	F				
1-Dec	48.9	Y	3	3			38	8				No Snowmaking	53.2
2-Dec	51.2	Y		3			38	9				Snowmaking	59.4
3-Dec	51.1	N										Total	58.0
4-Dec	50.2	N											
5-Dec	47.5	Y	4	2			42	9					
6-Dec	50.5	N										# of No Snowmaking Days	11
7-Dec	46.1	Y		3			38	10				# of Snowmaking Days	20
8-Dec	46.6	Y	4	3			29	10				Total Days of Monitoring	31
9-Dec	49.1	N											
10-Dec	49.1	N											
11-Dec	1.0	N											
12-Dec	59.1	N											
13-Dec	63.5	Y				13							
14-Dec	62.9	Y				19	45	9	10				
15-Dec	60.6	Y				19	29	10	10				
16-Dec	60.7	Y				3	39	3					
17-Dec	62.8	Y	8	5		4	38	7	10				
18-Dec	60.8	Y	20	5		4	20	10	9	1			
19-Dec	59.7	Y	12	6		4	31	7	10				
20-Dec	55.0	Y	37	4			5	4					
21-Dec	49.5	N											
22-Dec	53.0	N											
23-Dec	48.0	N											
24-Dec	58.0	N											
25-Dec	58.3	Y	28	6		10		4	24				
26-Dec	58.0	Y	32	6	6		12	2	12				
27-Dec	59.7	Y	42	3		7	15	2	1				
28-Dec	55.7	Y	33				18	3					
29-Dec	60.0	Y	36			7	20	3		1			
30-Dec	60.1	Y	24	1				1					
31-Dec	61.6	Y	15			6							

* A- Air Nozzles

F- Fan Guns

No Snowmaking Log Available

Snowmaking

Meter Downtime/Incomplete Data

Appendix B

2015-101

Heavenly Snowmaking Monitoring

Annual Snowmaking Report

Summary of CNEL

January, 2015

Day	CNEL dB	Snow	California				Nevada					CNEL Average	
			Upper		Lower		Upper		Lower	Base	York		
			A	F	A	F	A	F	A	F	F		
1-Jan	63.3	Y		16		6	10	10				No Snowmaking	51.0
2-Jan	59.9	Y		29		5	9	10				Snowmaking	56.9
3-Jan	59.4	Y	26	1		4	9					Total	55.9
4-Jan	49.5	Y	26	1			6	4					
5-Jan	49.0	Y	36										
6-Jan	48.5	N										# of No Snowmaking Days	9
7-Jan	49.2	N										# of Snowmaking Days	22
8-Jan	49.7	Y	12									Total Days of Monitoring	31
9-Jan	48.6	Y	31										
10-Jan	51.4	Y	19										
11-Jan	48.3	Y	29	1									
12-Jan	48.6	Y	22	2			2	1					
13-Jan	56.1	Y	36	2			6	11					
14-Jan	62.2	Y	20	2		10	25	12					
15-Jan	51.1	Y	2	21			14	9					
16-Jan	55.3	Y	15	1			14	9					
17-Jan	52.8	N											
18-Jan	54.0	N											
19-Jan	50.3	N											
20-Jan	52.3	Y	25	2			9	3					
21-Jan	60.7	Y	29	2		11	17	13					
22-Jan	60.7	Y	30	1			19	15					
23-Jan	50.6	Y	27	1			16	15					
24-Jan	52.7	Y	60				9	8					
25-Jan	50.1	N											
26-Jan	49.8	N											
27-Jan	49.3	N											
28-Jan	48.4	Y	24	2			7	3					
29-Jan	50.9	Y	24	2			26	3					
30-Jan	51.5	N											
31-Jan	58.4	Y	30	2		7	6	11					

* A- Air Nozzles

F- Fan Guns

No Snowmaking Log Available

Snowmaking

Meter Downtime/Incomplete Data

Appendix B

2015-101

Heavenly Snowmaking Monitoring

Annual Snowmaking Report

Summary of CNEL

February, 2015

Day	CNEL dB	California				Nevada					York	CNEL Average	
		Snow	Upper	Lower		Upper	Lower	Base	F				
			A	F	A	F	A	F	A	F			
1-Feb	57.2	Y	22	2		4	11	14				No Snowmaking	53.5
2-Feb	50.4	N										Snowmaking	58.6
3-Feb	51.6	N										Total	57.1
4-Feb	50.6	Y	15				2	1					
5-Feb	53.6	N											
6-Feb	1.0	N										# of No Snowmaking Days	12
7-Feb	1.0	N										# of Snowmaking Days	16
8-Feb	57.9	N										Total Days of Monitoring	28
9-Feb	60.5	N											
10-Feb	63.8	Y	27	2		22	11	9					
11-Feb	48.6	Y	41	2									
12-Feb	48.2	N											
13-Feb	48.4	N											
14-Feb	49.3	N											
15-Feb	50.0	N											
16-Feb	48.9	Y	26	2									
17-Feb	48.8	Y	24	2									
18-Feb	51.0	N											
19-Feb	48.5	Y	26	2									
20-Feb	50.8	Y	25	1									
21-Feb	57.4	Y	33	2			3	4					
22-Feb	63.4	Y	35	3		12	3	7	7	1			
23-Feb	63.4	Y	38	3		12	8	10	8	1			
24-Feb	59.8	Y	31	2		13	5	11	8	1			
25-Feb	51.7	Y	22	1		5	3	1	15				
26-Feb	49.0	Y	33	2			12	1					
27-Feb	56.5	Y	18	2			7	1					
28-Feb	62.2	Y	22	2	11		8	4		1			

* A- Air Nozzles
F- Fan Guns

No Snowmaking Log Available

Snowmaking

Meter Downtime/Incomplete Data

Appendix B

2015-101

Heavenly Snowmaking Monitoring

Annual Snowmaking Report

Summary of CNEL

March, 2015

Day	CNEL dB	California				Nevada				Base	York	CNEL Average	
		Snow	Upper		Lower		Upper		Lower				
			A	F	A	F	A	F	A	F	F		
1-Mar	61.3	Y	28	2		5		2	9			No Snowmaking	52.8
2-Mar	65.4	Y	1	31		11		7	8	1		Snowmaking	62.2
3-Mar	64.7	Y	25	1		11		8	2			Total	57.9
4-Mar	64.6	Y	32	1		12		6	9				
5-Mar	62.9	Y	23	2		11		6	10				
6-Mar	50.1	N										# of No Snowmaking Days	20
7-Mar	51.1	N										# of Snowmaking Days	8
8-Mar	49.9	N										Total Days of Monitoring	28
9-Mar	51.3	N											
10-Mar	52.1	N											
11-Mar	51.5	N											
12-Mar	55.4	N											
13-Mar	50.8	N											
14-Mar	51.0	N											
15-Mar	57.1	N											
16-Mar	52.1	N											
17-Mar	51.1	N											
18-Mar	48.8	N											
19-Mar	50.3	Y	17	1									
20-Mar	53.0	N											
21-Mar	53.5	N											
22-Mar	53.7	N											
23-Mar	56.7	Y		20				9	2				
24-Mar	52.0	Y	23	1				10	1				
25-Mar	53.1	N											
26-Mar	52.8	N											
27-Mar	53.7	N											
28-Mar	54.5	N											
29-Mar													
30-Mar													
31-Mar													

* A- Air Nozzles

F- Fan Guns

No Snowmaking Log Available

Snowmaking

Meter Downtime/Incomplete Data

Mitigation and Monitoring Plan Annual
Report (October 2014 – September 2015)

APPENDIX XI
2014-2015 SKI SHUTTLE & ROUTE
SCHEDULE

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Kingsbury Grade & Stateline Shuttle Routes

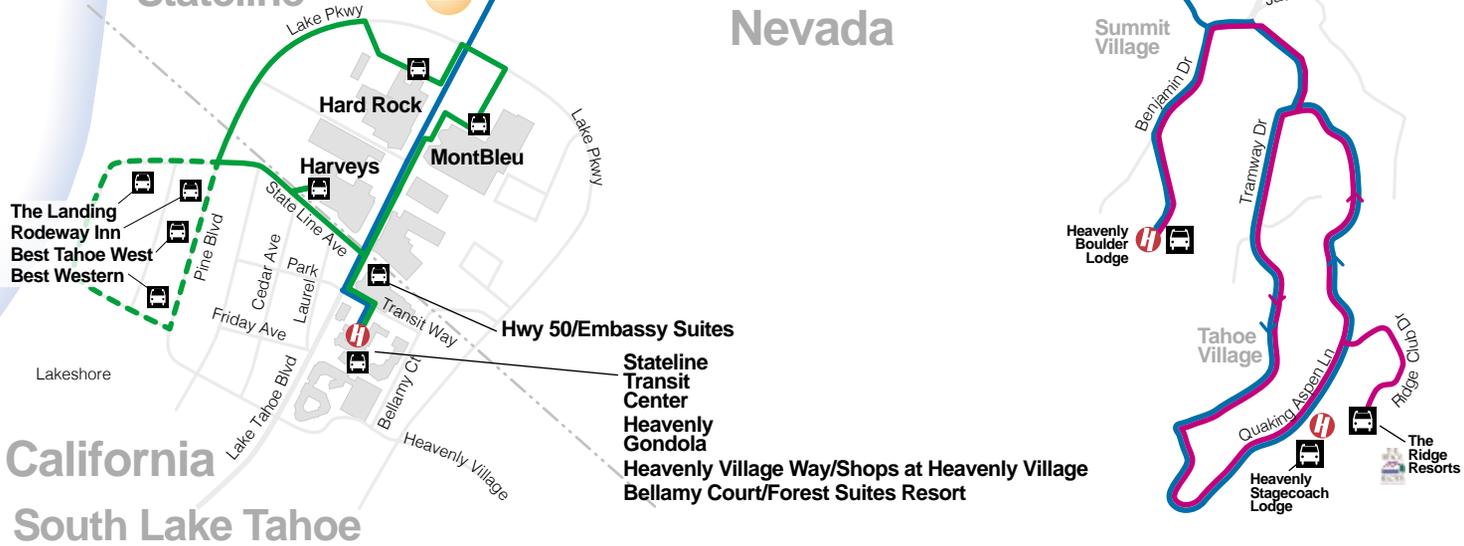
Not to Scale

Routes:

- Nevada
- Casino Corridor
- Upper Nevada

Stateline

Nevada



California South Lake Tahoe

Holiday schedules in effect December 20 – January 4; President's Day (February 16)

NEVADA: WEEKEND/HOLIDAY

8AM TO 6PM

Heavenly Gondola	Lakeside Inn & Casino	Mott Canyon Tavern	Heavenly Boulder Lodge	Heavenly Stagecoach Lodge	Kingsbury Hardware	Lakeside Inn & Casino	Heavenly Gondola
:00	:05	:07	:20	:35	:48	:50	:55
:20	:25	:27	:40	:55	:08	:10	:15
:40	:45	:47	:00	:15	:18	:30	:35

UPPER NEVADA: HOLIDAY/WEEKEND

8:15-11:15AM & 2:15-5:45PM

Heavenly Boulder Lodge	Heavenly Stagecoach Lodge	The Ridge Resorts Clubhouse*	Heavenly Stagecoach Lodge	Heavenly Boulder Lodge
:15	:25	:30	:35	:45
:30	:40	:45	:50	:00
:45	:55	:00	:05	:15
:00	:10	:15	:20	:30

NEVADA: WEEKDAY

8AM TO 6PM

Heavenly Gondola	Lakeside Inn & Casino	Mott Canyon Tavern	Heavenly Boulder Lodge	Heavenly Stagecoach Lodge	Kingsbury Hardware	Lakeside Inn & Casino	Heavenly Gondola
:00	:05	:07	:20	:35	:48	:50	:55
:30	:35	:37	:50	:05	:18	:20	:25

UPPER NEVADA: WEEKEND

11:15AM-2:15PM

UPPER NEVADA: WEEKDAY

8AM TO 6PM

Heavenly Boulder Lodge	Heavenly Stagecoach Lodge	The Ridge Resorts Clubhouse*	Heavenly Stagecoach Lodge	Heavenly Boulder Lodge
:00	:10	:15	:20	:30
:30	:40	:45	:50	:00

*Service to The Ridge Resorts begins at 8:15 a.m. Last Ridge Drop off at 5:45 p.m.

CASINO CORRIDOR

8AM TO 6PM

Heavenly Gondola	Montbleu	Hard Rock	Rodeway Inn	Best Tahoe West Inn	Best Western & The Landing	Harvey's	Heavenly Gondola
:00	:08	:10	on request	on request	on request	:15	:18
:20	:28	:30	on request	on request	on request	:35	:38
:40	:48	:50	on request	on request	on request	:55	:58



(530) 541-7149 ext. 0
tahoetransportation.org



(775) 586-7000
skiheavenly.com

SKI RUN ROUTE

8AM TO 6PM

Lake Tahoe Vacation Resort	Ski Run Blvd/Employee Parking	Rock House Rentals	Black Bear Inn	Ski Run & Pioneer Trail	Heavenly California Lodge	Inn at Heavenly	Tahoe Beach & Ski	Lakeland Village	Lakeshore Lodge	Beach Retreat & Lodge	Inn By The Lake	Highway 50 Safeway	Knight's Inn	Lake Tahoe Vacation Resort
:00	:01	:02	:04	:05	:10	:12	:15	:16	:17	:19	:21	:23	:25	:27
:30	:31	:32	:34	:35	:40	:42	:45	:46	:47	:49	:51	:53	:55	:57

LAKE TAHOE BLVD ROUTE

8:12 AM TO 6 PM

Heavenly Gondola	Tahoe Beach & Ski	Lakeland Village	Lakeshore Lodge & Spa	Beach Retreat & Lodge	Inn By The Lake	Safeway	Knight's Inn	Lake Tahoe Vacation Resort	Quality Inn	Heavenly Gondola
:00	:05	:06	:08	:10	:12	:14	:16	:20	:23	:25
:30	:35	:36	:38	:40	:42	:44	:46	:50	:53	:55

NOTE: Service begins at 8:12AM at Inn By The Lake

Stateline & South Shore Shuttle Routes

Not to Scale

Routes:

- Lake Tahoe Blvd.
- California
- Ski Run



CALIFORNIA ROUTE

8AM TO 6PM

Heavenly Gondola	Pioneer Tr 7-Eleven	Ski Run Blvd/Pioneer Trail	Heavenly CA Lodge	Ski Run/Inn at Heavenly	Pioneer Tr Keller Ave.	Pioneer Tr Glen Road	Pioneer Tr 7-Eleven	Heavenly Gondola
:00	:04	:08	:15	:19	:21	:23	:24	:27
:10	:14	:18	:25	:29	:31	:33	:34	:37
:20	:24	:28	:35	:39	:41	:43	:44	:47
:30	:34	:38	:45	:49	:51	:53	:54	:57
:40	:44	:48	:55	:59	:01	:03	:04	:07
:50	:54	:58	:05	:09	:11	:13	:14	:17



FOR WINTER SKI SHUTTLE QUESTIONS CONTACT:

(530) 541-7149 ext. 0
tahoetransportation.org

FOR MOUNTAIN RESORT INFORMATION CONTACT:

(775) 586-7000
skiheavenly.com

Information updated as ski or weather conditions change.



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Holiday schedules in effect December 20 – January 4; President's Day (February 16)

Mitigation and Monitoring Plan Annual
Report (October 2014 – September 2015)

APPENDIX XII
2014-2015 HEAVENLY EMPLOYEE
SURVEY RESULTS

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2014-2015 Annual Housing and Transportation Survey

January 2rd-January 12th, 2015



- Please help us this year and participate in this very short survey.
- This survey is a requirement of the Heavenly Mountain Resort Master Plan, and is one of many reporting requirements for us to operate a fantastic ski resort in a sensitive alpine environment.
- The purpose of this survey is to find out how you get to work, where you live, do you find your housing to be affordable, and whether or not you are satisfied with your current housing situation. It is 13 questions, and does not take very long to complete, approx 1-3 minutes.
- It is also available in Spanish.

If you have questions or comments please contact Frank Papandrea the Environmental Manager at Extention-2315.

Heavenly 2014-2015 Survey Results

What is your current employment classification?

Seasonal	46.00%
Year-Round	54.00%

Which of the following categories best describes your current residence?

House	64.00%
Duplex	7.00%
Triplex/Fourplex	2.00%
Townhouse/Condominium	6.00%
Apartment	15.00%
Mobile Home	1.00%
Employee Housing	3.00%
Other	2.00%

Heavenly 2014-2015 Survey Results

Do you own or rent your current residence?

Own	38.00%
Rent	62.00%

Where do you live?

South Lake Tahoe	59.00%
Meyers/ Tahoe Paradise	8.00%
Stateline/ Kingsbury Grade area	14.00%
Zephyr Cove area	4.00%
Minden/ Gardnerville	9.00%
Carson City	2.00%
Other	4.00%

How many people including yourself live in your household?

1	12.00%
1	
1	45.00%
2	
3	16.00%
3	
4	20.00%
4	
5	5.00%
5	
6 or more	2.00%

Heavenly 2014-2015 Survey Results

How many bedrooms are in your current residence?

0 (Studio-type layout)	5.00%
1	9.00%
2	27.00%
3	42.00%
4	16.00%
5	1.00%
6 or more	0.00%

RENTERS: How much do YOU currently pay for rent?

less than \$299	5.00%
\$300 - \$499	20.00%
\$500 - \$699	10.00%
\$700 - \$899	9.00%
\$900 - \$1099	9.00%
more than \$1100	9.00%
Not Applicable	38.00%

Heavenly 2014-2015 Survey Results

OWNERS: How much is YOUR current mortgage payment on your residence?

less than \$399	3.00%
\$400 - \$599	2.00%
\$600 - \$799	1.00%
\$800 - \$999	3.00%
\$1000 - \$1199	7.00%
more than \$1200	20.00%
Not Applicable	64.00%

How satisfied are you with your existing housing situation?

Very Satisfied	52.00%
Somewhat Satisfied	28.00%
Neutral	13.00%
Somewhat Unsatisfied	6.00%
Very Unsatisfied	3.00%

Heavenly 2014-2015 Survey Results

How would you rate the availability of housing in your community?

Very Good	13.00%
Good	39.00%
Neutral	33.00%
Poor	12.00%
Very Poor	4.00%

How do you rate your cost of housing?

Very Good	24.00%
Good	35.00%
Neutral	30.00%
Poor	8.00%
Very Poor	4.00%

Heavenly 2014-2015 Survey Results

Do you have a Car?

Yes	79.00%
No	21.00%

How do you normally get to work?

Drive	66.00%
Get a Ride with Someone in a Car or Truck	6.00%
Ride the Bus	21.00%
Walk/ Bike	16.00%
Other	0.00%

Mitigation and Monitoring Plan Annual
Report (October 2014 – September 2015)

APPENDIX XIII
ENVIRONMENTAL MONITORING
ANNUAL REPORT HEAVENLY
MOUNTAIN RESORT WATER YEAR
2015

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Environmental Monitoring Program Annual Report

Heavenly Mountain Resort Water
Year 2015

Project Number E314001900



Prepared on behalf of
Heavenly Mountain Resort

January 15, 2016 (Revised March 2016)

Contact Information

Cardno

295 Highway 50, Suite 1
P.O. Box 1533
Zephyr Cover, NV 89448

Telephone: 775.588.9069
Facsimile: 775.588.9219
International: 800.368.7511

www.cardno.com

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Acronyms

BMI	Benthic Macro Invertebrate
BMPs	Best Management Practices
BMPEP	Best Management Practices Effectiveness Program
CERP	Construction Erosion Reduction Program
CNPS	California Native Plant Society
CRWQCB	California Regional Water Quality Control Board
CWE	Cumulative Watershed Effects
cm	Centimeter
ESC	Effective Soil Cover
EIR/EIS	Environmental Impact Report / Environmental Impact Statement
EIR/EIS/EIS Statement	Environmental Impact Report / Environmental Impact Statement / Environmental Impact Statement
GIS	Arc-Geo Information Systems
IBI	Index of Biological Integrity
Lahontan	Lahontan Regional Water Quality Control Board (of the state of California)
LTBMU	Lake Tahoe Basin Management Unit (USDA Forest Service)
M or m	Meter
mm	Millimeter
Mg/L	milligrams/liter
MRP	Monitoring and Reporting Program
NDEP	Nevada Department of Environmental Protection
NTU	Nephelometric Turbidity Units
RCI	Resources Concepts Inc.
RIVPACS	River Invertebrate Prediction and Classification System
SCI	Stream Control Inventory
SOP	Standard Operating Procedure
STE	Standard Taxonomic Effort
SWAMP	Surface Water Ambient Monitoring Program
TBD	To Be Determined
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TRPA	Tahoe Regional Planning Agency
TSS	Total Suspended Sediment
USDA	United States Department of Agriculture
USFS	United States Forest Service
USGS	United States Geological Survey
VRAP	Vegetation Rapid Assessment Protocol
WMPR	Watershed Maintenance and Restoration Program

1 Introduction

This annual report is submitted in partial fulfillment of monitoring and reporting requirements set forth in the Lahontan Regional Water Quality Control Board and Monitoring and Reporting Program Order No. R6T-2015-0021. This report summarizes monitoring and evaluation activities conducted at Heavenly Mountain Resort (Heavenly) during the 2015 water year as a result of the implementation of the Water Quality and Best Management Practices Monitoring Program. This program is a component of the Heavenly Mountain Resort Master Plan (Heavenly 1996), the Heavenly Mountain Resort Master Plan Amendments (Heavenly 2007 and 2015).

Heavenly Mountain Resort is located on the south shore of Lake Tahoe within El Dorado and Alpine Counties of California and Douglas County of Nevada (Figure 1.1). Land ownership is shared between the U.S.D.A. Forest Service (USDA Forest Service) and Heavenly. Heavenly operates on National Forest lands through a special use permit, renewed in 2002 for a period of 40 years.

The Water Quality and Best Management Practices Monitoring Program were initiated at Heavenly in 1995 in conjunction with the completion of the Heavenly Mountain Resort Master Plan (Heavenly 1996). The need for such a monitoring program was established during preparation of a Cumulative Watershed Effects (CWE) Analysis required by Tahoe Regional Planning Agency (TRPA) guidelines for ski area expansion. Implementation of the monitoring program was a condition of the Master Plan approval by the USDA Forest Service and TRPA. The 2007 amendment to the Heavenly Mountain Resort Master Plan, approved by TRPA on April 25, 2007, was in effect and implemented by Heavenly in collaboration with Lahontan Regional Water Quality Control Board (Lahontan), the USDA Forest Service, and TRPA. Modifications resulting from the Master Plan Amendment include incorporating all monitoring into a single report that was submitted May 15, 2009 to the TRPA, USDA Forest Service, and Lahontan. This monitoring report is on an ongoing schedule due annually.

A joint Environmental Impact Report/Environmental Impact Statement/Environmental Statement (EIR/EIS/EIS) was approved in the spring of 2015. The EIR/EIS/EIS followed the past format and where appropriate the previous Master Plan was updated and refined.

The requirements of the Annual Water Quality and Best Management Practices Monitoring Reports remain the same following approval of the Master Plan Amendment. As the CEQA lead agency, the Water Board is the responsible party for ensuring all mitigation measures are in accordance with the program. "The Water Board recognizes that another agency (USFS or TRPA) has responsibilities for ensuring implementation" for monitoring mitigation measures outside of the Water Boards authority.¹ Similar to past reports, the BMP monitoring report will be submitted with the TRPA Annual Mitigation and Monitoring report due on May 1st of the following year.

The Master Plan represents a comprehensive twenty-year development plan for Heavenly Mountain Resort. Master Plan and Master Plan Amendment implementation objectives of Heavenly, TRPA, and the USDA Forest Service regarding protection of the environment include (Heavenly 1996):

Making optimal use of the natural attributes of the site without creating a significant impact on the environment (Heavenly);

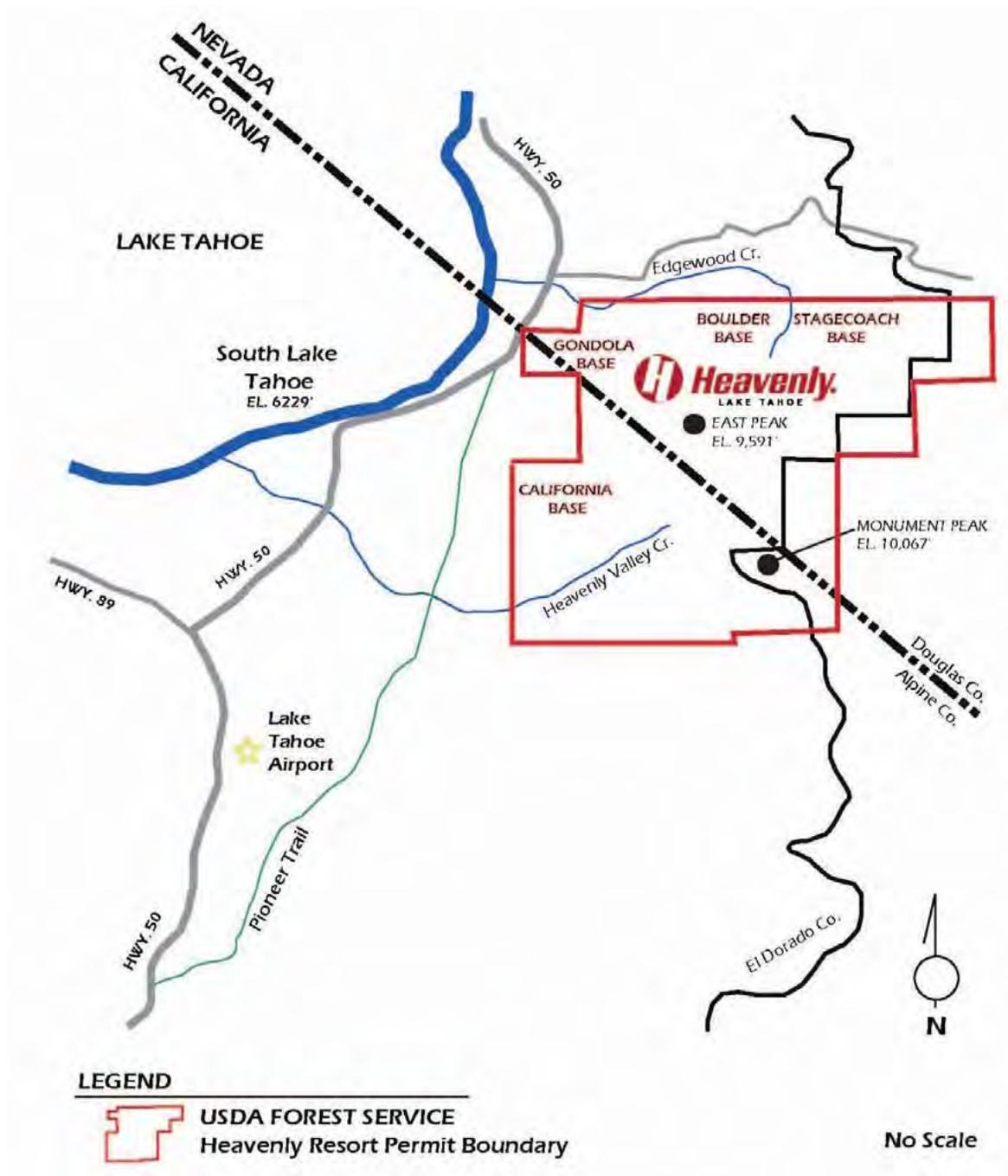
- > Restoring the health of sub-watersheds and other natural resource values disturbed by past activities (Heavenly);
- > Protecting the environmental quality of the area (USDA Forest Service);

¹ California Regional Water Quality Control Board-Lahontan Region. Board Order No. R6T-2015-0021. WDDID No. 6A090033000. Waste Discharge Requirements for Heavenly Mountain Resort. 2015 (pages 16-17).

- > Providing a quality ski experience within the resort with ski runs and other disturbed areas stabilized to reduce the potential for soil erosion (USDA Forest Service);
- > Improving the visual quality of the area (USDA Forest Service); and
- > Providing for long-term preservation and restoration of Stream Environment Zones (TRPA).

Implementation of the Collection/Monitoring Agreement between Heavenly and the USDA Forest Service (Monitoring Program) will provide data sufficient to determine compliance with agency water quality standards and validate the efficiency of management practices in protecting against adverse cumulative watershed effects.

Figure 1-1 Location of Heavenly Mountain Resort (Heavenly 2007)



1.2 Environmental Monitoring

The overall objective of the Environmental Monitoring Program is to evaluate and monitor water quality and overall ecological health of Heavenly creeks and watersheds while satisfying California, Nevada, and TRPA regulatory water quality requirements. The Environmental Monitoring Program is made up of five major components (Heavenly 1996):

- > Water quality monitoring to comply with regulatory monitoring requirements;
- > Soil cover monitoring to gain understanding of how to prevent soil loss and protect water quality;
- > Monitoring to determine BMP effectiveness under the various conditions at the ski area;
- > Riparian condition monitoring to determine riparian area response to Heavenly Mountain Resort activities; and,
- > Overall watershed condition and trend monitoring.

The overall objectives of the Environmental Monitoring Program have not changed; however amendments and modifications regarding the objectives have with acceptance of the EIR/EIS/EIS (2015).

1.3 Monitoring Plan

The Environmental Monitoring Program Plan was Chapter 7 of the Draft Master Plan Amendment (updated in 2007). The Monitoring Program was designed to satisfy the requirements of Lahontan Board Order No. 6-91-36. The Monitoring Plan addresses the five components stated above. Key plan requirements are summarized and revised as follows.

1.3.1 Water Quality Monitoring

The waste discharge requirements, monitoring, and reporting program were updated by Lahontan Board Order Number R6T-2003-0032 in 2003. The monitoring and reporting program was amended in 2011 under Board Order Number 2003-0032A1 and again in November 2013 under Board Order Number 2003-0032A2. In conjunction with the EIR/EIS/EIS Master Development Plan to protect water quality, the Water Board rescinded Board Order Number R6T-2003-0032 with the passage of new Board Order Number R6T-2015-0021 (May 14, 2015).

The new Monitoring Program includes water quality monitoring at five California stream stations as well as three California Base Parking Area StormFilter™ locations. Monitoring and sampling is to occur at all California stream sites monthly as safety and stream flows permit. During the spring snowmelt period, sampling is to occur bi-weekly (every two weeks). Five runoff sampling events at each of the three California Base Parking Area StormFilter™ locations shall be collected to reflect rainfall and snow runoff to assess performance of the StormFitlers™.²

Results and discussion are to be reported to Heavenly, TRPA, and Lahontan in this annual report.

Constituents are identified in the Monitoring Program for sampling at each of the stations. The following primary list of constituents is monitored at each of the receiving water sampling stations:

- > Discharge (Flow)
- > Turbidity
- > Suspended Sediment
- > Total Nitrogen (Total Kjeldahl Nitrogen+Nitrate+Nitrite)
- > Total Phosphorus

²California Regional Water Quality Control Board-Lahontan Region. 2015. Monitoring and Reporting Program No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort. 2015 (pages 1-2).

> Chloride

Influent and effluent sampling locations for the StormFilter™ at the California Base Parking Area shall monitor the following list of constituents:

- > Oil and Grease with silica gel treatment
- > Total Nitrogen (Total Kjeldahl Nitrogen+Nitrate+Nitrite)
- > Total Phosphorus
- > Turbidity
- > Chloride

1.3.2 Effective Soil Cover Monitoring

The Monitoring Program includes soil cover monitoring to determine requirements and effectiveness of various soil covers under different slopes and conditions. Monitoring examines the effectiveness of past and current projects. Soil cover monitoring conducted from 1995 to 2003 was based on the use of random transects at elevations above 7,000 ft. The results were reported in the 2003 Comprehensive Report. Collection of the data was too time-intensive, making it difficult to obtain data for the entire resort and the 2003 Comprehensive Report recommended that the measurements be discontinued. The report also recommended development of new protocol. A new general methodology was developed in 2005 by Cardno ENTRIX (formerly ENTRIX, Inc.) and approved by the USDA Forest Service.

In the 2007 Annual Report and later in the 2008 Effective Soil Cover Workplan, a new protocol was presented that combined the California Native Plant Society's (CNPS) Vegetation Rapid Assessment Protocol (VRAP) and the establishment of permanent photo points. After discussions with the USDA Forest Service, it was determined that the CNPS VRAP method should support an aerial survey, rather than being the only data collected. Heavenly and the USDA Forest Service agreed to share the cost of an over-flight. An infrared aerial flyover of Heavenly Mountain Resort was conducted by 3DiWest in conjunction with the USDA Forest Service in July of 2009. The flight produced a 1:8,000 resolution infrared aerial photo of the entire mountain and was used along with Geographic Information Systems (GIS) and field verification (i.e. ground-truthing) to produce an accurate picture of the soil cover at Heavenly. The VRAP method was augmented in 2009 with the establishment of permanent photo points to better track variability over time. Photo points established in 2009 established a baseline reference, though not all of the sites were accessible. Four years of photo monitoring showed little to no progress and it was determined that Integrated Environmental Restoration Services, Inc. (IERS) would lead a change to the existing program. Soil cover monitoring has shifted from ski slope vegetation and ground cover to hot spot prioritization monitoring and assessments leading to on the ground implementation. This programmatic shift is further discussed in Chapter 3 and is referred to as the Watershed Maintenance and Restoration Program (WMRP) in the Water Boards latest Monitoring and Reporting Program.

1.3.3 BMP Effectiveness Monitoring

The Monitoring Program includes BMP monitoring to determine the effectiveness of the BMPs in preventing soil erosion and protecting water quality under various conditions. Based on recommendations contained in the 2003 Comprehensive Report, the USDA Forest Service designed and implemented a new BMP monitoring strategy modelled after Region 5's Best Management Practices Effectiveness Program (BMPEP) protocols (USDA Forest Service 2002). The BMP monitoring program is currently being implemented by Resource Concepts Inc. (RCI). The 2015 Construction Erosion Reduction Program (CERP) data will be presented in the TRPA Annual Mitigation and Monitoring Report submitted in May 2016.

1.3.4 Riparian Condition Monitoring

The Monitoring Program includes stream condition inventory monitoring, as well as macro-invertebrate monitoring to assess the following objectives:

- > Determine which, and by how much, various creek health parameters fluctuate between monitoring periods
- > Evaluate the impacts Heavenly management practices have on the health of the stream riparian systems

In 2003, the USDA Forest Service made a number of recommendations to improve channel condition monitoring. These recommendations are reflected in the Riparian Conditions Monitoring Plan developed by ENTRIX in 2005. The revised plan was implemented in 2006, 2009 and most recently in 2011. Channel condition monitoring occurred annually along the Edgewood Creek reaches through 2011. Results from the annual survey showed little to no change, and the annual survey of these reaches was discontinued. Instead, the Edgewood stream condition inventory monitoring concurs with the California site reaches. The schedule for all reaches now occurs once every four years. The 2015 water year marked the first time many of the reaches had been surveyed since 2011.

Macro-invertebrate monitoring occurred in 2006, 2007, 2010, 2011, 2014 and 2015. Laboratory results for the 2015 samples have yet to be returned. Once returned, the results will be submitted in accordance with the Surface Water Ambient Monitoring Program (SWAMP) template to the Lahontan Water Control Board for scoring. The next round of macro-invertebrate monitoring is not required until the summer of 2018 in accordance with the approved schedule in the new Monitoring and Reporting Program.

1.3.5 Condition and Trend Monitoring

Condition and trend evaluations will be conducted on each of the data elements of the monitoring program both individually and cumulatively to gauge overall watershed condition, trends, and to determine if ski area management activities are improving or degrading water quality and ecological health. These evaluations are conducted in 5-year intervals and discussed in the Comprehensive Reports. The past comprehensive report covered six water years (2006-2011), in order to align the monitoring program with the reporting and monitoring sequencing. The six year comprehensive report was submitted in January 2012 and a revised copy was submitted in October 2013. An amendment to this report was submitted in August 2014 finalizing this report. The next comprehensive report is due in January 2017 covering the five year period from 2012-2016.

2 Water Quality

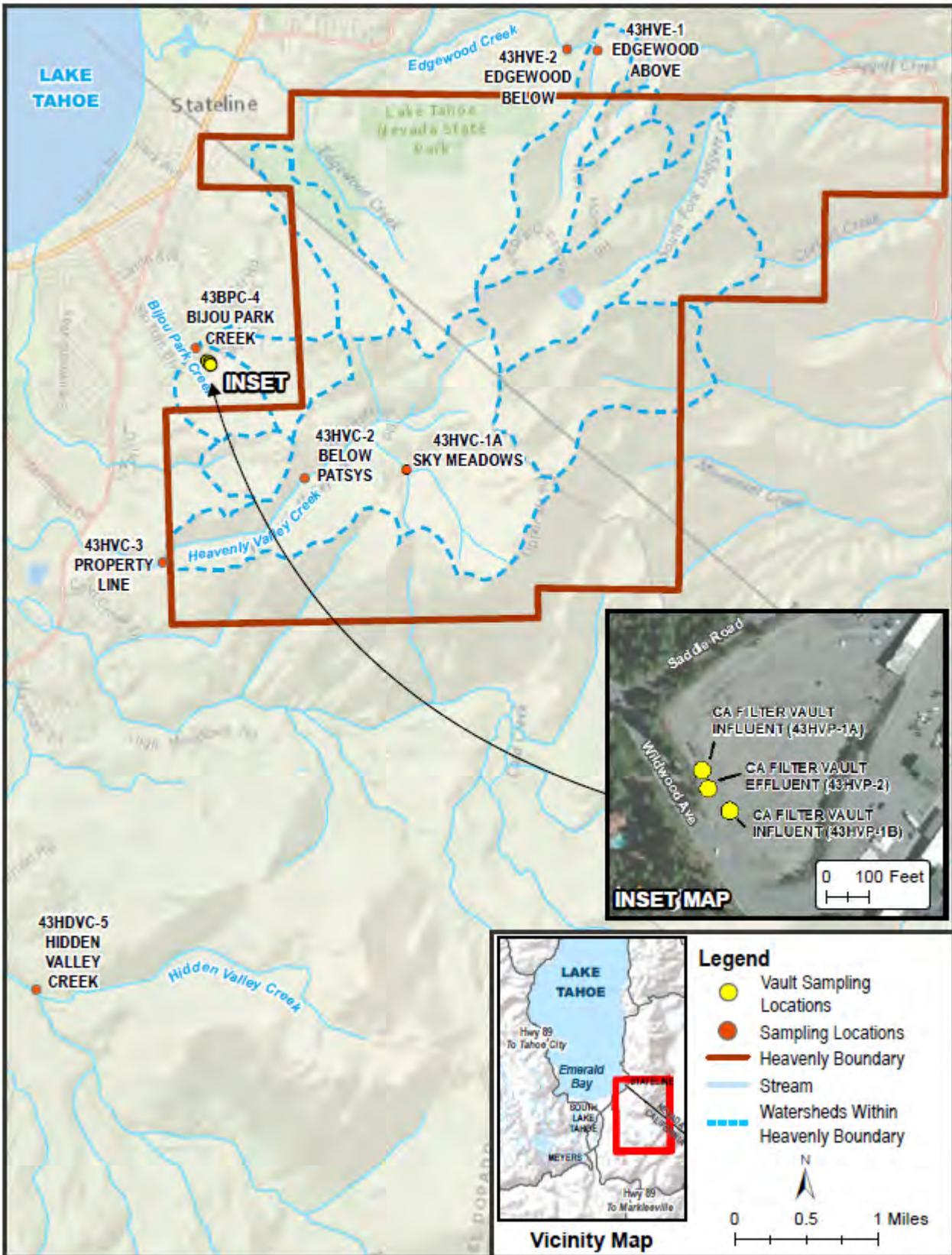
2.1 Station Description

Heavenly Mountain Resort (Heavenly) measures water quality parameters along four creeks to determine the effects of ski area development on background conditions (Table 2.3). Water samples were collected at seven stations for the 2015 water year, which include the additional station located on Heavenly Valley Creek at Sky Meadows, just above the snowmaking pond. Stations and sampling rationale are given in Table 2.1 and include the filter vault sampling locations. The approximate location of each station is shown in Figure 2.1.

Table 2-1 Heavenly Valley Mountain Resort Monitoring Program Water Quality Stations

Station ID	Station Name	Rationale
43HVC-1A	Heavenly Valley Creek at Sky Meadows, Above Snowmaking Pond	Characterized water quality in Heavenly Valley Creek drainage from the developed ski area
43HVC-2	Heavenly Valley Creek Below Patsy's and Groove Chair Lifts	Characterized water quality in Heavenly Valley Creek drainage from the developed ski area
43HVC-3	Heavenly Valley Creek located at the Forest Service Property Line	Characterized water quality in Heavenly Valley Creek leaving National Forest Lands below Heavenly Mountain Resort
43BPC-4	Bijou Park Creek located below the Heavenly California Base Parking Lot	Characterized water quality in Bijou Park Creek below the California Main Lodge and parking area
43HDVC-5	Hidden Valley Creek Baseline Station	Characterized water quality in creek draining a similar, mostly undeveloped watershed
43HVE-1	Edgewood Creek Above Boulder Parking Lot	Characterized water quality in Edgewood Creek above Boulder parking lot and below the ski runs
43HVE-2	Edgewood Creek Below Boulder Parking Lot	Characterized water quality in Edgewood Creek below Boulder parking lot
43HVP-1A	North Manhole Influent Pipe Into the Filter System	Characterized water quality inflow from the lower parking lot into the filter system
43HVP-1B	South Manhole Influent Pipe into the Filter System	Characterized water quality inflow from the upper parking lot into the filter system
43HVP-2	West Manhole Effluent Pipe Out Of The Filter System	Characterized water quality exiting the filter system

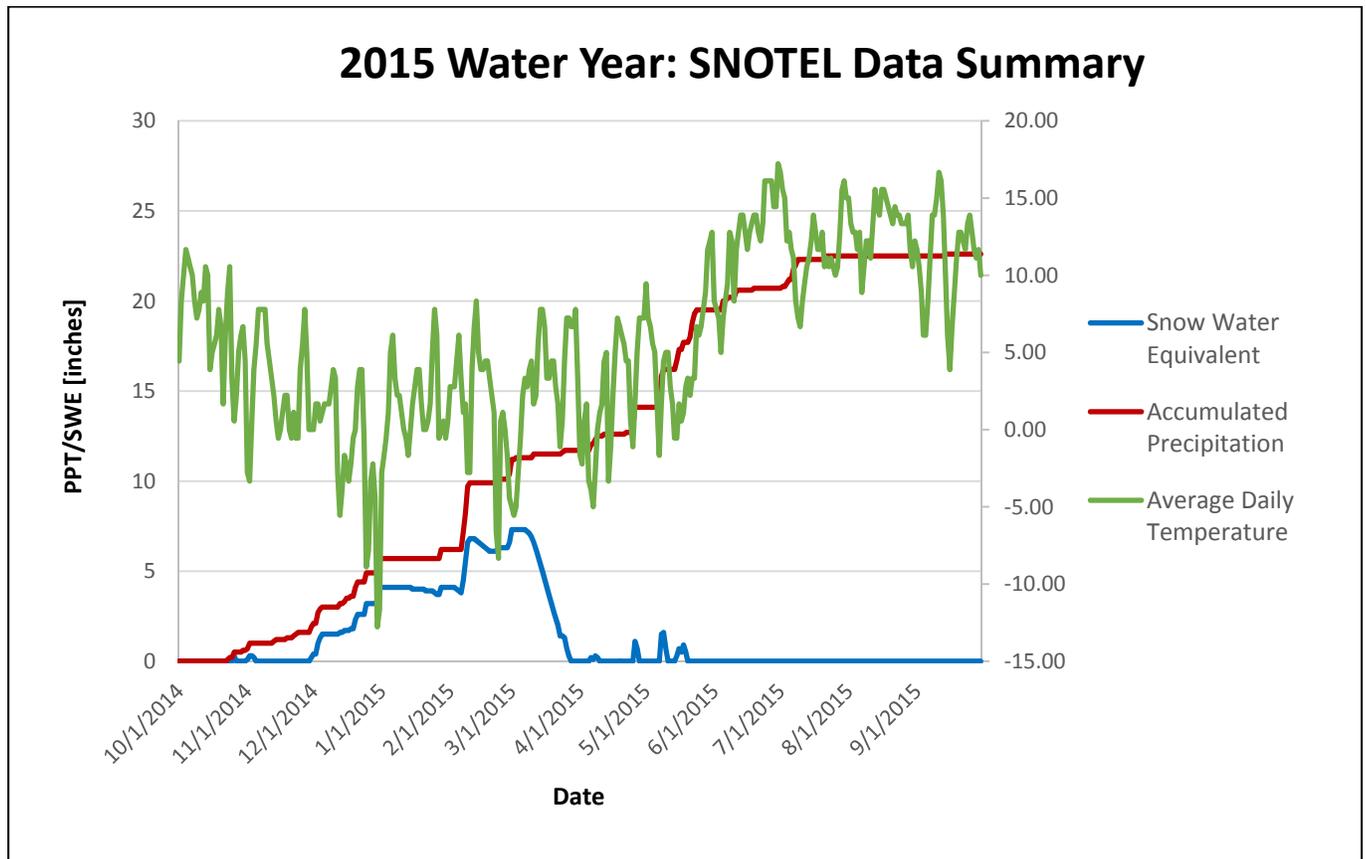
Figure 2-1 Approximate Location of Water Quality Sampling Sites



2.2 Precipitation Summary

Precipitation for the 2015 water year is shown in Figure 2.2. Data was taken from the National Resource Conservation Service, National Water and Climate Center website (<http://www.wcc.nrcs.usda.gov>). This graph represents accumulated precipitation and snow water content measured at SNOTEL Station 19L24S (“Heavenly Valley”), operated by the USDA Natural Resource Conservation Service. This station is located in the upper watershed of Heavenly Valley Creek near the current Sky Meadows monitoring station (43HVC-1A) at latitude 38° 56’ N, longitude 119° 54’ W, and elevation 8,850 feet.

Figure 2-2 SNOTEL Weather Graph for the Water Year 2015



2.3 Sampling Frequency and Analysis

A total of 99 stream samples were collected during the 2015 water year. Twenty-one samples were collected at Bijou Park Creek (43BPC-4) and Hidden Valley Creek (43HDVC-5). The extremely low to no flows in Heavenly Valley Creek at Property Line location (43HVC-3) and Below Patsy’s Chair (43HVC-2) resulted in only ten and nineteen total samples collected at each site, respectively. Water samples on Heavenly Valley Creek at Sky Meadows (43HVC-1A) were only collected during the fourth quarter of the 2015 water year, generating a total of three samples for this site. The new Lahontan Water Board Permit required the re-introduction of this site.

Twenty-one samples are comprised of monthly samples and an additional nine weekly samples collected during the spring runoff period. Only four samples were collected at the Upper Edgewood (43HVE-1) site, while a total of twenty-one samples were collected at Lower Edgewood (43HVE-2) due to seasonal low to no flows in the creek. The number of samples collected along the two Edgewood Creek sites varies because of low flows conditions and resort activities that prevent sampling. Seven storm samples were collected for each influent and effluent sample at the California Base Parking Area filter vault locations (43HVP-1A, 43HVP-1B, and 43HVP-2). Table 2-2 provides a summary of sampling and analysis for the 2015 water year.

Analyses for specific conductivity, turbidity, suspended sediment, nitrate/nitrite, total Kjeldahl nitrogen, total nitrogen, total phosphorus, soluble reactive phosphorus, and dissolved phosphorus were performed by High Sierra water Lab located near Truckee, California. Analyses for chloride were performed by Western Environmental Testing Laboratory (WET Lab) in Reno, Nevada. Additionally, WET Lab performed all constituent testing for the influent and effluent filter vault samples. Analytical results by station are provided in Appendix A and Appendix B.

Table 2-2 Summary of Sampling Analysis Conducted for the Water Year of 2015

Station ID	Station Name	# of Samples	Constituents Tested
43HVC-1A	Heavenly Creek at Sky Meadows	3	Full Suite
43HVC-2	Heavenly Creek Below Patsy's	19	Full Suite
43HVC-3	Heavenly Creek at Property Line	10	Full Suite
43BPC-4	Bijou Park Creek Below the California Parking Lot	21	Full Suite
43HDVC-5	Hidden Valley Creek	21	Full Suite
43HVE-1	Edgewood Creek Above Boulder Parking Lot	4	Full Suite, Specific Conductivity, SRP, & DP
43HVE-2	Edgewood Creek Below Boulder Parking Lot	21	Full Suite, Specific Conductivity, SRP, & DO
43HVP-1A	North Manhole Influent Pipe Into the Filter System	7	Full Suite, and Oil & Grease ²
43HVP-1B	South Manhole Influent Pipe into the Filter System	7	Full Suite, and Oil & Grease ²
43HVP-2	West Manhole Effluent Pipe Out Of The Filter System	7	Full Suite, and Oil & Grease ²

¹Full suite = Discharge, turbidity, suspended sediment, nitrate/nitrite, total Kjeldahl nitrogen, total nitrogen, total phosphorus, and chloride.

²Suspended sediment analysis was not performed on these samples.

2.4 Results and Discussion

2.4.1 Discharge

Stream flow was measured using a Marsh-McBimey meter at all of the stream sites except at Heavenly Creek Below Patsy's (43HVC-2) where flow was calculated from stage values in a Parshall Flume. Heavenly Creek monitoring locations at Below Patsy's (43HVC-2) and Property Line (43HVC-3) as well as the monitoring location at Hidden Valley Creek (43HDVC-5) exhibited peak discharge values near the end of May into early June. The values displayed for the Sky Meadows (43HVC-1A) monitoring location along Heavenly Creek reflect only the fourth quarter of the water year. The 2016 water year hydrology and monitoring effort at Sky Meadows (43HVC-1A) should align with the other two sampling sites along Heavenly Valley Creek. Limited samples (four) at the above Edgewood Creek monitoring location (43HVE-1) do not help estimate the peak discharge at this site. However, the Lower Edgewood Creek (43HVC-2) sampling site exhibited peak discharge values near the end of May. Peak discharge values for the Bijou Park Creek (43BPC-4) monitoring location where determined to occur towards the end of May. Each of the stream monitoring sites stream flow appeared to peak at different times throughout the spring runoff; however they all seem to peak near the end of May early June window. Limited snow pack, warmer temperatures, the lack of snowpack at lower elevations and smaller contributing watersheds are likely to be the cause for the earlier runoff spikes along Edgewood Creek and Bijou Park Creek. It should be noted that man-made snow at the resort affects the Heavenly Valley Creek watershed,

though stream runoff values peaked approximately a week later at the Hidden Valley Creek reference reach monitoring location.

The 2015 water year marked the fourth consecutive year of below average precipitation. Discharge peak values are well below the 2010 and 2011 peak values due to lack of precipitation (snow pack) over the past four winter seasons (water years).

Precipitation total values and snow water equivalent peak measurements for the 2015 water year were lower than those calculated for the 2014 water year. The precipitation total values show a reasonable decrease from the 2014 water year, however the snow water equivalent peak measurement displays a significant drop for the 2015 water year. Figure 2-3 represents the past ten water years of SNOTEL precipitation data. Figures 2-4, 2-5, 2-6 and 2-7 represent the hydrographs at each of the seven sampling stations and associated creeks.

Figure 2-3 SNOTEL Precipitation Graph for Water Years 2006-2015

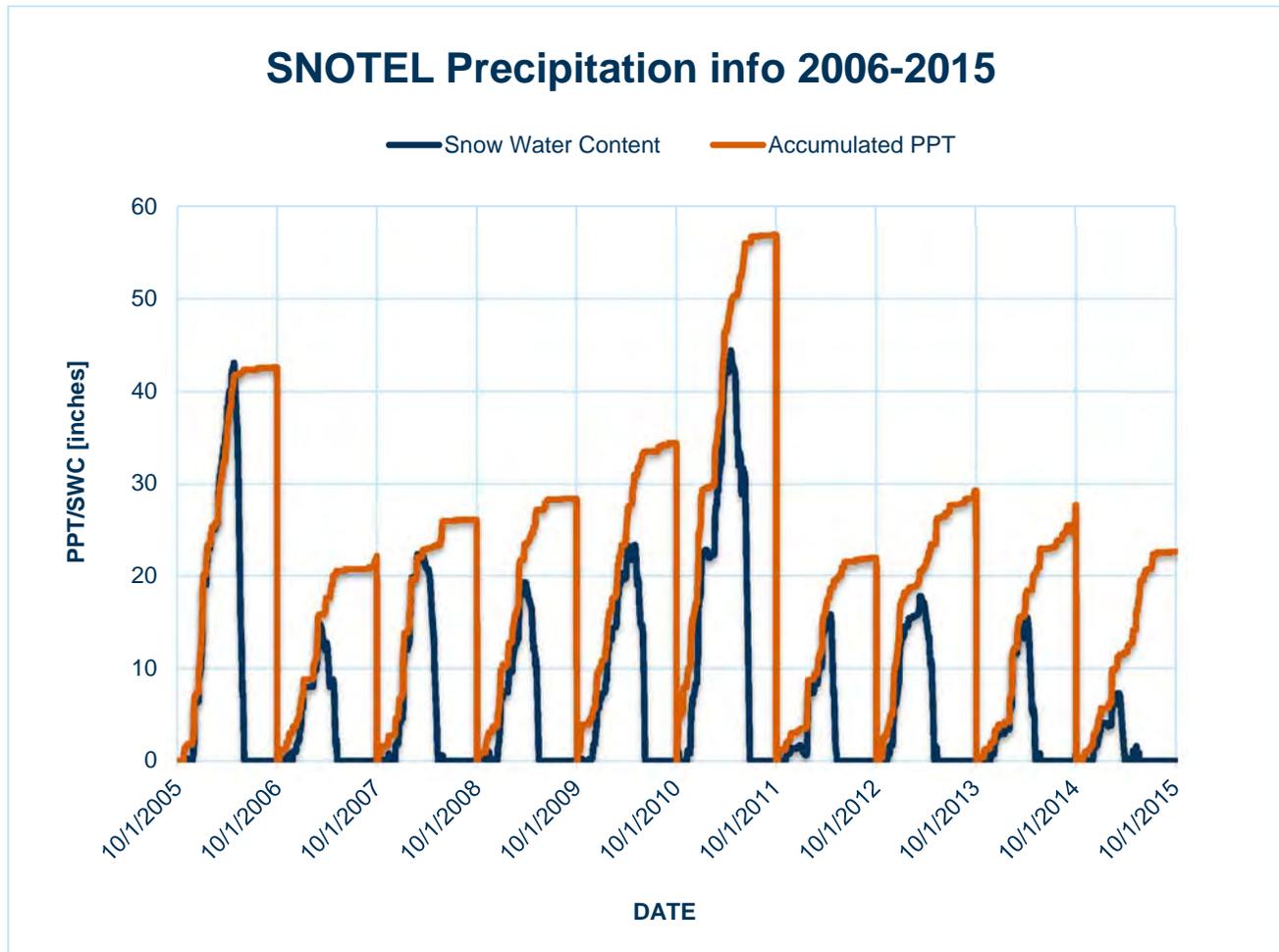


Figure 2-4 Hydrographs Representing Heavenly Valley Creek for the Water Year Ending in 2015

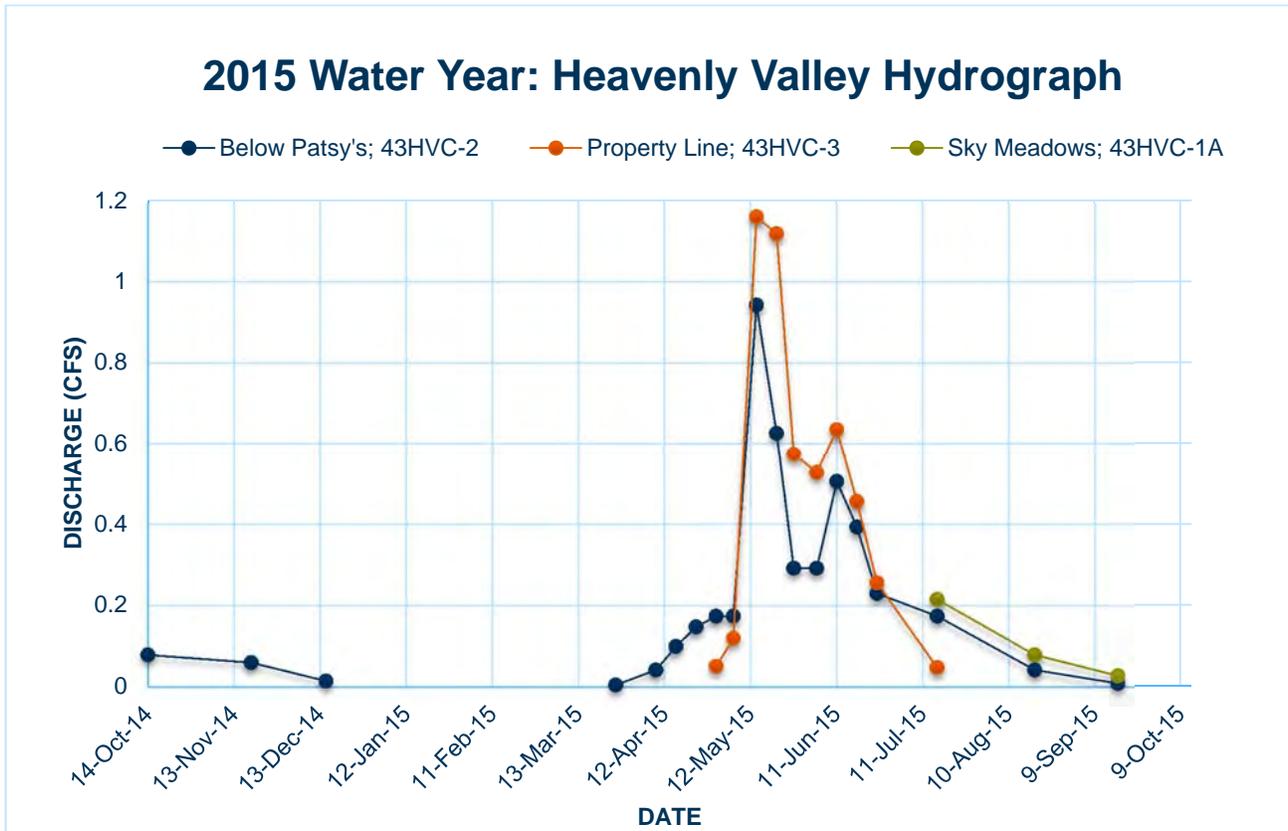


Figure 2-5 Hydrograph Representing Hidden Valley Creek for the Water Year Ending 2015

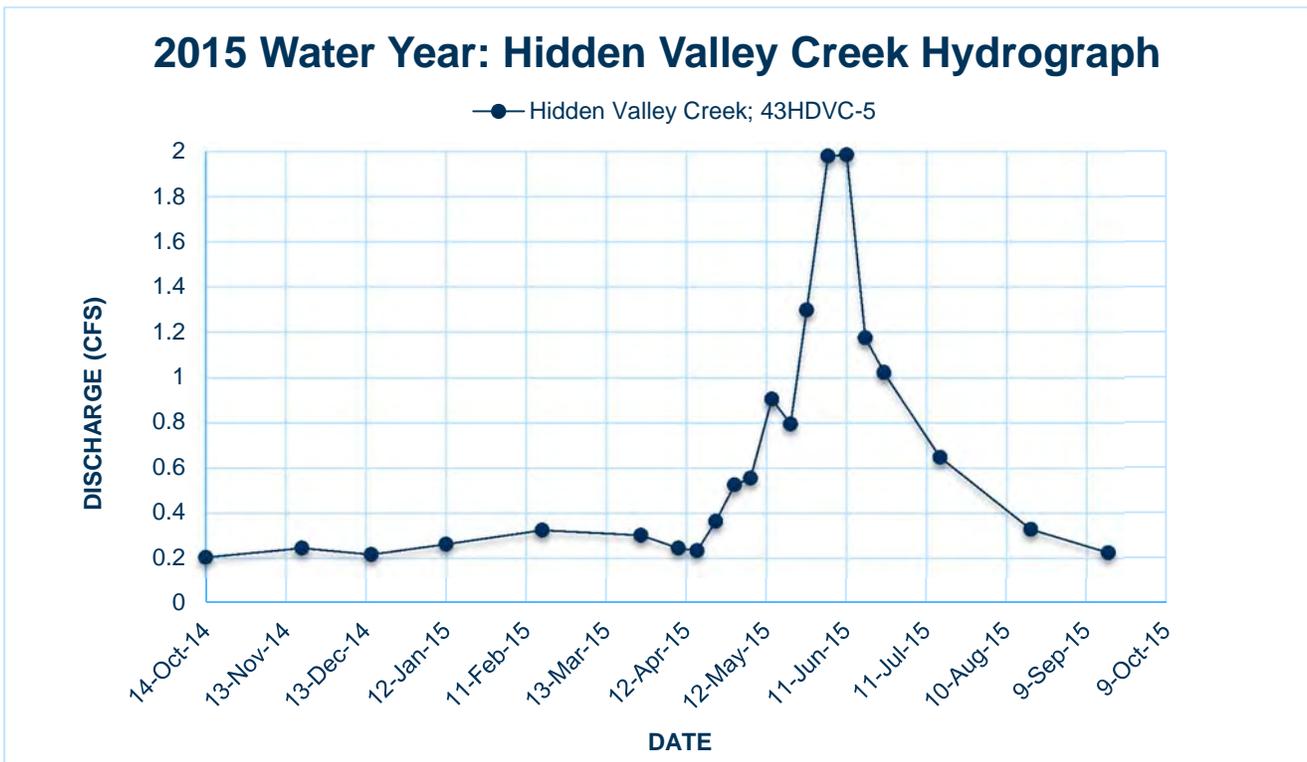


Figure 2-6 Hydrographs Representing Edgewood Creek for the Water Year Ending in 2015

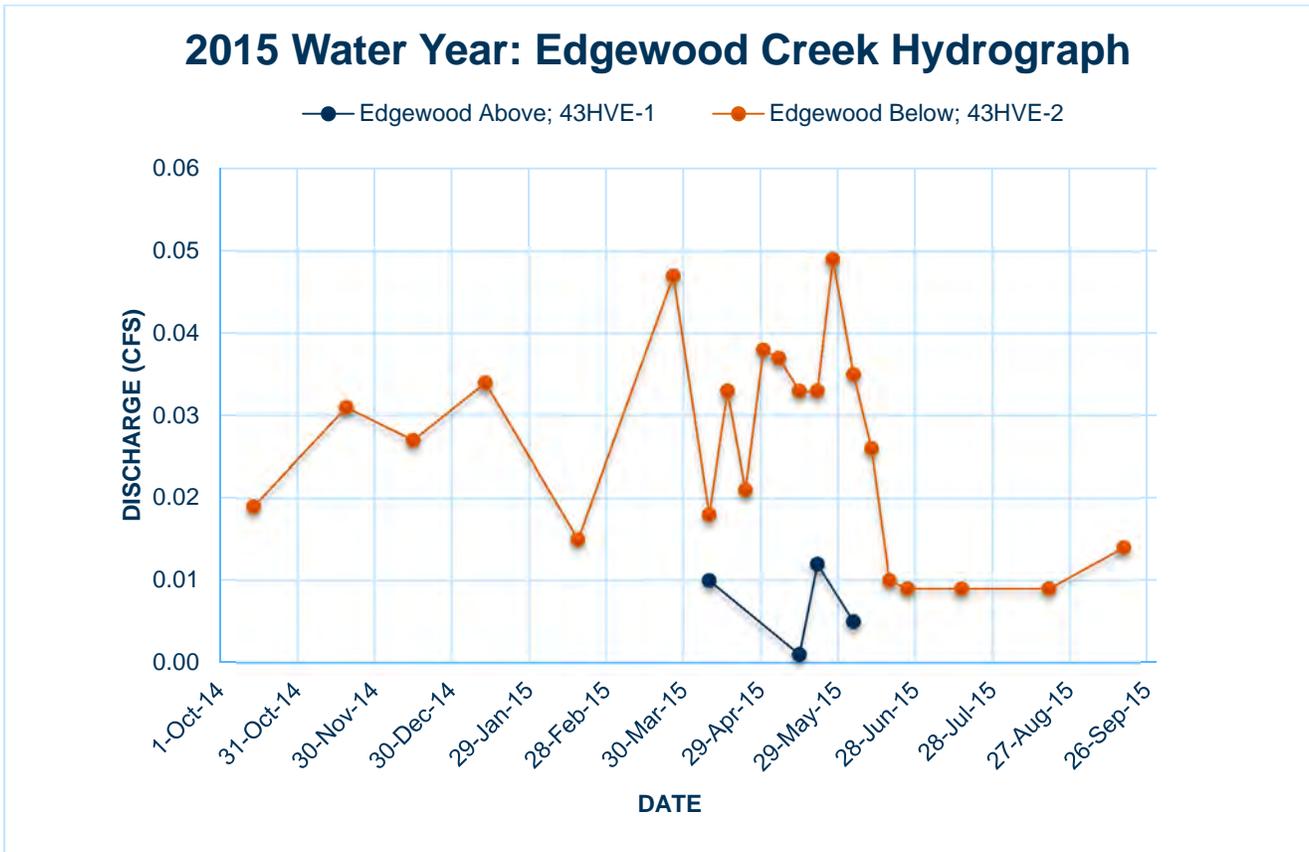
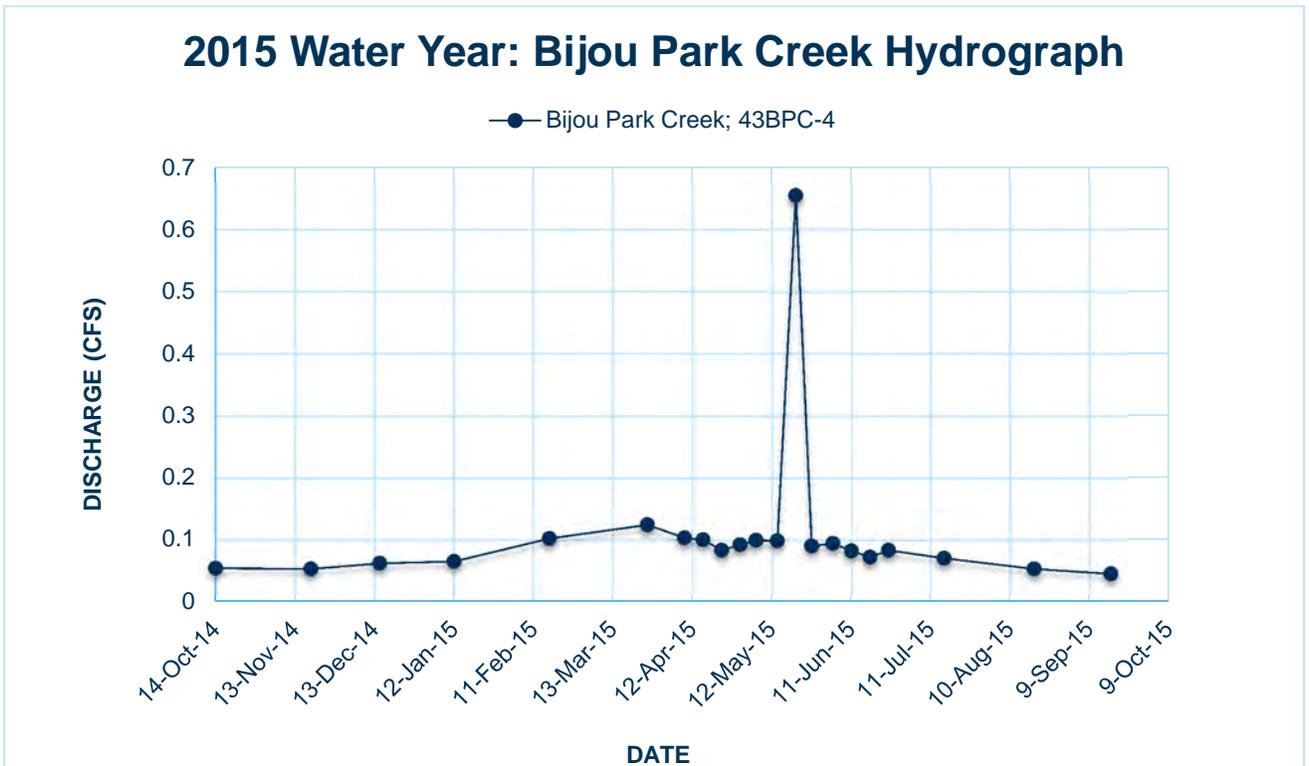


Figure 2-7 Hydrographs for Bijou Park Creek for the Water Year Ending in 2015



Early water year and winter month monitoring were infrequent due to low and/or no flows within the creeks. Upper Edgewood Creek monitoring data was not collected due to the lack of stream flow. In the past resort activities, which begin in December and continued to March, typically prevent sampling but without snow and manmade snowmaking the Boulder area and Lodge did not open in 2014/15. .

2.5 Annual Load Estimates

Table 2-3 presents the annual load values calculated from flow-weighted concentration data for total nitrogen, total phosphorus and suspended sediment at Heavenly Valley Creek at Property Line sampling location and at the Hidden Valley Creek baseline station from 2013 through the 2015 water year. Annual load values are calculated by weighing the number of days between sample collections and multiplying the weighted average times the discharge measurements collected in the field. This calculated value represents the weighted flow. Laboratory values for total nitrogen, total phosphorus and suspended sediment are multiplied and summed. The final unit conversion is applied and the annual loading values are reported in Table 2-3 and Table 2-4. The method used to calculate annual loading values is based on constituent concentrations, discharge and days between samples as discussed above. The methodology has been used in previously submitted annual reports and verified by Lahontan staff in the spring of 2010.

The Total Maximum Daily Load (TMDL) for sediment at Heavenly Creek is a five-year rolling average. The calculated 5-year rolling average from 2011 through the 2015 water year is shown in Table 2-4 and equates to a total of 24.4 tons/year along Heavenly Valley Creek. This is approximately 14 tons/year less than that calculated in the 2014 water year. It should be noted that only 10 stream flow values were collected in the 2015 water year due to the fact that on a number of sampling occasions the stream was near dry or dry preventing flow measurements. The Lahontan permit TMDL standard along Heavenly Valley Creek for suspended sediment is 58 tons/year. For comparison, the suspended sediment rolling average for Hidden Valley Creek was also calculated to be 14.2 tons/year. The decrease in constituent loading (total nitrogen, total phosphorus and suspended sediment) correlates to the decrease in precipitation and stream flows both of which were extremely low for the 2015 water year.

Table 2-3 Annual Load Values at Heavenly Valley Creek (Property Line 43HVC-3) and Hidden Valley Creek (43HDVC-5).

Year	Discharge (m ³ /yr)	Total Nitrogen (kg/yr)	Total Phosphorus (kg/yr)	Suspended Sediment (tons/yr)
Property Line (43HVC-3)				
2013	382,367	37	5	1.0
2014	149,688	19	3	0.24
2015	92,131	8	2	0.16
Hidden Valley Creek (43HDVC-5)				
2013	873,425	102	21	3.5
2014	594,447	93	15	1.5
2015	412,713	48	10	1.4

Table 2-4 Five Year Suspended Sediment Rolling Average for Heavenly Valley Creek (Property Line 43HVC-3) and Hidden Valley Creek (43HDVC-5) Stations.

Water Year	Property Line (HV-C3) Suspended Sediment (Tons/Year)	Hidden Valley Creek (HV-H5) Suspended Sediment (Tons/Year)
2009	0.5	1.9
2010 ¹	70.5	18.6
2011	118.6	60.9
2012	1.7	3.4
2013	1.0	3.5
2014	0.24	1.5
2015	0.16	1.4
5 Year Rolling Average	24.4	14.2

¹ The 2010 water year discharge values were revisited and changed the annual load calculations.

2.6 Heavenly Valley and Hidden Valley Creeks

2.6.1 Summary Statistics for Water Quality Constituents: Water Year 2015

Statistical summaries for both Heavenly Valley and Hidden Valley Creek for water year 2015 are shown in Tables 2-5 through 2-8. The raw data and constituent data are provided in Appendix A. At Sky Meadows (43HVC-1A) the total phosphorus and chloride annual average values exceeded the state standard for the three month record collected. Constituent data collected at the Sky Meadows site (43HVC-1A) on July 16th showed the highest annual values for turbidity, total nitrogen, total phosphorus and chloride representative of the first sample collected at this site along Heavenly Valley Creek. Additionally, total phosphorus and chloride annual average values were also exceeded at Heavenly Valley Creek samples sites Below Patsy’s Chair (43HVC-2) and Property Line (43HVC-3). Annual average standards along Heavenly Valley Creek for total phosphorus and chloride were exceeded at the reference reach along Hidden Valley Creek (43HDVC-5). The twenty-one samples collected reflect monthly sampling in addition to nine weeks of runoff sampling.

All four sampling sites (43HVC-1A, 43HVC-2, 43HVC-3 and 43HDVC-5) had total suspended sediment (TSS) values below the 90th percentile state standard value of 60 mg/L. The two highest daily peak TSS readings were recorded at Below Patsy’s Chair (17.2 mg/L at 43HVC-2) on Heavenly Valley Creek and at the Hidden Valley Creek sampling site (13.0 mg/L at 43HDVC-5). Both of these TSS peaks are well below the annual state standard for the water year 2015. These values compare similarly with low water/precipitation years. Decreased precipitation and stream flow somewhat correlate with decreased TSS measurements. As stream flows increase, suspended sediment along the stream banks is mobilized and transported. Additionally, higher flows tend to alter the stream channel and mobilize sediment that had otherwise been trapped behind woody debris and fallen trees. As flows steadily decrease during extended periods of drought; sediment and debris are trapped above the water line and during peak storm events these materials become mobilized causing a rise in suspended sediment readings.

The California Lahontan state annual standard for total nitrogen (0.19 mg/L) is the sum of the total nitrate, total nitrite and total Kjeldahl nitrogen. The annual total nitrogen average at Sky Meadows (43-HVC-1A) is 0.133 mg/L, 0.157 mg/L at the Below Pasty’s site (43HVC-2) and 0.102 mg/L at Property Line (43HVC-3) demonstrating that the annual state average was not exceeded on Heavenly Valley Creek. The Hidden Valley Creek reference site (43HDVC-5) annual average for total nitrogen is 0.115 mg/L below the annual state standard. These results suggest that resort operations have a less than significant impact on total nitrogen concentrations during low precipitation years.

Annual averages for total phosphorus were required to be below the 0.015 mg/L Lahontan state standard for Heavenly Valley Creek and Hidden Valley Creek. All four sampling locations were above the state standard (43HVC-1A, 43HVC-2, 43HVC-3 and 43HDVC-5). Average values for the four stations were as follows: Sky

Meadows (43HVC-1A) 0.018 mg/L, Below Patsy's Chair (43HVC-2) 0.022 mg/L, Property Line (43HVC-3) 0.022 mg/L and Hidden Valley Creek (43HDVC-5) 0.025 mg/L. The reference reach had the highest annual average value for total phosphorus, among the four sites listed above, suggesting that during low precipitation years resort activities along Heavenly Valley Creek have a less than significant impact on total phosphorus levels.

Annual average chloride values along Heavenly Valley Creek at Sky Meadows (43HVC-1A), Below Patsy's Chair (43HVC-2) and Property Line (43HVC-3) locations were exceeded for the 2015 water year. All three daily samples collected at Sky Meadows site (43HVC-1A) exceeded the annual average of 0.15 mg/L. Likewise all nineteen daily samples collected at Below Patsy's Chair (43HVC-2) and nine of the ten daily samples collected at Property Line (43HVC-3) exceeded the annual average for chloride. One daily sample did not exceed the annual average for unknown reasons and was determined to be non-detectable (June 25th). Nineteen of the twenty-one collected samples at Hidden Valley Creek (43HDVC-5) also exceeded the annual average for chloride. Chloride readings at all of these sites, with the exception of Sky Meadows (43HVC-1A), have been problematic and exceeding the state standard over the past decade. Sky Meadows has not been sampled regularly since 2006. While chloride readings were above the state standard at Hidden Valley Creek (43HDVC-5), they are relatively lower than values collected along Heavenly Valley Creek (43HVC-1A, 43HVC-2 and 43HVC-3). The exact cause for these increased chloride readings are not known. Application of salt on the terrain parks within the Heavenly Valley watershed may be one plausible cause; however, this doesn't explain the higher readings of the annual average at the undisturbed watershed reference site along Hidden Valley Creek (43HDVC-5).

Following the implementation of the Amended Monitoring and Reporting Program in May 2011, monitoring constituent test requirements for specific conductivity, soluble reactive phosphorus (SRP) and total iron were removed from the daily sampling regime along the Heavenly Valley Creek sites (43HVC-1A, 43HVC-2 and 43HVC-3) as well as the Hidden Valley Creek site (43HDVC-5).

Table 2-5 Heavenly Valley Creek Sky Meadows 2015 Water Year Statistical Summary

Exceedances of the California Lake Tahoe Receiving Water Limits – Sky Meadows (43HVC-1A)						
	Q (cfs)	Turbidity (NTU)	Total Suspended Sediment (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride (mg/L)
CA State Standard	-	-	60	0.19	0.015	0.15
# Samples	3	3	3	3	3	3
Min	0.028	0.62	1.60	0.105	0.018	0.78
Max	0.215	1.62	2.80	0.161	0.019	0.86
Annual Average	0.107	1.083	2.13	0.133	0.018	0.81
90 th Percentile ¹	-	-	-	-	-	-

¹The 90th Percentile values could not be calculated due to the limited number of samples collected (three).

Table 2-6 Heavenly Valley Creek Below Patsy's Chair 2015 Water Year Statistical Summary

Exceedances of the California Lake Tahoe Receiving Water Limits – Below Patsy's Chair (43HVC-2)						
	Q (cfs)	Turbidity (NTU)	Total Suspended Sediment (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride (mg/L)
CA State Standard		-	60	0.19	0.015	0.15
# Samples	19	19	19	19	19	19
Min	0.005	0.36	1.00	0.050	0.012	0.880
Max	0.942	11.8	17.2	0.312	0.065	4.20
Annual Average	0.226	1.94	3.46	0.157	0.022	1.62
90 th Percentile	-	-	6.40	-	-	-

Table 2-7 Heavenly Valley Creek Property Line 2015 Water Year Statistical Summary

Exceedances of the California Lake Tahoe Receiving Water Limits – Property Line (43HVC-3)						
	Q (cfs)	Turbidity (NTU)	Total Suspended Sediment (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride (mg/L)
CA State Standard	-	-	60	0.19	0.015	0.15
# Samples	10	10	10	10	10	10
Min	0.048	0.28	0.80	0.052	0.013	0.96
Max	1.161	1.65	6.00	0.212	0.034	2.00
Annual Average	0.495	0.70	1.92	0.102	0.022	1.25
90 th Percentile	-	-	5.60	-	-	-

Table 2-8 Hidden Valley Creek (Lower Hidden) 2015 Water Year Statistical Summary

Exceedances of the Lake Tahoe Receiving Water Limits for Trout Creek - Hidden Valley Creek (43HDVC-5)						
	Q (cfs)	Turbidity (NTU)	Total Suspended Sediment (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride (mg/L)
CA State Standard		20	60	0.19	0.015	0.15
# Samples	21	21	21	21	21	21
Min	0.204	0.28	0.80	0.055	0.018	0.15
Max	1.986	4.25	13.00	0.225	0.048	0.38
Annual Average	0.659	1.20	3.11	0.115	0.025	0.24
90 th Percentile	-	-	5.80	-	-	-

2.7 Bijou Park Creek and California Park Lot Effluent

2.7.1 Summary Statistics for Water Quality Constituents: Water Year 2015

Raw data for both the Bijou Park Creek (Below California Parking 43BPC-4) and Effluent of the California Base Parking Lot (43HVP-2) can be found in Appendix A and B. Table 2-9 summarizes the Lahontan State Standards that have been in place in the past. Current state standards at the Bijou Park Creek sampling site (43BPC-4) fall under the Lake Tahoe Receiving Water Limits for: total dissolved solids (TDS), total nitrogen, total phosphorus and chloride. The effluent sampling location from the parking lot filter system (43HVP-2) is governed by the maximum not to exceed concentrations for discharge to surface water. These standards took effect in May 2011, when the Amended Monitoring and Reporting Program was finalized. Table 2-10 shows the water quality analysis of the Bijou Park Creek sampling site for the water year 2015.

Table 2-9 Summary of the Sampling Analysis Limits for the 2015 Water Year

Constituents	Units	Maximum Concentration for Discharge to Land Treatment ¹	Maximum Concentration for Discharge to Surface Water ²	Lake Tahoe Receiving Water Limits ³
Total Dissolved Solids	mg/L	-	-	60
Total Nitrogen	mg/L	5.0	0.5	0.15
Total Phosphorus	mg/L	1.0	0.1	0.008
Chloride	mg/L	-	-	3.0

¹The effluent limits for discharge to land were effective for discharge from the California Base area on December 31, 2004.

²The effluent limits not to exceed for discharge to surface waters were effective for discharge from the California Base area beginning November 30, 2008.

³The amended monitoring and reporting program, effective May 30, 2011, for the 2012 Water Year and beyond required monitoring of the outfall of the filter vault system. Bijou Creek effluent limits to discharge moved to Lake Tahoe receiving water limits and the outfall to the filter vaults effluent limits fall under the maximum concentration for discharge to surface waters.

Table 2-10 Bijou Park Creek 2015 Water Year Statistical Summary

Exceedances of the California Lake Tahoe Receiving Water Limits for Bijou Park Creek - Below the California Parking Lot (43BPC-4)						
	Q (cfs)	Turbidity (NTU)	Total Suspended Sediment (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride (mg/L)
CA State Standard		-	60	0.15	0.008	3.0
# Samples	21	21	21	21	21	21
Min	0.046	6.47	2.4	0.365	0.048	22
Max	0.655	66.3	70.1	0.984	0.237	58
Annual Average	0.109	12.43	7.92	<i>0.541</i>	<i>0.070</i>	<i>45.9</i>

The annual average for total suspended sediment of 7.92 mg/L was well below the state standard of 60 mg/L at Bijou Park Creek (43BPC-4). The maximum daily reading for total suspended sediment was 70.1 mg/L recorded on May 21st, 2015. With the exception of the maximum daily reading, all other twenty daily samples collected during the 2015 water year were well below the state standard limit. As stated above with other creeks, suspended sediment values typically correlate with precipitation and increased flow values transporting sediment.

The annual average for total nitrogen at Bijou Park Creek (43BPC-4) of 0.541 mg/L, was above the state standard of 0.15 mg/L. All twenty-one of the daily samples collected were above the state standard. Since the state standard for total nitrogen was lowered from 0.50 mg/L to 0.15 mg/L, compliance within the state

standard has not been met nor have the sampling results been close to meeting the standard. The past three water year's total nitrogen values (all low precipitation / drought years) are relatively similar annual average values (2012 – 0.61 mg/L, 2013 – 0.74 mg/L and 2014 – 0.54 mg/L). Table 2-11 shows the past eight years of total annual average nitrogen data for Bijou Park Creek (43BPC-4). The general trend regarding the average is in a downward direction; however, this trend may also be associated with the decreased flow values measured in the creek over the past four water years. The annual average flow values shown do not reflect the annual precipitation totals. For example, the 2010 water year was wetter than the 2015 water year yet the annual average flow values are fairly close. This further cements the notion that calculated weighted average flow values shown in Tables 2-3 and 2-4 for the annual load estimates (Section 2.5) are more valid than the straight average calculation exclusive of flow.

Table 2-11 Total Nitrogen Annual Average Values versus Flow at Bijou Park Creek (43BPC-4)

Water Year	Annual Average Total Nitrogen Values – (mg/L)	Annual Average Flows – (cfs)
2007	1.47	0.26
2008	1.88	0.33
2009	0.88	0.20
2010	0.73	0.15
2011	0.66	0.46
2012	0.61	0.22
2013	0.74	0.22
2014	0.54	0.14
2015	0.54	0.11

The annual average for total phosphorus at Bijou Park Creek (43BPC-4) for the water year 2015 was 0.070 mg/L. This annual average is well above the state receiving water standard of 0.008 mg/L. The lower receiving water standard is more than eight times less than the recorded annual average. Total phosphorus annual averages were also exceeded along Heavenly Valley Creek (43HVC-1A, 43HVC-2 and 43HVC-3) as well as the reference reach along Hidden Valley Creek (43HDVC-5) for the water year 2015. The water year 2015 shows an increase in the total phosphorus annual average value (0.070 mg/L) compared to that calculated for the water year 2014 (0.063 mg/L) but still remains less than the annual average value for the 2013 water year (0.105 mg/L). Total phosphorus and total nitrogen constituent readings can vary with vegetation uptake, decay and removal along with changes in the hydrologic cycle (fluctuations in precipitation and flows).

All twenty-one daily samples collected, exceeded the annual state average for chloride at Bijou Park Creek (43BPC-4) during the water year of 2015. The 2015 annual average for chloride was 45.9 mg/L, well above the state standard of 3.0 mg/L. While not as high as the Bijou Park Creek readings, the annual average for chloride was exceeded at the reference reach at Hidden Valley Creek (43HDVC-5, 0.24 mg/L). The difference is that the exceedance value at Bijou Park Creek is more than fifteen times higher than that of the limit, whereas the reference reach (43HDVC-5) along Hidden Valley Creek is nearly double the state annual average limit. Chloride readings have been problematic for the past decade, as Heavenly and the City of South Lake Tahoe salt and cinder the roadway during storm events and times where the temperature is below freezing and icing can be a public safety concern. Residual chloride is known to accumulate in the environment and removal mechanisms/processes are not readily available or affordable.

With the signing of the Amended Monitoring and Reporting Program in May 2011, monitoring and constituent test requirements for specific conductivity, soluble reactive phosphorus (SRP) total iron, total lead, dissolved ammonia and total petroleum hydrocarbons (TPH) were removed from the daily sampling regime at the Bijou Park Creek site below the California Parking Lot (43BPC-4).

The signed Amended Monitoring and Reporting Program also enforced the submittal of the California Parking Lot filter vault effluent results. The filter vault system collects storm and snow melt runoff from both the upper and lower parking lots. Table 2-12 provides a summary of the results for the water year 2015. Seven storm samples were collected during the 2015 water year. The amended monitoring program requires ten samples over the course of the water year; however, the lack of storms and timing of storm event prevented additional sample collections. See Appendix B, for the storm filter sampling results (43HVP-1A, 43HVP-1B and 43HVP-2).

At the effluent sampling location (outlet 43HVP-2), five out of the seven samples collected for turbidity exceeded the not-to-exceed limit of 20 NTUs. Six out of seven samples collected exceeded the not-to-exceed limit for total nitrogen (0.50 mg/L); while four of the seven samples collected exceeded the total phosphorus not-to-exceed state limit (0.10 mg/L). Only one oil and grease sample exceeded the state not-to-exceed limit (2.0 mg/L) for the water year ending in 2015. These storm readings all reflect the first flush effect collecting and transporting constituents into and through the filter system.

Since installation, maintenance of the filter system has been problematic and limited (2008). Autumn 2011, marked the first time that the sacrificial filters (14 total) were replaced. Since 2011, the sacrificial filters have been replaced annually due to sediment loading. In September 2012, the sacrificial filters as well as the filters in the Wildwood vaults were replaced. A different phosphorus absorbent media was used in all fourteen sacrificial filters that were replaced in September 2013. The media was changed from Zeolite, Perlite and Granular Activated Carbon media (ZPG™) to a PhosphoSorb™ absorbent media in hopes to reduce total phosphorus exceedances. In addition, 176 filters were replaced in the main chambers. These additional filters were not installed with the newer media due to the additional associated cost. In June 2014, an additional 221 cartridges were replaced. Fourteen of the 221, included the PhosphoSorb™ media and replaced in the sacrificial filters. The remaining 207 did not include the newer media and replaced both the upstream and downstream parallel large vaults and filter bays. The filter installation in June completed the first full cycle of filter replacement since initial installation. The 2015 filter replacement cycle occurred on October 15th and 16th and included 42 filters. Fourteen PhosphoSorb™ media filters were replaced at the sacrificial vaults, while 28 cartridges were replaced at the Wildwood vaults.

Comparing the water quality results with the annual PhosphoSorb™ media and filter replacement show slight improvements with regards to the minimum tested constituent values; however total phosphorus and total nitrogen levels are still above the exceedance limits. Continued annual maintenance and filter replacement appear to show some water quality improvement as exceedance and maximum constituent values (spikes) have not risen significantly over time. Chloride and turbidity results from both the 2014 and 2015 water year remain high.

Table 2-12 California Base Storm Filter Effluent 2015 Water Year Statistical Summary

Exceedances of the California Maximum Concentration for Discharge to Surface Waters Limits for the Storm Filter Effluent Site (43HVP-2)					
	Turbidity (NTU)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride (mg/L)	Oil & Grease (mg/L)
CA State Standard	20	0.5	0.10	-	2.0
# Samples	7	7	7	7	7
Min	24	0.47	0.03	4	ND
Max	220	4.4	0.30	57	3.9
% of the time in Exceedance	71%	86%	57%	-	14%

2.8 Edgewood Creek

Edgewood Creek is located in Nevada, outside of Lahontan's jurisdiction, and included in this report for compliance with the Master Plan Amendment that are within TRPA's basin jurisdiction. The two Edgewood

Creek locations are sampled for compliance with the Nevada Department of Environmental Protection (NDEP) standards. Data are summarized in Tables 2-13 and 2-14, and the raw data tables are referenced in Appendix A.

Out of the four daily samples collected at the Upper Edgewood Creek sampling site (43HVE-1), no exceedances occurred for turbidity, suspended sediment, total nitrogen and total phosphorus.

Two daily values for turbidity exceeded the NDEP state standard for the Lower Edgewood Creek sampling site below the Boulder Parking Lot (43HVE-2). Exceedances at Lower Edgewood Creek site (43HVE-2) occurred on June 25th and August 19th, 2015. The daily turbidity readings were 10.9 NTUs and 11.6 NTUs, respectively. The exact cause of the turbidity spikes are not known. Exceedances for suspended sediment, total nitrogen and total phosphorus were not recorded for this site.

Table 2-13 Edgewood Creek Above the Boulder Parking Lot 2015 Water Year Statistical Summary

Exceedances of the State (NDEP) Standards for the Edgewood Creek Site – Above the Boulder Parking Lot (43HVE-1)								
	Q (cfs)	Specific Conductivity (mmhos)	Turbidity (NTU)	Suspended Sediment (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	SRP (mg/L)	DOP (mg/L)
NDEP Standards ¹	-	-	10.0	25	0.6 ²	0.10	-	-
# Samples	4	4	4	4	4	4	4	4
Min	0.001	40.40	0.77	2.40	0.057	0.028	0.009	0.019
Max	0.012	72.40	1.82	7.60	0.277	0.059	0.012	0.024
Annual Average	0.007	57.15	1.28	5.30	0.176	0.042	0.010	0.021

¹NDEP Standards are from the Nevada Administrative Code (NAC) Chapter 445A.1915. All listed numbers are standards for single values no greater than a given parameter unless otherwise noted
²Annual Average

Table 2-14 Edgewood Creek Below the Boulder Parking Lot 2015 Water Year Statistical Summary

Exceedances of the State (NDEP) Standards for the Edgewood Creek Site – Below the Boulder Parking Lot (43HVE-2)								
	Q (cfs)	Specific Conductivity (mmhos)	Turbidity (NTU)	Suspended Sediment (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	SRP (mg/L)	DOP (mg/L)
NDEP Standards ¹	-	-	10.0	25	0.6 ²	0.10	-	-
# Samples	21	21	21	21	21	21	21	21
Min	0.009	134.7	0.57	1.20	0.099	0.016	0.002	0.012
Max	0.049	153.6	11.6	18.0	0.472	0.068	0.010	0.030
Annual Average	0.026	142.76	2.48	3.75	0.208	0.025	0.005	0.017

¹NDEP Standards are from the Nevada Administrative Code (NAC) Chapter 445A.1915. All listed numbers are standards for single values no greater than a given parameter unless otherwise noted
²Annual Average

2.9 Conclusions and Recommendations

The 2015 water year marks the four consecutive below average precipitation water year. The 2015 water year compares similarly to the 2007 and 2012 water year in terms of precipitation totals but is significantly lower in term of water content (amount of water held within the snow pack) dating back to the 2005 water year. Figure

2-3 presents a great comparison for the amount of water content and precipitation totals since 2005. Annual noncompliance values are typically less in low water years than in higher precipitation and increased stream flow seasons. Constituent values in noncompliance are not solely due to mountain operations associated with the resort activities as values at the base line reference station also exceeded annual averages. The following sections include a summary of the monitoring program and the 2015 finding for each creek and applicable recommendations.

2.9.1 Heavenly Valley Creek

Annual average values for both total phosphorus and chloride were exceeded at all three sampling locations along Heavenly Valley Creek (43HVC-1A, 43HVC-2 and 43HVC-3). These two annual average constituent values were also exceeded for the 2011, 2012, 2013 and 2014 water years along Heavenly Valley Creek at the Below Patsy's Chair (43HVC-2) and Property Line (43HVC-3) sampling sites. Total phosphorus and chloride annual average constituent values were exceeded at the reference site along Hidden Creek (43HDVC-5) over the past four water years as well. Resort operations and development within the watershed are not solely responsible for these higher readings along Heavenly Valley Creek as evidenced by the increased readings at the reference site.

Suspended sediment Total Maximum Daily Load (TMDL) weighted annual average values have been calculated since 2001 and the five year rolling average has been below the limit since 2005. Low precipitation and runoff levels have been linked to these lower suspended sediment totals. Additional resources (BMPs), increased employee awareness and on mountain improvements can also be linked to this value being in compliance. While total suspended sediment values are in compliance for Heavenly Valley Creek, other metrics such as benthic macroinvertebrate (BMI) and stream condition inventory results (Chapter 5) will need to show improvement before possible discussion and potential (TMDL) de-listing of the Heavenly Valley Creek were to occur.

2.9.2 Bijou Park Creek / California Parking Lot Effluent

Since the state standards along Bijou Park Creek were lowered to the Lake Tahoe receiving water limits, the annual state standard values collected at the monitoring location have not been met for total nitrogen, total phosphorus and chloride. The amended monitoring and reporting program in 2011 lowered the standards by nearly a factor of ten for these three constituents. As discussed above, total phosphorus and chloride levels were also exceeded at the reference reach along Hidden Valley Creek (43HDVC-5); however, the Bijou Park Creek (43BPC-4) exceedances were well above the state standards.

Chloride readings continue to be problematic at these two sites as well as the other California stream monitoring locations. In the past, Heavenly Mountain Ski Resort (Heavenly) has purchased different deicer mixtures for roadway application. However, the existing spreading equipment and vehicle were not equipped to handle this denser material and Heavenly ended up applying more deicer to the roadways resulting in a "dirty" look as the applied material fell out in clumps. Heavenly reverted back to the older mixture for the 2014/2015 winters season; however new equipment and vehicular improvements have allowed Heavenly to switch to a Washoe Sand deicer mixture with a five-to-one cinder to salt ratio for the 2015/2016 winter season. As a benefit to their guests, Heavenly continues to apply deicer to the roadways leading to the California parking lot providing guests a safer means during icy travel conditions. Further discussion on this issue can be found in Chapter 7.

The 2015 water year marks the fourth year that effluent results from the California Parking Lot filter vault system were reported to the State Water Board. All seven storm samples collected had constituent results that exceeded the not-to-exceed state standard. Turbidity, total phosphorus, total nitrogen and oil and grease values each were exceeded once or more for the seven samples collected. Chloride levels were exceeded for each sample collected with the annual average chloride readings calculated at 23.6 mg/L (almost half of the annual average limit at Bijou Park Creek located downstream 45.9 mg/L). The filter outlet annual average for chloride is lower than the Bijou Park Creek annual average; however there is a larger cumulative watershed and inputs at Bijou Park Creek. There is not a state standard exceedance limit for chloride at the filter vault

outlet monitoring location (43HVP-2). The Water Board language states that the metric for exceedance is 10% above background levels; however there is not an upstream sampling location to determine this value.

As mentioned in last year's annual report, the 221 filters replaced in 2014 marked the first time that all of the original filters had been replaced since initial installation in 2008. Continuing with filter maintenance and replacement schedule an additional 42 filters were replaced in 2015. Pacific Stormwater Solution's vault inspection report is included in Appendix D. The implementation and filter replacement schedule has prioritized the need for Heavenly to spend maintenance dollars on the system. The schedule prioritized filter replacement ensuring that over a four year period Heavenly will replace every filter within the system while helping to spread out the filter replacement costs over time. The sacrificial filters replaced in 2015 included the newer Phosphosorb™ media. The media and filter data show a small improvement with regards to total phosphorus exceedances; though at this time there is not a filter media that exists specifically targeting the reduction of chloride levels. The 2015 water year marks the second year of data collected using the new media. Water quality results with the use of this new media have limited the total phosphorus exceedance spikes; however, they are still exceedances. The peak exceedance values at the outlet monitoring location (43HVP-2) were similar to those reported in 2014 with the exception being chloride. Chloride storm samples were well below the 2014 values and are likely attributed to less deicer used on the parking lot associated with the lack of storms, snow fall and cold temperatures.

Heavenly continues to be proactive in attempting to limit discharge exceedances by replacing cartridges, maintaining the system, updating sampling equipment and trying new media. The new Lahontan permit required that Heavenly submit a feasibility plan in the fall of 2015 to address deicer use, chloride spikes and Bijou Park Creek (43BPC-4). Additional monitoring, and potential vault improvements will be collected and reviewed in 2016. Results from these additional studies required by the feasibility study will be incorporated into the comprehensive report next year as well as implemented to help limit future constituent exceedance discharges.

2.9.3 Edgewood Creek

Only four samples were collected at the Edgewood Creek site above the Boulder parking lot (43HVE-1); while twenty-one samples were collected downstream the lower Edgewood Creek site (43HVE-2). The discrepancy between the total samples collected results from the lack of water/flows at the Upper Edgewood Creek sampling site. Typically resort activities (snow making and grooming) limit winter sampling; however the lack of snow and no additional snow making prevented Heavenly from opening Boulder Lodge area for the 2014/2015 ski season. The lack of samples at the upper site (43HVE-1) do not complete the runoff hydrograph for the 2015 water year. Additional samples were collected at the lower site (43HVE-2), located at a lower elevation in the water shed, completing the 2015 runoff hydrograph. No documented daily exceedances occurred at the Upper Edgewood Creek sampling site (43HVE-1) for the limited samples collected. NDEP daily standards at the Lower Edgewood Creek sampling site (43HVE-2) were exceeded for turbidity in late June and August. Since the restoration project in 2007 along Edgewood Creek, there have only been three water year's in which the daily not to exceed NDPE stream effluents limits were not met. Exceedances were collected over the past two water years (2014 and 2015) forming an unfavourable trend.

3 Watershed Maintenance and Restoration Program (WMRP)

Beginning in 2013, Integrated Environmental Services (IERS) began an adaptive management approach and paradigm shift away from past monitoring methodology and protocol. The revised approach and history is documented in Chapter 3 of the *Heavenly Mountain Environmental Monitoring Program (2012)*, as well as IERS's paradigm shift memorandum included in Appendix E. Shifting away from what was once titled the "Effective Soil Cover Program", the Monitoring and Reporting program now outlines reporting and tracking of mitigation and restoration projects. In addition, annually or once within a three year cycle the Heavenly Valley Creek and Bijou Park Creek watersheds will be assessed for erosion problem areas. This report will also note the potential solution and schedule for implementing corrective actions. The 2016 water year will mark the first results from this program. Past monitoring results from the 2015 monitoring period will be included in the Mitigation and Monitoring Program Annual Report due on May 1st 2016.

4 Best Management Practices (BMP) Implementation and Monitoring

The new Monitoring and Reporting Program (MRP) 2015-0021 includes a requirement for USFS Roads Monitoring.³ On March 26th, 2015 Heavenly Mountain Resort and the LTBMU entered a roads maintenance and reporting agreement to cooperate on maintaining the existing on mountain roadway network. This agreement also set forth the standards for road maintenance, new roadway construction, annual meetings, and reporting of road maintenance activity. Heavenly submitted the road network maintenance performed in 2015 to the Forest Service in September 2015 in accordance with the above mentioned agreement. The road improvements and map are included in Appendix G. This agreement does not specify a protocol for assessing, identifying, and documenting road condition and maintenance needs on an annual basis, however several monitoring efforts outlined in the MRP and Heavenly Resort Monitoring Plan adequately address this need.

BMP effectiveness monitoring is also required in the permit to help address Heavenly Valley Creek Sediment TMDL targets.⁴ RCI conducted this monitoring, utilizing a protocol modelled after the Forest Service's Region 5 BMP Evaluation Program (BMPEP) in 2015. Results for both temporary and permanent BMPs for the 2015 construction season will be included in the Mitigation and Monitoring Program Annual Report due on May 1st, 2016.

The USFS Region 5 is phasing out its Regional BMPEP program, in favor of a new National US Forest Service BMP monitoring program. The National BMP Monitoring program technical guide is still in draft form, but the protocols have been actively utilized by the agency across the nation for the past two years. A final version of the National BMP monitoring technical guide is expected before the end of 2016. The National BMP Monitoring protocols programmatically assess BMP implementation and effectiveness for a wide variety of land management practices. Roads, facilities, and ski runs on USFS lands at Heavenly Resort will be included in the sample pool for this randomly selected annual monitoring beginning in 2016, and USFS staff will conduct and report out results from this monitoring effort.

Because the targets for National BMP monitoring on each Forest are relatively small (approximately 6 evaluations per Forest per year) and are randomly selected, Heavenly will also continue to implement annual resort wide identification of erosion problems and BMP effectiveness, on resort roads, ski runs, and facilities. Heavenly and its consultant(s) will consider a more streamlined process in 2016 for documenting and reporting this information, and may discontinue use of the current forms that were based on the USFS Regional BMPEP protocol.

Furthermore, IERS performed rapid assessment erosion hot spot monitoring⁵, within the CA-1 watershed prioritizing potential erosion risk areas from roads, ski runs and facilities within the watershed that are hydrologically connected to a water body. Identified erosion risk areas were incorporated into the Annual Work list for repair and BMP implementation. The 2015 "hot spot" monitoring report will also be submitted this spring as an appendix in the Mitigation and Monitoring Report. Results from this report will be incorporated into the 2016 summer Annual Work list. Rapid assessment erosion hot spot monitoring will be conducted on additional California watersheds in future years.

³ California Regional Water Quality Control Board-Lahontan Region. 2015. Monitoring and Reporting Program for Heavenly Mountain Resort. Board Order No. R6T-2015-0021. WDID No. 6A090033000. 2015. Page 9. Section D.

⁴ California Regional Water Quality Control Board-Lahontan Region. 2015. Waste Discharge Requirements for Heavenly Mountain Resort. Board Order No. R6T-2015-0021. WDID No. 6A090033000. 2015. Page 24. Table 3.

⁵ Drake Kevin, *Heavenly Mountain Resort Outcome-Based Watershed Management Program, 2014 Restoration and Monitoring Annual Report*. Integrated Environmental Restoration Solutions, Inc. April, 2015.

5 Riparian Condition Summary

5.1 Introduction and Monitoring Objectives

Riparian areas function as transition zones between uplands and stream channels, linking terrestrial and aquatic ecosystem processes. Their position in the landscape often affords immediate and measurable effects from changes on either side. It is this sensitivity that makes riparian areas ideal for interpreting management effects on the ecosystem over both short and long temporal scales.

Past riparian condition monitoring at Heavenly Mountain Resort (Resort) included a modified version of the Pfankuch Stream Inventory, Channel Stability Evaluation (Pfankuch 1975), and the Rosgen Stream Classification (Rosgen 1992, 1996).

This chapter discusses the stream channel monitoring activities conducted in 2015 in accordance with the Work Plan for Riparian Condition Monitoring (Work Plan) (ENTRIX 2005), incorporating the Stream Condition Inventory (SCI) procedures (Roby et al. 2005, Version 5), and reflecting recommendations from the most recent comprehensive report (2006-2011)⁶.

The objective of this long-term monitoring is to assess the effectiveness of erosion control measures and restoration activities on stream health. Monitoring is conducted to characterize stream and riparian conditions along selected stream reaches within the Heavenly Mountain Resort area as well as along reference reaches unaffected by Resort activity. The evaluation and comparison of monitoring data is used to assess changes in stream and riparian conditions and, if changes are encountered, determine whether they are associated with operations at the Resort.

5.1.1 Monitoring Schedule

In accordance with the EIR/EIS/EIS and subsequent Total Maximum Daily Load (TMDL) from the Monitoring and Reporting Program, Heavenly is required to monitor and survey stream conditioning inventory (SCI) at least once every four years corresponding with the second year of the benthic macroinvertebrate (BMI) sampling on Heavenly Valley and Hidden Valley Creeks.⁷ The 2015 season marked the second year of BMI collection followed by SCI surveys. Edgewood and Daggett Creeks were also included in this investigation to align with the California stream surveys. The next round of required BMI sampling will occur in 2018, while the next SCI surveys will occur in 2019. The monitoring schedule is documented in the Lahontan Water Board's Monitoring and Reporting Program No. 2015-002 (WDID NO. 6A090033000).

5.2 Monitoring Methods

As outlined in the Work Plan for Riparian Condition Monitoring (ENTRIX 2005), the monitoring activities collect geomorphology and riparian data in accordance with the United States Department of Agriculture Forest Service (USFS) Stream Condition Inventory (SCI) Technical Guide: Pacific Northwest Region, Version 5.0 (USFS Technical Document) (2005). The SCI method was developed to collect intensive and repeatable data from stream reaches to monitor conditions over time.

The SCI methodology also includes BMI sampling, which was conducted in 2006, 2007, 2010, 2011, 2014 and 2015 on Heavenly Valley and Hidden Valley Creeks in support of bioassessment monitoring required by the 2003 Heavenly Valley Creek Total Maximum Daily Load (TMDL) Bioassessment Monitoring Plan and amended in the Lahontan monitoring and reporting program permit (2011). Bioassessment data scored and reviewed in the EIR/EIS/EIS show inconclusive to poor health in Heavenly Valley Creek. Further discussion of BMI monitoring and results are presented in Chapter 5, section 5.4.2.8.

⁶ Cardno ENTRIX 2012 Environmental Monitoring Program Comprehensive Report Heavenly Mountain Resort. Water Years 2006-2011 (Revised August 2014). Cardno ENTRIX, Zephyr Cove, Nevada.

⁷ California Regional Water Quality Control Board-Lahontan Region. 2015. Monitoring and Reporting Program No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort. 2015 (pages 3-4).

5.3 Monitoring Locations

The project-related monitoring locations consist of three project reaches along Heavenly Valley Creek (HVC-1, HVC-2, and HVC-3), two project reaches on Edgewood Creek (EC-1 and EC-2), two project reaches on Daggett Creek (DC-1 and DC-2), and one project reach on Mott Creek (MC-1). The background or reference monitoring sites consist of two reference reaches on Hidden Valley Creek (HDVC-1 and HDVC-2). The locations are shown in Figures 5.1 and 5.2.

The project reaches on Heavenly Valley Creek are located within California and were established by the USFS in 2001. HVC-1 (Sky Meadows) is situated in the vicinity of Sky Meadows between the snowmaking pond and the 90-degree bend in the creek immediately downstream of the Sky Express Chair. HVC-2 (Below Patsy's) extends downstream of the culverts near Patsy's Chair to immediately upstream of the steep boulder field situated beyond the ski area boundary. HVC-3 (Property Line) extends downstream from the USFS boundary to immediately upstream of Powerline Trail.

The project reaches on Edgewood Creek, Daggett Creek, and Mott Creek are located in Nevada and were established by Cardno ENTRIX (formerly ENTRIX, Inc.) and the USFS in 2006. EC-1 (Upper Edgewood) on Edgewood Creek is located upstream of the stream restoration project completed in 2006 along the proposed alignment for the new North Bowl Express Lift and is used to monitor the stream restoration project in that area. EC-2 (Lower Edgewood) extends downstream from the Boulder Lodge parking lot past the Edgewood Below water quality site and is used to monitor the stream restoration project completed in 2007. Along Daggett Creek, DC-1 (Upper Daggett) is located downstream of the dam outlet culvert and DC-2 (Lower Daggett) is located downstream of DC-1 under the Galaxy chairlift. The monitoring location MC-1 on Mott Creek is located downstream of the Tahoe Rim Trail creek crossing. Based on feedback from the LTBMU (USFS) following recent evaluations for the Heavenly Epic Discovery Project, no additional surveys are recommended at the Mott Creek location. This boulder-dominated channel is inherently stable and resistant to change and is unlikely to be affected by ongoing and proposed management activities in the contributing watershed⁸.

The two reference reaches are located on Hidden Valley Creek in California and were established by the USFS in 2001. These two reference reaches are used for comparison with the project reaches on Heavenly Valley Creek. HDVC-1 (Upper Hidden Valley Creek) is located in the upper watershed, above the Resort area, and is used as a reference site for project reach HVC-1. HDVC-2 (Lower Hidden Valley Creek) extends approximately 270 meters (m) upstream from the Trout Creek confluence and is used as a reference site for project reach HVC-3.

The field observation dates during 2015 are listed in Table 5.1 for the benefit of analysis that may require consideration of weather and streamflow conditions.

Table 5-1 Riparian Condition Monitoring in 2015

Creek	Reach	Observation Date(s)
Heavenly Valley Creek	Sky Meadows	6/22/2015
Heavenly Valley Creek	Below Patsy's	6/17/2015
Heavenly Valley Creek	Property Line	6/29/2015
Hidden Valley Creek	Upper Hidden Valley	6/23/2015
Hidden Valley Creek	Lower Hidden Valley	6/16/2015
Edgewood Creek	Upper Edgewood	7/14/2015
Edgewood Creek	Lower Edgewood	7/15/2015
Daggett Creek	Upper Daggett	7/31/2015
Daggett Creek	Lower Daggett	6/02/2015
Mott Creek	Mott Creek	N/A

⁸ S. Norman (LTBMU) – Personal Communication May 28th, 2015.

Figure 5-1 SCI monitoring sites in California established in 2001 (USFS 2001)

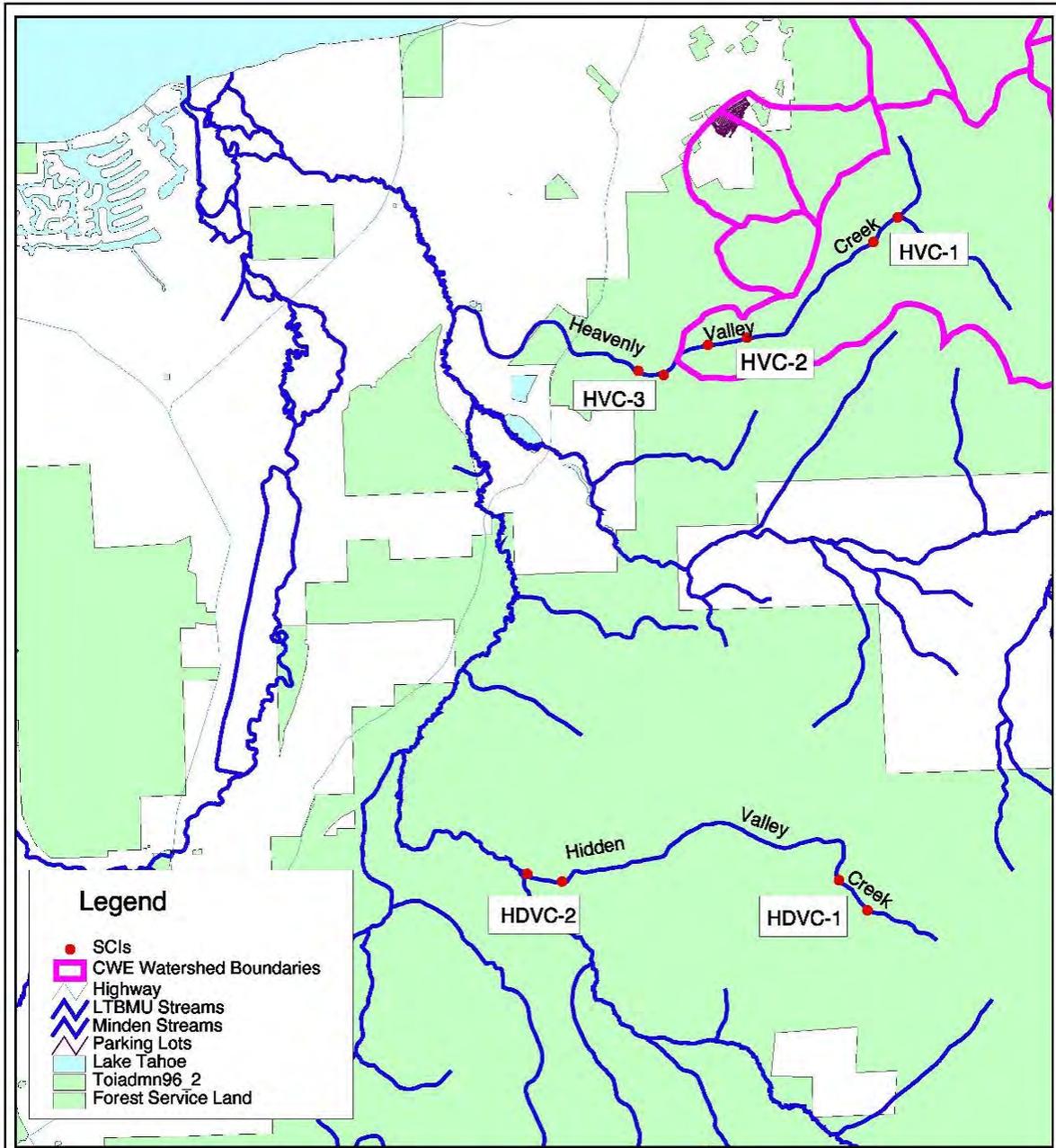
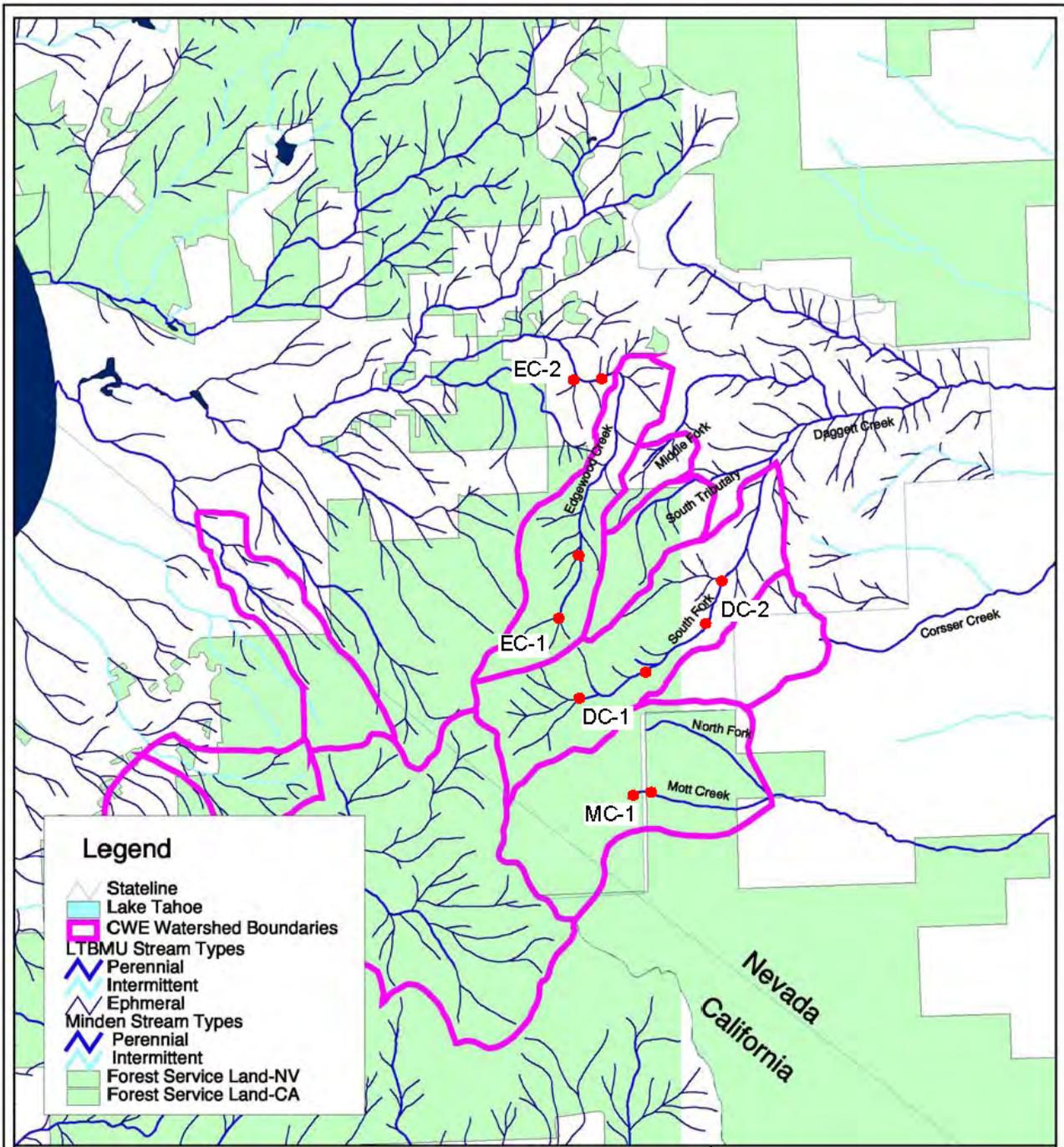


Figure 5-2 SCI monitoring sites in Nevada established in 2006 (USFS 2001)



5.4 Monitoring Results

5.4.1 Goal: Stable Functional Channel

5.4.1.1 *Channel Type*

5.4.1.1.1 California Project Reaches

The Sky Meadows site (HVC-1) is the upper-most monitoring reach on Heavenly Valley Creek and was established by the USFS in 1996. This stretch of creek is a perennial reach that falls under the “C” type channel under the Rosgen classification system. A “C” type channel is a low gradient, meandering, riffle/pool, alluvial channel with broad, well-defined floodplains (Rosgen 1996). This channel type has not changed since 2006.

The Below Patsy’s site (HVC-2) is the second monitoring reach located on Heavenly Valley Creek and was established by the USFS in 1996. This reach exhibits the characteristics of a Rosgen “B” type channel. A “B” type channel is a moderately entrenched, moderate gradient, riffle dominated channel with infrequently spaced pools, stable banks and a stable profile (Rosgen 1996). The channel type has not changed since 2006.

The Property Line site (HVC-3) downstream of Heavenly Ski Resort’s boundaries was established in 2001 to show temporal changes in channel morphology resulting from cumulative impacts. This reach exhibits Rosgen “A” channel characteristics. An “A” type channel is a steep, entrenched, cascading, stream that has high energy to transport sediment (Rosgen 1996). In 2006, the classification was changed from a “B” type to an “A” type channel. Although there some attributes fit both types (such as its stable banks and moderate entrenchment), the classification was changed back to an “A” type channel due to the steepness of the reach.

5.4.1.1.2 California Reference Reaches

The Upper Hidden Valley site (HDVC-1) is located in the headwaters area of Hidden Valley Creek. Established in 1996, HDVC-1 is a reference reach undisturbed by ski resort activities, and is comparable to the Sky Meadows site on Heavenly Valley Creek. The Upper Hidden reach exhibits the characteristics of a Rosgen “C” type channel. A “C” type channel is low gradient, meandering, point bar, riffle/pool alluvial channel with broad, well-defined floodplains (Rosgen 1996). The channel type has not changed since 2006.

The Lower Hidden Valley site (HDVC-2) was established in 2001 as a reference site to HVC-3 (Property Line). While both reaches have similar gradient, canopy cover, adjacent streamside vegetation types, elevation, and bankfull widths; Heavenly Valley and Hidden Valley creeks have dissimilar flow regimes. The discharge in Heavenly Valley Creek is influenced by the Sky Meadows dam, while Hidden Valley Creek flows are not regulated. This reach exhibits Rosgen “A” type channel characteristics. An “A” type channel is generally described as a steep, entrenched, cascading, stream that has high energy to transport sediment (Rosgen, 1996). In 2006, the classification was changed from a “B” type channel to an “A” type channel. Although some attributes fit both types (such as stable banks and moderate entrenchment), the classification was changed to an “A” type channel due to the steepness of the reach.

5.4.1.1.3 Nevada Project Reaches

The Edgewood Creek watershed has been the location of multiple restoration projects. The restoration project in the portion of Edgewood Creek including the Upper Edgewood riparian monitoring site (EC-1) is referred to as the North Bowl Restoration Stream Environment Project. Phase 1 (the downstream two-thirds of the project) of the North Bowl Restoration Stream Environment Project was completed in 2006. Other activities in 2006 included gabion structures added as gully improvements upstream of the North Bowl Restoration Stream Environment Project and best management practices installed on the road that descends from Boulder Parking Lot along Edgewood Creek. Phase 2 of the North Bowl Restoration Stream Environment Project was completed in the summer of 2007. Phase 2 involved the installation of more gabion structures, strategic placement of large woody debris, and vegetation establishment. For a more thorough description, please reference the Final Edgewood Watershed Assessment and Enhancement Plan: Upper Edgewood Creek (Swanson 2006).

The stream at the Upper Edgewood site (EC-1) is a high gradient stream so only a longitudinal bed profile and cross-section analysis were conducted in the past. The three permanent cross-sections extend across the entire valley floor width and were selected in 2006 to avoid construction disturbance from restoration in 2007. The EC-1 reach exhibits characteristics of a Rosgen "Aa+" type channel. It is very steep (>10 percent), somewhat entrenched, and confined. The channel resembles a gully and has a step/pool morphology resulting from the large number of downed trees in the channel (Rosgen 1996).

Edgewood Creek, directly upstream of the Lower Edgewood Creek monitoring site (EC-2), underwent restoration in 2007. These restoration activities included repair of a head-cut and channel incision by constructing plunge pools and riparian planting. Only the upstream cross-section of the EC-2 riparian monitoring site was modified. A vault treatment system was previously installed at the Boulder parking lot in 2005. The untreated areas of Lower Edgewood exhibits characteristics of a Rosgen "G" type channel. A "G" channel type typically has very high bank erosion rates and a high sediment supply. Channel degradation and side slope rejuvenation processes are also typical (Rosgen 1996).

The Upper Daggett Creek site (DC-1) exhibits characteristics of a Rosgen "Aa+" type channel. An "Aa+" type channel is a very steep, deeply entrenched stream with the capacity of debris transport (Rosgen 1996). This reach is steep (>10 percent), well entrenched, and is highly confined. Typical characteristics include a step/pool morphology with chutes and waterfalls (Rosgen 1996). The channel type has not changed since 2006.

The Lower Daggett site (DC-2) exhibits characteristics of a Rosgen "A" type channel. It is similar to an "Aa+" type channel in terms of several channel characteristics, yet has lower channel slope (Rosgen 1996). The channel type has not changed since 2006.

The Mott Creek site (MC-1) exhibits characteristics of a Rosgen "Aa+" type channel. It is very steep (>10 percent), well entrenched, and is highly confined. Typical characteristics include step/pool morphology with chutes and waterfalls (Rosgen 1996). The channel type has not changed since 2006. Mott Creek was not sampled in 2015, based on recommendations from the LTBMU to focus monitoring on more sensitive reaches. Large boulders within and along the creek channel are very stable preventing morphology changes within this reach.

5.4.1.2 Bankfull Channel Geometry

Bankfull stage is identified in the field in order to determine the associated channel characteristics such as bankfull width, bankfull depth, bankfull width-to-depth ratio, and as input to the entrenchment ratio. The bankfull stage is not readily apparent at some of the steep channel sites that lack a well-defined floodplain surface. In such cases, best professional judgment was used to identify other bankfull indicators such as: break in bank slope, vegetation, changes in sizes of bank materials, water stains or lichen lines on substrate, and scour lines or undercut banks. To improve the consistency of field decisions regarding bankfull indicators, and to provide better records, the specific indicator types and 'quality' ratings were noted for all field observations within each reach. A wide range of indicators and certainty were noted by the observers (Table 5.2), as represented by a few photographs from the field (Figure 5.3).

Table 5-2 Bankfull Indicator Types and Quality* in 2015

Creek	Reach	Type of Bankfull Indicator					
		Deposits	Slope Break	Inundation Feature	Exposed Roots / Undercuts	Vegetation Rooting	Lichen/Moss types and change
HVC	Sky Meadows	-	Strong	Moderate Weak	-	Strong Moderate Weak	Strong
HVC	Below Patsy's	-	Strong Weak	-	-	Strong Moderate Weak	-
HVC	Property Line	-	Strong Moderate	-	Strong	Strong Moderate Weak	Strong Moderate
HDVC	Upper Hidden Valley	Strong	Strong Moderate	-	-	Moderate Weak	Moderate Weak
HDVC	Lower Hidden Valley	-	Strong Moderate	Moderate Weak	Strong Moderate	Moderate Weak	Strong
EC	Upper Edgewood	-	Strong Moderate Weak	-	Moderate	Strong Moderate	-
EC	Lower Edgewood	-	Strong Moderate	-	Strong Moderate	Strong Moderate	Strong Moderate
DC	Upper Daggett		Strong Moderate		Moderate	Strong Moderate	Strong Moderate
DC	Lower Daggett	Moderate Weak	Strong Moderate	Moderate		Strong Moderate	

* Each indicator noted by the observers was also assigned one of three quality/certainty ratings: "Strong" "Moderate" or "Weak"

Figure 5-3 Examples of 2015 Bankfull Indicator Types and Quality



Strong Slope Break (Sky Meadows)



Strong/Moderate Lichen/Moss Types (Property Line)



Moderate Exposed Roots/Undercut (Upper Edgewood)



Moderate/Weak Deposits (Lower Daggett)

Bankfull width is the width of the active channel at the bankfull stage elevation. The bankfull widths for each of the monumented cross-sections in the monitoring reaches are reported in Table 5.3.

Table 5-3 Bankfull Width

Year	Bankfull Width (m)											
	Heavenly Valley Creek											
	HVC-1 (Sky Meadows)				HVC-2 (Below Patsy's)				HVC-3 (Property Line)			
XS	1	2	3	mean	1	2	3	mean	1	2	3	mean
@ STA**	34	131	426	-	30	537	1300	-	154	892	1200	-
2015	2.4	1.3	2.6	2.1	1.7	2.1	1.9	1.9	2.3	4.3	2.5	3.0
	Hidden Valley Creek*											
	HDVC-1 (Upper Hidden Creek)*				HDVC-2 (Lower Hidden Creek)							
XS	1	2	3	mean	1	2	3	mean				
@ STA**	15	478	624	-	247	604	800	-				
2015	2.0	1.8	2.1	2.0	4.5	2.4	3.5	3.5				
	Edgewood Creek											
	EC-1 (Upper Edgewood)				EC-2 (Lower Edgewood)							
XS	1	2	3	mean	1	2	3	mean				
@ STA**	50	241	540	-	20	105	325	-				
2015	11.6	10.4	10.2	10.7	4.4	0.6	2.1	2.4				
	Daggett Creek											
	DC-1 (Upper Daggett Creek)				DC-2 (Lower Daggett Creek)							
XS	1	2	3	mean	1	2	3	mean				
@ STA**	33	203	622	-	43	140	376	-				
2015	2.7	2.1	2.1	2.3	1.1	2.4	2.4	2.0				

*Cross section ID numbers and station profile location vary in prior year field notes. Use caution comparing year-to-year.

**Station values are expressed in field measurement units (feet).

The width-to-depth ratio is the ratio of bankfull channel width to the mean bankfull channel depth. This is a common metric used to characterize stream morphology and aquatic habitat. The width-to-depth ratio based on survey data for each of the monumented cross-sections is reported in Table 5.4.

Table 5-4 Bankfull Width/Depth Ratio

Year	Bankfull Width/Mean Depth Ratio											
	Heavenly Valley Creek											
	HVC-1 (Sky Meadows)				HVC-2 (Below Patsy's)				HVC-3 (Property Line)			
XS	1	2	3	mean	1	2	3	mean	1	2	3	mean
2015	7.1	10.1	18.9	12.0	6.2	5.4	7.5	6.4	9.6	28.9	7.3	15.3
	Hidden Valley Creek											
	HDVC-1 (Upper Hidden Creek)*					HDVC-2 (Lower Hidden Creek)*						
XS	1	2	3	mean	1	2	3	4	mean			
2015	5.9	9.2	15.0	10.0	16.6	7.0	20.3	N/A	14.6			
	Edgewood Creek											
Year	EC-1 (Upper Edgewood)					EC-2 (Lower Edgewood)						
XS	1	2	3	mean	1	2	3	mean				
2015	27.0	12.5	9.0	16.2	25.8	1.1	9.4	12.1				
	Daggett Creek											
Year	DC-1 (Upper Daggett Creek)					DC-2 (Lower Daggett Creek)						
XS	1	2	3	mean	1	2	3	mean				
2015	4.7	12.7	9.7	9.0	14.5	33.0	16.4	21.3				

*Cross section ID numbers and station profile location vary in prior year field notes. Use caution comparing year-to-year.

Entrenchment ratio is calculated as the ratio of floodprone width (measured in the field at twice the maximum bankfull depth) to bankfull width. The objective of this measurement is to quantify the degree of lateral channel confinement within the valley floor. The entrenchment ratio calculated for the monumented cross-sections along each survey reach is reported in Table 5.5.

Table 5-5 Entrenchment Ratio

Year	Floodprone Width/Bankfull Width (Entrenchment Ratio)											
	Heavenly Valley Creek											
	HVC-1 (Sky Meadows)				HVC-2 (Below Patsy's)				HVC-3 (Property Line)			
XS	1	2	3	mean	1	2	3	mean	1	2	3	mean
2015	12.5	2.3	8.9	7.9	4.4	3.3	4.4	5.4	2.5	2.5	2.0	2.3
	Hidden Valley Creek											
	HDVC-1 (Upper Hidden Creek)*				HDVC-2 (Lower Hidden Creek)							
XS	1	2	3	mean	1	2	3	mean				
2015	4.8	9.3	4.9	6.3	1.6	2.1	2.1	1.9				
	Edgewood Creek											
	EC-1 (Upper Edgewood)				EC-2 (Lower Edgewood)							
XS	1	2	3	mean	1	2	3	mean				
2015	3.3	4.9	4.6	4.3	2.4	16.8	3.5	7.6				
	Daggett Creek											
	DC-1 (Upper Daggett Creek)				DC-2 (Lower Daggett Creek)							
	1	2	3	mean	1	2	3	mean				
2015	11.8	4.6	5.1	7.2	10.9	4.0	3.9	6.3				

*Cross section ID numbers and station profile location vary in prior year field notes. Use caution comparing year-to-year.

5.4.1.3 Cross section geometry

The permanent monitoring cross-sections at each monitoring reach provide survey data to evaluate possible changes in channel geometry. Three monumented cross-sections were established within each of the 10 monitoring reaches. The cross-sections were located in fast water habitats and were oriented perpendicular to flow. At each cross-section, headpins were established along the left and right streambanks (viewed in the downstream direction) and a measuring tape was run horizontally across the channel from the left bank monument to the right bank monument. Elevations were surveyed using an auto-level along the ground surface, including the left and right edge of water surfaces, breaks in slope, apparent location of bankfull stage, and at notable changes in vegetation or substrate. Photographs of each cross-section were taken. Graphs and representative photographs (see Appendix H) of the cross sections provide visual indicators of channel shape and dimension. The calculated channel cross section areas are used to quantitatively compare channel dimensions (see Table 5.6).

Table 5-6 Bankfull Channel Cross Sectional Area

Year	Bankfull Channel Cross Sectional Area (square meters)											
	Heavenly Valley Creek											
	HVC-1 (Sky Meadows)				HVC-2 (Below Patsy's)				HVC-3 (Property Line)			
XS	1	2	3	mean	1	2	3	mean	1	2	3	mean
2015	0.8	0.2	0.4		0.5	0.8	0.5		0.5	0.7	0.9	
	Hidden Valley Creek											
	HDVC-1 (Upper Hidden Creek)*					HDVC-2 (Lower Hidden Creek)						
XS	1	2	3	mean	1	2	3	mean				
2015	0.7	0.4	0.3		1.2	0.9	0.6					
	Edgewood Creek											
	EC-1 (Upper Edgewood)					EC-2 (Lower Edgewood)						
XS	1	2	3	mean	1	2	3	mean				
2015	5.0	8.6	11.5		0.8	0.4	0.5					
	Daggett Creek											
	DC-1 (Upper Daggett Creek)					DC-2 (Lower Daggett Creek)						
	1	2	3	mean	1	2	3	mean				
2015	1.6	0.2	0.4		0.1	0.2	0.4					

*Cross section ID numbers and station profile location vary in prior year field notes. Use caution comparing year-to-year.

5.4.1.4 Channel Gradient

The channel gradient surveys measure the water surface slope, if flow is present, and streambed slope at each of the three surveyed cross sections, extending upstream and downstream, and over a minimum of 100 feet of channel length. The average slopes are provided in Table 5.7, as calculated two ways: a simple overall slope using the two furthest upstream and downstream survey points; and, an average from a linear best-fit line using all of the surveyed profile points (listed in parentheses).

Table 5-7 Channel and Water Surface* Slopes

2015	Channel Bed and Water Surface Slopes, In Percent**											
	Heavenly Valley Creek											
	HVC-1 (Sky Meadows)				HVC-2 (Below Patsy's)				HVC-3 (Property Line)			
XS	1	2	3	mean	1	2	3	mean	1	2	3	mean
Bed	1.3 (1.6)	1.1 (1.5)	0.5 (0.5)		3.0 (3.4)	3.0 (2.5)	4.0 (4.2)		3.0 (3.1)	1.5 (0.8)	12.3 (9.6)	
Water*	1.2 (1.4)	1.0 (1.8)	0.3 (0.4)		3.0 (3.4)	3.0 (2.4)	4.0 (4.2)		3.0 (3.0)	2.0 (1.2)	12.0 (9.2)	
	Hidden Valley Creek											
	HDVC-1 (Upper Hidden Creek)*					HDVC-2 (Lower Hidden Creek)						
XS	1	2	3	mean	1	2	3	mean				
Bed	1.0 (1.4)	1.0 (0.9)	0.6 (0.5)		5.0 (3.7)	8.7 (8.4)	6.6 (5.8)					
Water*	1.1 (1.3)	1.0 (0.9)	0.6 (0.5)		4.4 (3.6)	8.0 (8.5)	9.6 (5.9)					
	Edgewood Creek											
	EC-1 (Upper Edgewood)					EC-2 (Lower Edgewood)						
XS	1	2	3	mean	1	2	3	mean				
Bed	19.3 (19.7)	12.5 (12.0)	16.0 (17.5)		7.2 (6.7)	8.6 (7.8)	10.0 (7.6)					
Water*	n/a	n/a	n/a		9.8 (6.4)	8.0 (7.7)	9.6 (7.3)					
	Daggett Creek											
	DC-1 (Upper Daggett Creek)					DC-2 (Lower Daggett Creek)						
	1	2	3	mean	1	2	3	mean				
Bed	7.3 (8.2)	14.4 (14.0)	13.0 (13.3)		6.6 (6.8)	3.3 (3.3)	7.3 (7.6)					
Water*	8.0 (8.0)	14.0 (13.7)	13.0 (13.2)		7.0 (6.7)	3.0 (3.3)	7.0 (7.6)					

* Water surface slope surveyed only if water present at the time of survey.
 ** Values in parenthesis () are from linear best-fit lines (see Appendix for graphs).

5.4.1.5 Streambank Stability

Streambank stability is a measure of the vulnerability of streambanks to erosion. Streambank stability was measured along the entire length of a monitoring reach, at 25 equally spaced intervals. These measurements were taken along the left and right banks of each reach. Observations on streambank stability were recorded using a 1, 2, 3 ranking system as follows: 1 = stable, 2 = vulnerable and 3 = unstable. Stable streambanks were identified as having 75% or more cover of living plants and/or other stability components that are not easily eroded (such as binding roots, rocks and logs). Stable banks show no indicator of instability (e.g., erosion). Vulnerable banks have 75% or more cover, but have one or more instability indicators. Unstable banks have less than 75% cover and have instability indicators. Unstable streambanks are often bare, or nearly bare, composed of particle sizes too small or un-cohesive to resist erosion at high flows.

The bank stability ratings (combined left and right bank observations) (Table 5.8) indicate that bank stability ranges from 21% stability at EC-1 (Upper Edgewood Creek) to 99% stability at DC-2 (Lower Daggett Creek).

Table 5-8 Percent of Stable Banks

Heavenly Valley Creek			
Year	HVC-1 (Sky Meadows)	HVC-2 (Below Patsy's)	HVC-3 (Property Line)
2015	71%	65%	29%
Hidden Valley Creek			
Year	HDVC-1 (Upper Hidden Creek)		HDVC-2 (Lower Hidden Creek)
2015	47%		63%
Edgewood Creek			
Year	EC-1 (Upper Edgewood Creek)		EC-2 (Lower Edgewood Creek)
2015	21%		39%
Daggett Creek			
Year	DC-1 (Upper Daggett Creek)		DC-2 (Lower Daggett Creek)
2015	69%		99%

5.4.2 Goal: Quality Aquatic Habitat

5.4.2.1 Habitat Types

Habitat types were classified along entire monitoring reaches to describe the spatial distribution of fast and slow water habitat units. Fast water (riffles and runs) and slow water (pools) are important core attributes because they are the base stratification of physical habitats that support aquatic life. The habitat types were measured and described by an aquatic ecologist based on stationing established along each survey reach. All of the monitoring reaches are dominated by fast water habitats, with slow water (pool) habitats occupying a relatively low percent of the channel length (Table 5.9).

Table 5-9 Pool (Slow Water) Habitat (% of length)

Heavenly Valley Creek			
Year	HVC-1 (Sky Meadows)	HVC-2 (Below Patsy's)	HVC-3 (Property Line)
2015	8	7	19
Hidden Valley Creek			
Year	HDVC-1 (Upper Hidden Creek)		HDVC-2 (Lower Hidden Creek)
2015	5		12
Edgewood Creek			
Year	EC-1 (Upper Edgewood Creek)		EC-2 (Lower Edgewood Creek)
2015	12		11
Daggett Creek			
Year	DC-1 (Upper Daggett Creek)		DC-2 (Lower Daggett Creek)
2015	11		13

5.4.2.2 Pools

The objectives of pool measurements include quantifying the number of pools in each survey reach, determining the range of residual pool depth⁹ within the survey segment, and documenting whether wood is a factor in pool formation (Table 5.10). Residual pool depth was measured to characterize pools because it corrects for possible variability in pool depths that result from differences in the stage at the time of observation. Residual pool depth was determined by identifying the point of zero flow (PZF) elevation on the controlling riffle downstream and then measuring the depth from the bottom of the pool up to the PZF elevation. Pools were identified on the on basis of three key criteria: 1. Flow (slow or no velocity during summer low flows), 2. Morphology (hydraulic control at the pool tail, usually a concave longitudinal profile, and, 3. Dimension (length is greater than the wetted width, depth is greater than non-pools, and the maximum depth is more than twice the pool tail depth). To be considered a pool, it must occupy most of stream width and include the thalweg. Backwater and side water pools were not measured. At each pool the depth at the deepest point was measured along with the pool tail crest depth.

Table 5-10 Pool Numbers, Length (m) and Residual Pool Depth (cm)

Year	Number of Pools (n)	Number of Pools per 100 ft of channel (n)	Mean Pool Length (m)	Mean Pool Residual depth (cm)
	HVC-1 (Sky Meadows)			
2015	3	0.9	3.3	16.7
	HVC-2 (Below Patsy's)			
2015	10	0.8	3.0	31.2
	HVC-3 (Property Line)			
2015	24	2.1	2.3	41
	HDVC-1 (Upper Hidden Creek)			
2015	4	1.2	1.5	19.8
	HDVC-2 (Lower Hidden Creek)			
2015	15	1.8	2.5	20.8
	EC-1 (Upper Edgewood Creek)			
2015	8	1.5	3.0	32.2
	EC-2 (Lower Edgewood Creek)			
2015	8	2.5	1.6	18.5
	DC-1 (Upper Daggett Creek)			
2015	12	1.9	2.0	21.2
	DC-2 (Lower Daggett Creek)			
2015	3	1.9	2.4	21.3

5.4.2.3 Particle Size Distribution

Particle size distribution measurements on the streambed surface were conducted at riffle locations along each reach. At each riffle location, measurements were collected from the streambed at randomly spaced transects.

⁹ Residual pool depth is the depth of the pool when adjacent riffle bed is dry.

Ten particles were selected along each transect using the blind touch method and were measured using a gravelometer. The median particle size (D₅₀) and associated dominant pebble class of the 100 particles sampled was determined (Table 5-11). Refer to Appendix H for bed particle distribution graphs at each cross section.

Table 5-11 Median (D50) Particle Diameter Class (mm)

Year	Median Particle Size by Sample and Typical Particle Size Class by Reach														
	Heavenly Valley Creek														
	HVC-1 (Sky Meadows)					HVC-2 (Below Patsy's)					HVC-3 (Property Line)				
XS	1	2	3	4	Typical	1	2	3	4	Typical	1	2	3	4	Typical
@ STA*	38	100	112	290		185	535	860	1090		152	365	716	1170	
2015	18.5	7.1	24.7	17.5	Coarse Gravel (16-32)	18.5	27.8	29.7	24.8	Coarse Gravel (16-32)	8.2	27.8	38.1	32.0	Coarse Gravel (16-23)
	Hidden Valley Creek														
	HDVC-1 (Upper Hidden Creek)					HDVC-2 (Lower Hidden Creek)									
XS	1	2	3	4	Typical	1	2	3	4	Typical					
@ STA*	33	203	366	515		80	250	487	640						
2015	12.5	10.7	11.9	12.5	Medium Gravel (8-16)	36.4	25.4	42.5	30.1	Coarse Gravel (23-32)					
	Edgewood Creek														
	EC-1 (Upper Edgewood Creek)					EC-2 (Lower Edgewood Creek)									
XS	1	2	3	4	Typical	1	2	3	4	Typical					
@ STA*	24	100	230	470		20	116	242	264						
2015	9.3	2.0	13.8	3.2	Fine/ Med Gravel (4-11)	2.9	4.3	3.9	3.9	Fine Gravel (4-8)					
	Daggett Creek														
	DC-1 (Upper Daggett Creek)					DC-2 (Lower Daggett Creek)									
XS	1	2	3	4	Typical	1	2	3	4	Typical					
@ STA*	25	205	231	290		50	153	235	370						
2015	20.8	4.4	3.7	2.8	Fine Gravel (4-8)	7.7	8.1	7.6	6.4	Fine Gravel (4-8)					

*Station values are expressed in field measurement units (feet).

5.4.2.4 LWD/Total Wood

Large woody debris (LWD) variables characterize the abundance of woody debris within each reach. The monitoring involved inventorying and counting all LWD that was longer than one-half the bankfull width and located within a portion of the bankfull width of the channel. The counts of individual pieces (Table 5.13) and LWD aggregates comprised of at least 4 pieces each (Table 5.14), are presented, along with the number per unit stream length (100 feet). In 2015, the only root wads were four observed on Upper Edgewood Creek, all other LWD was in the form of trunks (logs) lacking intact root wads.

Table 5-12 Large Wood Pieces

Year	Number of LWM pieces		Number of LWM pieces/100 feet of channel			
	Heavenly Valley Creek					
	HVC-1 (Sky Meadows)		HVC-2 (Below Patsy's)		HVC-3 (Property Line)	
2015	29	6.1	144	11.1	342	28.5
	Hidden Valley Creek					
	HDVC-1 (Upper Hidden Creek)			HDVC-2 (Lower Hidden Creek)		
2015	96	13.7	207	24.4		
	Edgewood Creek					
	EC-1 (Upper Edgewood Creek)			EC-2 (Lower Edgewood Creek)		
2015	170	28.3	153	43.7		
	Daggett Creek					
	DC-1 (Upper Daggett Creek)			DC-2 (Lower Daggett Creek)		
2015	76	11.7	68	14.5		

Table 5-13 Large Wood Aggregates

Year	Number of LWM Aggregates (>4 pieces)		Number of Aggregates /100 feet of channel			
	Heavenly Valley Creek					
	HVC-1 (Sky Meadows)		HVC-2 (Below Patsy's)		HVC-3 (Property Line)	
2015	8	1.7	140	10.8	370	30.8
	Hidden Valley Creek					
	HDVC-1 (Upper Hidden Creek)			HDVC-2 (Lower Hidden Creek)		
2015	5	0.7	215	25.3		
	Edgewood Creek					
	EC-1 (Upper Edgewood Creek)			EC-2 (Lower Edgewood Creek)		
2015	20	3.3	16	4.6		
	Daggett Creek					
	DC-1 (Upper Daggett Creek)			DC-2 (Lower Daggett Creek)		
2015	45	6.9	0	0		

5.4.2.5 Stream Shading

Stream shading measures the average canopy cover in each monitoring reach. Stream shading was measured at the same 50 equally spaced transects used to assess streambank stability. At each of the 50 transects, stream shading was measured using a Solar Pathfinder. The Solar Pathfinder was oriented to the south at approximately 0.3 meters (m) above the water surface. Looking at the reflection of the sky in the Solar Pathfinder dome along the August sun path, the field crew was able to add up the shaded sections to yield the percent shade for each of the 50 transects. Table 5.15 lists the average percent stream shading for each reach.

Table 5-14 Stream Shading

Year	Mean Percent of Channel Shading (%)		
	Heavenly Valley Creek		
	HVC-1 (Sky Meadows)	HVC-2 (Below Patsy's)	HVC-3 (Property Line)
2015	24	80	92
	Hidden Valley Creek		
	HDVC-1 (Upper Hidden Creek)		HDVC-2 (Lower Hidden Creek)
2015	41		92
	Edgewood Creek		
	EC-1 (Upper Edgewood)		EC-2 (Lower Edgewood)
2015	27		94
	Daggett Creek		
	DC-1 (Upper Daggett Creek)		DC-2 (Lower Daggett Creek)
2015	80		33

5.4.2.6 Streambank Angle

Streambank angle measures the dominant angle of the streambank between the bottom of the bank and the bankfull stage. This measure falls under the SCI Standard protocol for low gradient channels (gradient less than 2%) and can influence factors such as shading, vegetation potential and bank stability. Upper Edgewood Creek, Daggett Creek, and Mott Creek channel gradients are all too steep for the protocol, therefore this metric is only applicable for Heavenly Valley Creek at Sky Meadows (HVC-1) and Upper Hidden Creek (HDVC-1). Measurements were collected at the same 50 transects used to assess streambank stability and stream shading. At each transect, each bank was measured for an angle using a clinometer. (Table 5.16).

Table 5-15 Streambank Angle

Year	Mean Streambank Angle (degrees)
	Heavenly Valley Creek*
	HVC-1 (Sky Meadows)
2015	125
	Hidden Valley Creek*
	HDVC-1 (Upper Hidden Creek)
2015	125

5.4.2.7 Streamshore Water Depth

Streamshore water depth is an important indicator of channel morphology and is closely related to other indicators of channel conditions such as bank angle and undercut bank. Streamshore water depth was measured at each of the 50 equally spaced transects along the entire channel reach, on each bank. At each transect and each bank, the water depth was measured at the water's edge. If the bank angle was equal to or less than 90 degrees, the water depth was measured using a measuring tape. If the bank angle was greater than 90 degrees the bank shore depth was recorded as zero. These measurements fall under the SCI Standard protocol and are only made for streams with gradients less than 2 %. Therefore, this metric is only applicable for Heavenly Valley Creek at Sky Meadows (HVC-1) and Upper Hidden Creek (HDVC-1) (Table 5.17).

Table 5-16 Mean Shore Depth (cm)

Year	Heavenly Valley Creek*
	HVC-1 (Sky Meadows)
2015	3.8
	Hidden Valley Creek
	HDVC-1 (Upper Hidden Creek)
2015	2.3

5.4.2.8 Aquatic Fauna

Due to a lack of consistent methods and varied observers from year to year, the aquatic fauna observations are not considered useful or reliable.

5.4.2.9 Benthic-Macro Invertebrate Surveys

BMI stream reach surveys were collected in 2014 and again in 2015. Samples were collected prior to the July 1st collection window due to the lack of winter precipitation and low flows in the creek. The earlier sample date was approved by the Water Board. Laboratory results from the surveys are submitted and scored by the Lahontan Water Board. As discussed in the EIR/EIS/EIS, results are inconclusive. However the Sky Meadow reach along Heavenly Valley Creek suggests an impaired trend occurring. Future surveys of this reach including particle size and stream embeddedness results hope to clarify the invertebrate and stream health trending analysis. Results from the 2015 survey are expected within next month (January) and will be submitted to the Water Board for scoring. The 2014 BMI results have been scored and an internal memorandum with the results continues to suggest that Heavenly Valley Creek is impaired. The memorandum conclusion requests additional bioassessment surveys providing a longer reference period of time and scores for gauging stream health. Additional discussion and trend analysis will be discussed in the comprehensive report next year (January 2017).

5.5 Discussion

Stream condition surveys to evaluate the impacts of Heavenly management practices on riparian system health were completed for Heavenly Valley Creek, Hidden Valley Creek, Edgewood Creek and Daggett Creek. Condition and trend evaluations will be conducted on each of the data elements of the monitoring program both individually and cumulatively to gauge overall watershed condition, trends, and to determine if ski area management activities are improving or degrading water quality and ecological health. These evaluations are completed in 5-year intervals and will be presented in the 2016 Comprehensive Report due January, 2017.

6 Annual Work List

The Annual Work List for the 2016 construction season will be included in the Mitigation and Monitoring Program Annual Report due on May 1st, 2016. The list will include significant maintenance and restoration projects to be completed during the summer construction window in 2016. Included projects will be prioritized based on the annual erosion hot spot assessment as part of the Watershed Maintenance and Restoration Program (WMRP) as well as capital improvement projects, stability, known areas of concern and conductivity to surface water.

7 Deicer and Abrasives Application and Recovery

Application of deicer and abrasives began on November 29th, 2014 during the first quarter of the water year 2015. Application was limited to November and December in the first quarter and there was no application in the month of January due to the lack of precipitation and cold temperatures. Limited application occurred in February March and April with conclusion of application on April 10th. Upon the resort closure, 30,960 lbs of abrasives were collected in and around the California parking lots. Daily and monthly deicer logs, for the fourth quarter, can be found in Appendix D. Table 7-1 provides a year to date balance of deicer application and recovery.

For the water year 2015, approximately 57% of the material applied to the roadways was recovered by Heavenly and their subcontracted vendor for sweeping (vactor truck). The percentage of recovery is not entirely inclusive, since the City of South Lake Tahoe additionally sweeps the roadways leading up to Heavenly Mountain Resort. The City sweeper collects debris, cinders, and sand that Heavenly applies to roadways leading to the resort (Ski Run Blvd., Needle Peak Road, Wildwood Avenue and Saddle Road). In theory, the city's sweeper collection values should be added to the recovery number increasing the percentage of recovery. However, the city also applies deicer to the roadways adjacent the resort and at this time application and recovery is not tracked and accounted for.

Table 7-1 Summary of Deicer Application and Recovery

Month/Year	Total Amount of Deicer and Abrasives Applied (lbs.)	Total Amount of Deicer and Abrasives Recovered (lbs.)
October 2014	0	0
November 2014	4,443	0
December 2014	37,666	0
January 2015	0	2,940
February 2015	10,604	0
March 2015	2,323	0
April 2015	4,040	30,960
May 2015	0	0
June 2015	0	0
July 2015	0	0
August 2015	0	0
September 2015	0	0
Totals	59,076 lbs.	33,900 lbs.

Deicer laboratory analysis was performed in the first quarter of 2015 water year (December 2014) and can be found in the Second Quarter Report (May 1st, 2015). New regulations set forth in the Monitoring and Reporting Program (2015-0021) prompted Heavenly to switch from a volcanic cinder/deicer mixture to a 5:1 Washoe Sand deicer mixture for the 2015/2016 winter season. This material was analysed by the laboratory and will be included in the First Quarter Report (February 1st, 2016). Improvements and upgrades to the application fleet of vehicles (dump truck and spreader truck) have allowed Heavenly to switch from the use of cinders to a Washoe Sand deicer mixture that is more favourable with the Water Board. Monitoring results from the 2015/2016 winter months hope to show improved water quality results with regards to chloride levels around the California Base Lodge water quality sites (Vault Outlet 43HVP-2, and Bijou Park Creek 43BPC-4).

8 Snow Condition and Snowmaking Enhancement Monitoring

Pursuant to Environmental Monitoring Program Comprehensive Report for Heavenly Mountain Resort Water Years 2006-2011, submitted on January 17, 2012 and modified in October 2013, Table 8-1 was created in order to summarize the annual water year's total application of huck salt applied at the four recorded sites on the mountain. No additional huck salt was applied during the fourth quarter of the 2015 water year.

Table 8-1 The Location and the Application Amount of Huck Salt (Obtained from the Monthly Monitoring Logs, Water Year 2015)

Month/Year	Top of the Gondola (lbs.)	World Cup Race Course (lbs.)	Terrain Park (lbs.)	Adventure Peak – Tubing Area (lbs.)
October 2014	0	0	0	0
November 2014	0	0	0	0
December 2014	3	0	0	0
January 2015	10	0	18	0
February 2015	3	0	230	0
March 2015	0	50	170	0
April 2015	0	0	0	0
May 2015	0	0	0	0
June 2015	0	0	0	0
July 2015	0	0	0	0
August 2015	0	0	0	0
September 2015	0	0	0	0
Totals	16 lbs.	50 lbs.	418 lbs.	0 lbs.

In addition, snow and ice melt is applied to the upper parking lot walkways providing safer guest access to the main lodge from the parking areas. The 2015 water year marks the first year these application values have been tracked and reported. Moving forward, this additional “deicer” application location and amounts will be recorded and tracked in future reports. Application at the Upper California Main Lodge area is done using a hand spreader or similar. Table 8-2 summarizes the 2015 water year salt application at the Lodge. The last date of application occurred on April 6th, 2015. There was no application of ice melt for either the third or fourth quarter and the total ice melt used for water year 2015 was 544.25 lbs. The fourth quarter monthly applications logs are included in Appendix D.

Table 8-2 Upper California Main Lodge Parking Area Snow and Ice Melt Application Totals (Obtained from the Monthly Monitoring Logs, Water Year 2015)

Month/Year	Snow and Ice Melt (lbs.)
October 2014	-
November 2014	50
December 2014	230
January 2015	98
February 2015	100
March 2015	50
April 2015	16.25
May 2015	0
June 2015	0
July 2015	0
August 2015	0
September 2015	0
Totals	544.25 lbs.

Table 8-3 summarizes the past five water year salt application totals for each of the five locations. As noted above the 2015 water year marks the first year that the Upper California Parking Lot site was monitored. Salt application usage has decreased over the past two ski seasons. This can be contributed to two things: one, the lack to precipitation and snow fall has decreased deicer usage; and two, additional employee training and application approval is required limiting usage. Additional application records over a longer period of time through varying precipitation years will help to verify the application relationship with water year precipitation (snow fall) totals.

Table 8-3 Annual Huck Salt Application Records (2011-2015).

Water Year	Top of the Gondola	World Cup Race Course	Terrain Park	Adventure Peak – Tubing Area	CA Parking Lot Application ²	Total Salt Usage
2011 Water Year	250 lbs.	900 lbs.	3,360 lbs.	3,400 lbs.	-	7,910 lbs.
2012 Water Year	300 lbs.	800 lbs.	1,962 lbs.	100 lbs.	-	3,162 lbs.
2013 Water Year	450 lbs.	1,680 lbs.	4,160 lbs.	400 lbs.	-	6,690 lbs.
2014 Water Year	80 lbs.	60 lbs.	2,840 lbs.	0 lbs.	-	2,980 lbs.
2015 Water Year ¹	16 lbs.	50 lbs.	418 lbs.	0 lbs.	544 lbs.	1,028 lbs.

¹ The 2015 Water Year marked the first year that deicer/salt application near and around the CA lodge was tracked on a monthly basis. Application is needed to provide safer walkability during the ski season (slip/fall). Application has occurred in the past water years; however the amounts were not recorded.

9 On Mountain Monitoring

Additional on mountain monitoring documentation can be found in Appendices D-G. Appendix D includes the facilities monitoring checklist for the months of July, August and September. Previous monthly facility monitoring checklists (October through June) can be found in past quarterly reports for the water year 2015. Additionally, Appendix D contains the filter vaults maintenance inspection report. Appendix E includes the documentation of the quarterly Erosion Control and Facilities Maintenance Monitoring. The table and associated photos represent the fourth quarter of the 2015 water year (July through September). Past quarterly monitoring logs have been submitted with the quarterly reports. As required by the Monitoring and Reporting Program, Appendix F includes the compliance cover letter, sign in sheet and slide presentation associated with the Facilities Watershed Awareness Training (BMP Breakfast) held annually. The training this year was held on May 28, 2015.

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Heavenly Mountain Resort Water Year
2015

APPENDIX A
RAW WATER QUALITY CONSTITUENTS
WATER YEAR 2015

Heavenly Valley Creek - Sky Meadows
(43HVC-1A)

Table A-1:		Heavenly Mountain Resort water year 2014/2015 water quality monitoring data from station 43HVC-1A, Heavenly Valley Creek at Sky Meadows. This station is located above the snowmaking pond at an elevation of 8,525 feet.									
Date	Time	Discharge (cfs) ⁴	Turbidity (ntu)	Suspended Sediment ² (mg/L)	Total Nitrite/Nitrate (mg/L)	Total Kjeldahl N (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride (mg/L)	Average Temperature (Deg C)	Precipitation (in)
Lahontan Standards¹		N/A	N/A	60	N/A	N/A	0.190	0.015	0.15	N/A	N/A
First Quarter WY 2014-2015											
Samples not collected at this site during the First Quarter											
Second Quarter WY 2014-2015											
Samples not collected at this site during the Second Quarter											
Third Quarter WY 2014-2015											
Samples not collected at this site during the Third Quarter											
Fourth Quarter WY 2014-2015											
7/16/15	14:15	0.215	1.62	1.6	0.067	0.094	0.161	0.019	0.86	13.9	0
8/19/2015 ⁴	14:15	0.079	1.01	2.8	0.035	0.099	0.134	0.018	0.78	14.4	0
9/17/15	13:55	0.028	0.62	2.0	0.015	0.090	0.105	0.018	0.80	6.7	0
Annual Summary	Minimum	0.028	0.620	1.60	0.015	0.090	0.105	0.018	0.78	6.7	-
	Maximum	0.215	1.620	2.80	0.067	0.099	0.161	0.019	0.86	14.4	-
	Average	0.107	1.083	2.13	0.039	0.094	0.133	0.018	0.81	11.7	-
90th Percentile ³		-	-	#NUM!	-	-	-	-	-	-	-

¹ Standards are annual averages for the receiving waters of Trout Creek.

² Standards are for receiving waters of Trout Creek, 90th Percentile.

³ There are not enough numbers in the range to interpolate a value for the 90th percentile.

⁴ 8/19/15 discharge value estimated from flume reading.

Other 4th quarter discharge recordings are values obtained using the Marsh McBirney flow meter due to the fact that the flume outfall is submerged.

Heavenly Valley Creek - Below Patsys
(43HVC-2)

Table A-2:		Heavenly Mountain Resort water year 2014/2015 water quality monitoring data from station 43HVC-2, Heavenly Valley Creek below Patsy's Chair. This station is located just beyond ski area development within this watershed at an elevation of 8,000 feet.										
Date	Time	Discharge (cfs) ³	Turbidity (ntu)	Suspended Sediment ² (mg/L)	Total Nitrite/Nitrate (mg/L)	Total Kjeldahl N (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride (mg/L)	Average Temperature (Deg C)	Precipitation (in)	
Lahontan Standards¹		N/A	N/A	60	N/A	N/A	0.190	0.015	0.15	N/A	N/A	
First Quarter WY 2014-2015												
10/14/14	13:20	0.079	0.55	2.00	0.007	0.048	0.055	0.017	1.2	10.0	0	
11/19/14	13:10	0.060	0.8	1.0	0.015	0.035	0.050	0.013	1.3	2.2	0.1	
12/15/14	12:45	0.015	0.36	1.6	0.01	0.051	0.061	0.014	1.5	-1.7	0.1	
Second Quarter WY 2014-2015												
1/12/15	No Sample collected, due to extremely low flows and ice in the stream.										-0.6	0
2/17/15	No Sample collected, due to extremely low flows and ice in the stream.										4.4	0
3/26/15	13:20	0.005	0.60	4.0	0.015	0.073	0.088	0.026	3.2	7.2	0	
Third Quarter WY 2014-2015												
4/9/15	13:00	0.042	2.51	2.0	0.252	0.054	0.306	0.020	4.2	0.0	0.2	
4/16/15	13:25	0.100	1.40	2.0	0.10	0.123	0.223	0.016	2.7	2.2	0	
4/23/15	13:05	0.148	0.73	1.2	0.04	0.106	0.146	0.013	2.4	4.4	0	
4/30/15	12:20	0.174	0.84	1.6	0.018	0.107	0.125	0.014	2.0	7.2	0	
5/6/15	13:30	0.174	0.75	2.0	0.01	0.059	0.069	0.012	1.8	1.7	0	
5/14/15	11:15	0.942	11.8	17.2	0.007	0.305	0.312	0.065	1.1	-0.6	0	
5/21/15	11:15	0.626	3.15	6.4	0.025	0.207	0.232	0.025	0.88	2.2	0.3	
5/27/15	12:55	0.292	1.46	2.0	0.019	0.149	0.168	0.017	0.99	7.8	0	
6/4/15	13:35	0.292	2.33	5.2	0.028	0.168	0.196	0.024	0.95	5.0	0	
6/11/15	13:00	0.505	3.08	4.4	0.034	0.148	0.182	0.023	0.95	11.7	0.4	
6/18/15	13:45	0.393	1.48	2.4	0.034	0.096	0.130	0.025	0.99	13.3	0	
6/25/15	14:15	0.230	1.49	2.8	0.034	0.100	0.134	0.023	1.0	16.1	0	
Fourth Quarter WY 2014-2015												
7/16/15	13:30	0.174	1.06	1.6	0.039	0.097	0.136	0.019	1.1	13.9	0	
8/19/15	13:30	0.042	1.16	4.4	0.073	0.190	0.263	0.027	1.2	14.4	0	
9/17/15	13:25	0.009	1.21	2.00	0.053	0.063	0.116	0.018	1.4	6.7	0	
Annual Summary		Minimum	0.005	0.360	1.00	0.007	0.035	0.050	0.012	0.88	-1.7	-
		Maximum	0.942	11.800	17.20	0.252	0.305	0.312	0.065	4.20	16.1	-
		Average	0.226	1.935	3.46	0.043	0.115	0.157	0.022	1.62	6.1	-
		90th Percentile	-	-	6.40	-	-	-	-	-	-	-

¹ Standards are annual averages for the receiving waters of Trout Creek.

² Standards are for receiving waters of Trout Creek, 90th Percentile.

³ Sampling of the Creek during 01/13/14 was frozen, gage reading might be skewed by ice.

Heavenly Valley Creek - Property Line
(43HVC-3)

Table A-3:		Heavenly Mountain Resort water year 2014/2015 water quality monitoring data from station 43HVC-3, Heavenly Valley Creek at the Property Line. This station is located just above the Forest Service property line and subdivision development at an elevation of 6,620 feet.									
Date	Time	Discharge (cfs)	Turbidity (ntu)	Suspended Sediment ² (mg/L)	Total Nitrite/Nitrate (mg/L)	Total Kjeldahl N (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride (mg/L)	Average Temperature (Deg C)	Precipitation (in)
Lahontan Standards¹		N/A	N/A	60	N/A	N/A	0.190	0.015	0.15	N/A	N/A
First Quarter WY 2014-2015											
10/14/14	No Sample collected, due to extremely low flows.										
11/19/14	No Sample collected, due to extremely low flows.										
12/15/14	No Sample collected, due to extremely low flows.										
Second Quarter WY 2014-2015											
1/12/15	No Sample collected, due to extremely low to no flows.										
2/17/15	No Sample collected, due to extremely low to no flows.										
3/26/15	No Sample collected, due to extremely low to no flows.										
Third Quarter WY 2014-2015											
4/9/15	No Sample collected, due to extremely low to no flows.										
4/16/15	No Sample collected, due to extremely low to no flows.										
4/23/15	No Sample collected, due to extremely low to no flows.										
4/30/15	11:00	0.051	1.11	1.6	0.005	0.207	0.212	0.034	2.0	7.2	0
5/6/15	11:40	0.120	1.65	6.0	0.003	0.161	0.164	0.028	1.9	1.7	0
5/14/15	13:15	1.161	0.69	1.6	0.003	0.071	0.074	0.020	1.3	-0.6	0
5/21/15	11:20	1.119	0.89	2.0	0.004	0.099	0.103	0.017	0.96	2.2	0.3
5/27/15	11:50	0.573	0.34	0.8	0.002	0.070	0.072	0.013	1.0	7.8	0
6/4/15	11:45	0.527	0.28	1.6	0.002	0.086	0.088	0.018	1.0	5.0	0
6/11/15	11:50	0.635	0.31	1.2	0.002	0.091	0.093	0.021	0.96	11.7	0.4
6/18/15	12:10	0.456	0.75	0.8	0.003	0.049	0.052	0.025	1.0	13.3	0
6/25/15	12:15	0.256	0.43	1.6	0.002	0.062	0.064	0.022	ND	16.1	0
Fourth Quarter WY 2014-2015											
7/16/15	11:45	0.048	0.52	2.0	0.003	0.095	0.098	0.020	1.1	13.9	0
8/19/15	No Sample collected, due to extremely low to no flows.										
9/17/15	No Sample collected, due to extremely low to no flows.										
Annual Summary	Minimum	0.048	0.28	0.80	0.002	0.049	0.052	0.013	0.96	-1.7	-
	Maximum	1.161	1.65	6.00	0.005	0.207	0.212	0.034	2.00	16.1	-
	Average	0.495	0.70	1.92	0.003	0.099	0.102	0.022	1.25	6.1	-
	90th Percentile	-	-	5.60	-	-	-	-	-	-	-

¹ Standards are annual averages for the receiving waters of Trout Creek.

² Standards are for receiving waters of Trout Creek, 90th Percentile.

Bijou Park Creek - Below California Parking Lot
(43BPC-4)

Table A-4:		Heavenly Mountain Resort water year 2014/2015 water quality monitoring data from station 43BPC-4, Bijou Park Creek below California Parking Lot. This station is located 1/4 miles below the culvert outlet draining the parking lot off of Wildwood Avenue at an elevation of 6,530 feet.									
Date	Time	Discharge (cfs) ²	Turbidity (ntu)	Suspended Sediment ¹ (mg/L)	Total Nitrite/Nitrate (mg/L)	Total Kjeldahl N (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride ¹ (mg/L)	Average Temperature (Deg C)	Precipitation (in)
Lahontan Standards¹		N/A	N/A	60	N/A	N/A	0.15	0.008	3.0	N/A	N/A
First Quarter WY 2014-2015											
10/14/14	12:50	0.055	17.5	8.5	0.229	0.136	0.365	0.088	46	10.0	0
11/19/14	12:30	0.054	8.6	6.0	0.253	0.128	0.381	0.058	43	2.2	0.1
12/15/14	12:00	0.063	10.2	5.0	0.210	0.173	0.383	0.058	44	-1.7	0.1
Second Quarter WY 2014-2015											
1/12/15	12:00	0.066	6.98	2.4	0.192	0.226	0.418	0.048	51	-0.6	0
2/17/15	12:00	0.103	7.86	4.0	0.219	0.226	0.445	0.052	51	4.4	0
3/26/15	12:00	0.125	8.17	4.8	0.223	0.217	0.440	0.081	42	7.2	0
Third Quarter WY 2014-2015											
4/9/15	12:15	0.104	9.15	4.4	0.270	0.205	0.475	0.062	57	0.0	0.2
4/16/15	12:30	0.101	9.42	4.4	0.337	0.355	0.692	0.056	46	2.2	0
4/23/15	12:10	0.084	10.5	4.0	0.328	0.367	0.695	0.060	51	4.4	0
4/30/15	12:00	0.093	8.59	4.0	0.319	0.272	0.591	0.053	56	7.2	0
5/6/15	12:40	0.100	11.4	4.8	0.340	0.275	0.615	0.061	58	1.7	0
5/14/15	11:45	0.099	8.43	3.2	0.352	0.227	0.579	0.049	48	-0.6	0
5/21/15	12:45	0.655	66.3	70.1	0.258	0.726	0.984	0.237	22	2.2	0.3
5/27/15	13:25	0.091	6.47	3.6	0.366	0.242	0.608	0.048	47	7.8	0
6/4/15	12:50	0.095	10.7	5.2	0.314	0.282	0.596	0.063	46	5.0	0
6/11/15	12:30	0.083	7.59	7.6	0.307	0.252	0.559	0.070	47	11.7	0.4
6/18/15	12:55	0.073	9.84	3.2	0.328	0.237	0.565	0.063	44	13.3	0
6/25/15	13:35	0.084	7.44	4.0	0.264	0.264	0.528	0.065	44	16.1	0
Fourth Quarter WY 2014-2015											
7/16/15	12:30	0.071	17.4	8.0	0.240	0.284	0.524	0.091	44	13.9	0
8/19/15	12:40	0.054	10.3	4.8	0.241	0.252	0.493	0.056	40	14.4	0
9/17/15	12:35	0.046	8.26	4.4	0.233	0.197	0.430	0.058	37	6.7	0
Annual Summary											
Min		0.046	6.47	2.40	0.192	0.128	0.365	0.048	22.0	-1.7	-
Max		0.655	66.30	70.10	0.366	0.726	0.984	0.237	58.0	16.1	-
Average		0.109	12.43	7.92	0.277	0.264	0.541	0.070	45.9	6.1	-

ND=Non-detect

¹Standards are for receiving water objectives from the Lahontan Basin Plan expressed as an annual average.

²Sampling of the Creek on 01/13/14 the flow measurement may be skewed due to a missing piece of the equipment.

Hidden Valley Creek - Lower Hidden
(43HDVC-5)

Table A-5:		Heavenly Mountain Resort water year 2014/2015 water quality monitoring data from station 43HDVC-5, Hidden Valley Creek baseline station. This station is located just above the confluence with Trout Creek, at an elevation of 6,680 feet.									
Date	Time	Discharge (cfs)	Turbidity (ntu)	Suspended Sediment (mg/L)	Total Nitrite/Nitrate (mg/L)	Total Kjeldahl N (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride (mg/L)	Average Temperature (Deg C)	Precipitation (in)
Lahontan Standards¹		N/A	N/A	60	N/A	N/A	0.19	0.015	0.15	N/A	N/A
First Quarter WY 2014-2015											
10/14/14	10:50	0.204	4.25	13.0	0.004	0.221	0.225	0.048	0.38	10.0	0
11/19/14	11:10	0.245	0.95	1.0	0.007	0.048	0.055	0.021	0.27	2.2	0.1
12/15/14	10:30	0.217	1.94	5.0	0.009	0.100	0.109	0.028	0.30	-1.7	0.1
Second Quarter WY 2014-2015											
1/12/15	10:30	0.263	0.49	0.8	0.014	0.056	0.070	0.019	0.27	-0.6	0
2/17/15	10:30	0.325	0.76	2.4	0.013	0.121	0.134	0.023	0.25	4.4	0
3/26/15	10:30	0.302	0.28	0.80	0.008	0.092	0.100	0.018	0.26	7.2	0
Third Quarter WY 2014-2015											
4/9/15	10:30	0.245	0.57	2.4	0.010	0.067	0.077	0.020	0.31	0.0	0.2
4/16/15	10:45	0.234	0.65	1.6	0.009	0.127	0.136	0.022	0.38	2.2	0
4/23/15	10:30	0.364	2.23	2.8	0.007	0.157	0.164	0.023	0.30	4.4	0
4/30/15	10:30	0.526	0.54	2.0	0.007	0.104	0.111	0.021	0.32	7.2	0
5/6/15	10:35	0.555	1.45	2.8	0.006	0.070	0.076	0.019	0.29	1.7	0
5/14/15	14:30	0.906	0.44	2.8	0.005	0.070	0.075	0.020	0.20	-0.6	0
5/21/15	10:30	0.795	0.40	2.8	0.005	0.130	0.135	0.020	0.19	2.2	0.3
5/27/15	10:45	1.298	1.05	2.8	0.004	0.124	0.128	0.022	0.19	7.8	0
6/4/15	10:45	1.980	1.49	4.8	0.004	0.143	0.147	0.027	0.16	5.0	0
6/11/15	10:40	1.986	2.86	6.0	0.006	0.165	0.171	0.035	0.17	11.7	0.4
6/18/15	11:00	1.174	0.74	2.0	0.006	0.093	0.099	0.029	0.15	13.3	0
6/25/15	11:10	1.022	0.49	2.0	0.006	0.088	0.094	0.028	0.15	16.1	0
Fourth Quarter WY 2014-2015											
7/16/15	10:40	0.648	0.85	1.6	0.010	0.092	0.102	0.022	0.16	13.9	0
8/19/15	10:50	0.328	0.70	3.2	0.023	0.094	0.117	0.025	0.20	14.4	0
9/17/15	11:00	0.225	2.07	2.8	0.014	0.080	0.094	0.026	0.22	6.7	0
Annual Summary	Minimum	0.204	0.28	0.80	0.004	0.048	0.055	0.018	0.15	-1.7	-
	Maximum	1.986	4.25	13.00	0.023	0.221	0.225	0.048	0.38	16.1	-
	Average	0.659	1.20	3.11	0.008	0.107	0.115	0.025	0.24	6.1	-
	90th Percentile	-	-	5.80	-	-	-	-	-	-	-

ND=Non-detect

¹ Standards are annual averages for the receiving waters of Trout Creek. For Suspended Sediment, standards are for streams tributary to Lake Tahoe. Suspended Sediment concentrations shall not exceed a 90th percentile value of 60 mg/L.

Edgewood Creek - Above
(43HVE-1)

Table A-6:		Heavenly Mountain Resort water year 2014/2015 water quality monitoring data from station 43HVE-1, Edgewood Creek above Boulder Parking Lot. This station is located in Edgewood Bowl above the learn-to-ski center, at an elevation of 7,280 feet.											
Date	Time	Discharge (cfs)	Specific Conductivity (mmhos)	Turbidity (ntu)	Suspended Sediment (mg/L)	Total Nitrite/Nitrate (mg/L)	Total Kjeldahl N (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Soluble Reactive P (mg/L)	Dissolved P (mg/L)	Average Temperature (Deg C)	Precipitation (in)
NDEP Standards¹		N/A	N/A	10	25.00	N/A	N/A	0.6 ²	0.1	N/A	N/A	N/A	N/A
First Quarter WY 2014-2015													
10/14/14	No measurement due to completely dry stream											10.0	0
11/19/14	No measurement due to completely dry stream											2.2	0.1
12/15/14	No measurement due to completely dry stream/resort activities (snow making and grooming)											-1.7	0.1
Second Quarter WY 2014-2015													
1/12/15	No measurement due to completely dry stream/resort activities (snow making and grooming)											-0.6	0
2/17/15	No measurement due to completely dry stream/resort activities (snow making and grooming)											4.4	0
3/26/15	No measurement due to completely dry stream/resort activities (snow making and grooming)											7.2	0
Third Quarter WY 2014-2015													
4/9/15	13:50	0.010	51.9	1.82	7.6	0.003	0.054	0.057	0.059	0.012	0.024	0.0	0.2
4/16/15	No Sample collected, due to extremely low to no flows.											2.2	0
4/23/15	No Sample collected, due to extremely low to no flows.											4.4	0
4/30/15	No Sample collected, due to extremely low to no flows.											7.2	0
5/6/15	No Sample collected, due to extremely low to no flows.											1.7	0
5/14/15	10:00	0.001	40.4	0.92	6.4	0.003	0.274	0.277	0.044	0.009	0.019	-0.6	0
5/21/15	13:50	0.012	63.9	1.59	4.8	0.002	0.186	0.188	0.038	0.009	0.019	2.2	0.3
5/27/15	No Sample collected, due to extremely low to no flows.											7.8	0
6/4/15	14:40	0.005	72.4	0.77	2.4	0.002	0.181	0.183	0.028	0.009	0.022	5.0	0
6/11/15	No Sample collected, due to extremely low to no flows.											11.7	0.4
6/18/15	No Sample collected, due to extremely low to no flows.											13.3	0
6/25/15	No Sample collected, due to extremely low to no flows.											16.1	0
Fourth Quarter WY 2014-2015													
7/16/15	No Sample collected, due to extremely low to no flows.											13.9	0
8/19/15	No Sample collected, due to extremely low to no flows.											14.4	0
9/17/15	No Sample collected, due to extremely low to no flows.											6.7	0
Annual Summary	Minimum	0.001	40.40	0.77	2.40	0.002	0.054	0.057	0.028	0.009	0.019	-1.70	-
	Maximum	0.012	72.40	1.82	7.60	0.003	0.274	0.277	0.059	0.012	0.024	16.10	-
	Average	0.007	57.15	1.28	5.30	0.003	0.174	0.176	0.042	0.010	0.021	6.07	-

¹NDEP Standards are from the Nevada Administrative Code (NAC) Chapter 445A.1915. All listed numbers are standards for single values no greater than a given parameter unless otherwise noted.

²Annual Average

Edgewood Creek - Below
(43HVE-2)

Table A-7:		Heavenly Mountain Resort water year 2014/2015 water quality monitoring data from station 43HVE-2, Edgewood Creek below Boulder Parking Lot. . This station is located 1/4 mile below the parking lot, underneath the power lines at an elevation of 7,120 feet.											
Date	Time	Discharge (cfs) ³	Specific Conductivity (mmhos)	Turbidity (ntu)	Suspended Sediment (mg/L)	Total Nitrite/Nitrate (mg/L)	Total Kjeldahl N (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Soluble Reactive P (mg/L)	Dissolved P (mg/L)	Average Temperature (Deg C)	Precipitation (in)
NDEP Standards¹		N/A	N/A	10.0	25.0	N/A	N/A	0.6²	0.1	N/A	N/A	N/A	N/A
First Quarter WY 2014-2015													
10/14/14	14:10	0.019	153.6	1.25	2.0	0.004	0.095	0.099	0.025	0.002	0.018	10.0	0
11/19/14	14:30	0.031	153.5	1.5	4.0	0.041	0.136	0.177	0.026	0.003	0.017	2.2	0.1
12/15/14	14:10	0.027	144.3	1.55	2.8	0.062	0.139	0.201	0.019	0.004	0.015	-1.7	0.1
Second Quarter WY 2014-2015													
1/12/15	15:00	0.034	136.1	0.98	1.20	0.07	0.088	0.158	0.017	0.003	0.015	-0.6	0
2/17/15	14:20	0.015	138.0	2.60	2.0	0.066	0.136	0.202	0.018	0.005	0.014	4.4	0
3/26/15	14:20	0.047	145.0	0.82	1.20	0.066	0.104	0.17	0.016	0.004	0.012	7.2	0
Third Quarter WY 2014-2015													
4/9/15	14:00	0.018	144.4	1.42	2.0	0.07	0.12	0.190	0.022	0.004	0.016	0.0	0.2
4/16/15	14:30	0.033	145.2	1.77	2.4	0.072	0.176	0.248	0.018	0.004	0.012	2.2	0
4/23/15	14:00	0.021	144.8	1.16	2.0	0.051	0.166	0.217	0.018	0.004	0.013	4.4	0
4/30/15	12:20	0.038	145.0	1.18	3.2	0.064	0.136	0.20	0.029	0.005	0.014	7.2	0
5/6/15	10:35	0.037	145.0	0.98	1.6	0.054	0.102	0.156	0.017	0.005	0.013	1.7	0
5/14/15	10:30	0.033	143.7	1.24	1.2	0.062	0.113	0.175	0.018	0.004	0.015	-0.6	0
5/21/15	14:10	0.033	139.8	1.71	2.0	0.061	0.128	0.189	0.017	0.004	0.013	2.2	0.3
5/27/15	14:45	0.049	140.8	2.96	2.0	0.054	0.164	0.218	0.025	0.010	0.018	7.8	0
6/4/15	14:55	0.035	143.6	2.33	2.8	0.061	0.153	0.214	0.020	0.005	0.015	5.0	0
6/11/15	13:55	0.026	145.3	1.96	2.8	0.061	0.141	0.202	0.034	0.005	0.030	11.7	0.4
6/18/15	15:00	0.010	142.7	2.30	4.0	0.058	0.149	0.207	0.033	0.006	0.028	13.3	0
6/25/15	15:15	0.009	139.4	10.9	18.0	0.064	0.408	0.472	0.068	0.006	0.028	16.1	0
Fourth Quarter WY 2014-2015													
7/16/15	15:15	0.009	138.2	1.20	1.6	0.059	0.093	0.152	0.021	0.006	0.018	13.9	0
8/19/15	15:05	0.009	134.9	11.6	17.2	0.031	0.383	0.414	0.051	0.006	0.017	14.4	0
9/17/15	15:35	0.014	134.7	0.57	2.8	0.023	0.081	0.104	0.018	0.005	0.016	6.7	0
Annual Summary	Minimum	0.009	134.70	0.57	1.200	0.004	0.081	0.099	0.016	0.002	0.012	-1.7	-
	Maximum	0.049	153.60	11.60	18.000	0.072	0.408	0.472	0.068	0.010	0.030	16.1	-
	Average	0.026	142.76	2.48	3.752	0.055	0.153	0.208	0.025	0.005	0.017	6.1	-

¹NDEP Standards are from the Nevada Administrative Code (NAC) Chapter 445A.1915. All listed numbers are standards for single values no greater than a given parameter unless otherwise noted.

²Annual Average

7/20/2015

Cardno Entrix, Inc.
PO Box 1533
Zephyr Cove, NV 89448
Attn: Chris Donley

OrderID: 1507466

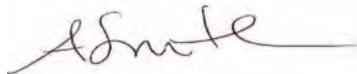
Dear: Chris Donley

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 7/17/2015. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,



Andy Smith
QA Manager

SPARKS

475 E. Greg Street, Suite 119
Sparks, Nevada 89431
tel (775) 355-0202
fax (775) 355-0817
EPA LAB ID: NV00925 - ELAP No: 2523

ELKO

1084 Lamoille Hwy
Elko, Nevada 89801
tel (775) 777-9933
fax (775) 777-9933
EPA LAB ID: NV00926

LAS VEGAS

3230 Polaris Ave. Suite 4
Las Vegas, Nevada 89102
tel (702) 475-8899
fax (702) 622-2868
EPA LAB ID: NV00932

Western Environmental Testing Laboratory

Report Comments

Cardno Entrix, Inc. - 1507466

Specific Report Comments

None

Report Legend

- B -- Blank contamination; Analyte detected above the method reporting limit in an associated blank.
- D -- Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.
- HT -- Sample analyzed beyond the accepted holding time.
- J -- The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- M -- The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.
- N -- There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.
- NC -- Not calculated due to matrix interference or very high sample concentration.
- QD -- The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.
- QL -- The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.
- S -- Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits.
- SC -- Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered.
- U -- The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit.

General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:

A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

SPARKS

475 E. Greg Street, Suite 119
Sparks, Nevada 89431
tel (775) 355-0202
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EPA LAB ID: NV00925 - ELAP No: 2523

ELKO

1084 Lamoille Hwy
Elko, Nevada 89801
tel (775) 777-9933
fax (775) 777-9933
EPA LAB ID: NV00926

LAS VEGAS

3230 Polaris Ave. Suite 4
Las Vegas, Nevada 89102
tel (702) 475-8899
fax (702) 622-2868
EPA LAB ID: NV00932

Western Environmental Testing Laboratory Analytical Report

Cardno Entrix, Inc.
PO Box 1533
Zephyr Cove, NV 89448
Attn: Chris Donley
Phone: (775) 588-9069 Fax: (775) 588-9219

Date Printed: 7/20/2015
OrderID: 1507466

Customer Sample ID: 20150716 43 HDVC-5 Hidden
WETLAB Sample ID: 1507466-001

Collect Date/Time: 7/16/2015 10:40
Receive Date: 7/17/2015 08:20

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
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Anions by Ion Chromatography

Chloride	EPA 300.0	0.16	mg/L	1	0.10	7/17/2015	NV00925
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Customer Sample ID: 20150716 43 HVC-3 Property
WETLAB Sample ID: 1507466-002

Collect Date/Time: 7/16/2015 11:45
Receive Date: 7/17/2015 08:20

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
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Anions by Ion Chromatography

Chloride	EPA 300.0	1.1	mg/L	1	0.10	7/17/2015	NV00925
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Customer Sample ID: 20150716 43 BPC-4 Bijou
WETLAB Sample ID: 1507466-003

Collect Date/Time: 7/16/2015 12:30
Receive Date: 7/17/2015 08:20

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
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Anions by Ion Chromatography

Chloride	EPA 300.0	44	mg/L	1	0.10	7/17/2015	NV00925
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Customer Sample ID: 20150716 43 HVC-2 Patsy's
WETLAB Sample ID: 1507466-004

Collect Date/Time: 7/16/2015 13:30
Receive Date: 7/17/2015 08:20

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
---------	--------	---------	-------	----	----	----------	-------

Anions by Ion Chromatography

Chloride	EPA 300.0	1.1	mg/L	1	0.10	7/17/2015	NV00925
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Customer Sample ID: 20150716 43 HVC-1A Sky Meadow
WETLAB Sample ID: 1507466-005

Collect Date/Time: 7/16/2015 14:15
Receive Date: 7/17/2015 08:20

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
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Anions by Ion Chromatography

Chloride	EPA 300.0	0.86	mg/L	1	0.10	7/17/2015	NV00925
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Western Environmental Testing Laboratory QC Report

QCBatchID	QCType	Parameter	Method	Result	Units
QC15070749	Blank 1	Chloride	EPA 300.0	ND	mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Recovery	Units
QC15070749	LCS 1	Chloride	EPA 300.0	10.4	10.0	104	mg/L

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result	MS Result	MSD Result	Spike Value	Units	MS % Rec.	MSD % Rec.	RPD
QC15070749	MS 1	Chloride	EPA 300.0	1507466-001	0.164	5.83	5.93	5.00	mg/L	113	115	2%

SPARKS

475 E. Greg Street, Suite 119
 Sparks, Nevada 89431
 tel (775) 355-0202
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ELKO

1084 Lamoille Hwy
 Elko, Nevada 89801
 tel (775) 777-9933
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 EPA LAB ID: NV00926

LAS VEGAS

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8/25/2015

Cardno
PO Box 1533
Zephyr Cove, NV 89448
Attn: Chris Donley

OrderID: 1508509

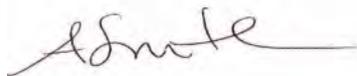
Dear: Chris Donley

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 8/20/2015. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,



Andy Smith
QA Manager

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EPA LAB ID: NV00925 - ELAP No: 2523

ELKO

1084 Lamoille Hwy
Elko, Nevada 89801
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EPA LAB ID: NV00926

LAS VEGAS

3230 Polaris Ave. Suite 4
Las Vegas, Nevada 89102
tel (702) 475-8899
fax (702) 622-2868
EPA LAB ID: NV00932

Western Environmental Testing Laboratory

Report Comments

Cardno - 1508509

Specific Report Comments

None

Report Legend

- B -- Blank contamination; Analyte detected above the method reporting limit in an associated blank.
- D -- Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.
- HT -- Sample analyzed beyond the accepted holding time.
- J -- The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- M -- The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.
- N -- There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.
- NC -- Not calculated due to matrix interference or very high sample concentration.
- QD -- The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.
- QL -- The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.
- S -- Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits.
- SC -- Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered.
- U -- The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit.

General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:

A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

SPARKS

475 E. Greg Street, Suite 119
Sparks, Nevada 89431
tel (775) 355-0202
fax (775) 355-0817
EPA LAB ID: NV00925 - ELAP No: 2523

ELKO

1084 Lamoille Hwy
Elko, Nevada 89801
tel (775) 777-9933
fax (775) 777-9933
EPA LAB ID: NV00926

LAS VEGAS

3230 Polaris Ave. Suite 4
Las Vegas, Nevada 89102
tel (702) 475-8899
fax (702) 622-2868
EPA LAB ID: NV00932

Western Environmental Testing Laboratory Analytical Report

Cardno
PO Box 1533
Zephyr Cove, NV 89448
Attn: Chris Donley
Phone: (775) 588-9069 **Fax:** (775) 588-9219

Date Printed: 8/25/2015
OrderID: 1508509

Customer Sample ID: 20150819 43HDVC-5

Collect Date/Time: 8/19/2015 10:50

WETLAB Sample ID: 1508509-001

Receive Date: 8/20/2015 08:09

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
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Anions by Ion Chromatography

Chloride	EPA 300.0	0.20	mg/L	1	0.10	8/20/2015	NV00925
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Customer Sample ID: 20150819 43-BPC-4

Collect Date/Time: 8/19/2015 12:40

WETLAB Sample ID: 1508509-002

Receive Date: 8/20/2015 08:09

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
---------	--------	---------	-------	----	----	----------	-------

Anions by Ion Chromatography

Chloride	EPA 300.0	40	mg/L	1	0.10	8/20/2015	NV00925
----------	-----------	----	------	---	------	-----------	---------

Customer Sample ID: 20150819 43HVC-2

Collect Date/Time: 8/19/2015 13:30

WETLAB Sample ID: 1508509-003

Receive Date: 8/20/2015 08:09

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
---------	--------	---------	-------	----	----	----------	-------

Anions by Ion Chromatography

Chloride	EPA 300.0	1.2	mg/L	1	0.10	8/20/2015	NV00925
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Customer Sample ID: 20150819 43HVC-1A

Collect Date/Time: 8/19/2015 14:15

WETLAB Sample ID: 1508509-004

Receive Date: 8/20/2015 08:09

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
---------	--------	---------	-------	----	----	----------	-------

Anions by Ion Chromatography

Chloride	EPA 300.0	0.78	mg/L	1	0.10	8/20/2015	NV00925
----------	-----------	------	------	---	------	-----------	---------

SPARKS

475 E. Greg Street, Suite 119
 Sparks, Nevada 89431
 tel (775) 355-0202
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 EPA LAB ID: NV00925 - ELAP No: 2523

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1084 Lamoille Hwy
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LAS VEGAS

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 Las Vegas, Nevada 89102
 tel (702) 475-8899
 fax (702) 622-2868
 EPA LAB ID: NV00932

Western Environmental Testing Laboratory QC Report

QCBatchID	QCType	Parameter	Method	Result	Units
QC15080911	Blank 1	Chloride	EPA 300.0	ND	mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Recovery	Units
QC15080911	LCS 1	Chloride	EPA 300.0	10.2	10.0	102	mg/L

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result	MS Result	MSD Result	Spike Value	Units	MS % Rec.	MSD % Rec.	RPD
QC15080911	MS 1	Chloride	EPA 300.0	1508519-002	0.244	1.54	1.55	1.25	mg/L	104	104	1%

SPARKS

475 E. Greg Street, Suite 119
Sparks, Nevada 89431
tel (775) 355-0202
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EPA LAB ID: NV00925 - ELAP No: 2523

ELKO

1084 Lamoille Hwy
Elko, Nevada 89801
tel (775) 777-9933
fax (775) 777-9933
EPA LAB ID: NV00926

LAS VEGAS

3230 Polaris Ave. Suite 4
Las Vegas, Nevada 89102
tel (702) 475-8899
fax (702) 622-2868
EPA LAB ID: NV00932

9/29/2015

Cardno
PO Box 1533
Zephyr Cove, NV 89448
Attn: Chris Donley

OrderID: 1509514

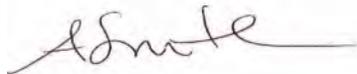
Dear: Chris Donley

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 9/18/2015. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,



Andy Smith
QA Manager

SPARKS

475 E. Greg Street, Suite 119
Sparks, Nevada 89431
tel (775) 355-0202
fax (775) 355-0817
EPA LAB ID: NV00925 - ELAP No: 2523

ELKO

1084 Lamoille Hwy
Elko, Nevada 89801
tel (775) 777-9933
fax (775) 777-9933
EPA LAB ID: NV00926

LAS VEGAS

3230 Polaris Ave. Suite 4
Las Vegas, Nevada 89102
tel (702) 475-8899
fax (702) 622-2868
EPA LAB ID: NV00932

Western Environmental Testing Laboratory

Report Comments

Cardno - 1509514

Specific Report Comments

None

Report Legend

- B -- Blank contamination; Analyte detected above the method reporting limit in an associated blank.
- D -- Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.
- HT -- Sample analyzed beyond the EPA recommended holding time.
- J -- The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- M -- The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.
- N -- There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.
- NC -- Not calculated due to matrix interference or very high sample concentration.
- QD -- The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.
- QL -- The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.
- S -- Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits.
- SC -- Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered.
- U -- The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit.

General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:

A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

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LAS VEGAS

3230 Polaris Ave. Suite 4
Las Vegas, Nevada 89102
tel (702) 475-8899
fax (702) 622-2868
EPA LAB ID: NV00932

Western Environmental Testing Laboratory Analytical Report

Cardno
PO Box 1533
Zephyr Cove, NV 89448

Attn: Chris Donley

Phone: (775) 588-9069 **Fax:** (775) 588-9219

Date Printed: 9/29/2015

OrderID: 1509514

Customer Sample ID: 20150917 43HDVC-5 Hidden

Collect Date/Time: 9/17/2015 11:00

WETLAB Sample ID: 1509514-001

Receive Date: 9/18/2015 08:09

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
---------	--------	---------	-------	----	----	----------	-------

Anions by Ion Chromatography

Chloride	EPA 300.0	0.22	mg/L	1	0.10	9/22/2015	NV00925
----------	-----------	------	------	---	------	-----------	---------

Customer Sample ID: 20150917 43BPC-4 Bijou

Collect Date/Time: 9/17/2015 12:35

WETLAB Sample ID: 1509514-002

Receive Date: 9/18/2015 08:09

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
---------	--------	---------	-------	----	----	----------	-------

Anions by Ion Chromatography

Chloride	EPA 300.0	37	mg/L	1	0.10	9/22/2015	NV00925
----------	-----------	----	------	---	------	-----------	---------

Customer Sample ID: 20150917 43HVC-2 Patsy's

Collect Date/Time: 9/17/2015 13:25

WETLAB Sample ID: 1509514-003

Receive Date: 9/18/2015 08:09

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
---------	--------	---------	-------	----	----	----------	-------

Anions by Ion Chromatography

Chloride	EPA 300.0	1.4	mg/L	1	0.10	9/22/2015	NV00925
----------	-----------	-----	------	---	------	-----------	---------

Customer Sample ID: 20150917 43HVC-1A Sky Meadows

Collect Date/Time: 9/17/2015 13:55

WETLAB Sample ID: 1509514-004

Receive Date: 9/18/2015 08:09

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
---------	--------	---------	-------	----	----	----------	-------

Anions by Ion Chromatography

Chloride	EPA 300.0	0.80	mg/L	1	0.10	9/22/2015	NV00925
----------	-----------	------	------	---	------	-----------	---------

SPARKS

475 E. Greg Street, Suite 119
Sparks, Nevada 89431
tel (775) 355-0202
fax (775) 355-0817
EPA LAB ID: NV00925 - ELAP No: 2523

ELKO

1084 Lamoille Hwy
Elko, Nevada 89801
tel (775) 777-9933
fax (775) 777-9933
EPA LAB ID: NV00926

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3230 Polaris Ave. Suite 4
Las Vegas, Nevada 89102
tel (702) 475-8899
fax (702) 622-2868
EPA LAB ID: NV00932

Western Environmental Testing Laboratory QC Report

QCBatchID	QCType	Parameter	Method	Result	Units
QC15090833	Blank 1	Chloride	EPA 300.0	ND	mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Recovery	Units
QC15090833	LCS 1	Chloride	EPA 300.0	10.0	10.0	100	mg/L

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result	MS Result	MSD Result	Spike Value	Units	MS % Rec.	MSD % Rec.	RPD
QC15090833	MS 1	Chloride	EPA 300.0	1509514-004	0.803	2.15	2.15	1.25	mg/L	108	108	<1%

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475 E. Greg Street, Suite 119
Sparks, Nevada 89431
tel (775) 355-0202
fax (775) 355-0817
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Las Vegas, Nevada 89102
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WETLAB

WESTERN ENVIRONMENTAL TESTING LABORATORY

Specializing in Soil, Hazardous Waste and Water Analysis.

475 E. Greg Street #119 | Sparks, Nevada 89431 | www.WETLaboratory.com

tel (775) 355-0202 | fax (775) 355-0817

1084 Lamoille Highway | Elko, Nevada 89801

tel (775) 777-9933 | fax (775) 777-9933

3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102

tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 15095184

Sparks Control # _____

Elko Control # _____

LV Control # _____

Report Due Date 10-02-15

Page 1 of 1

Client CARDNO

Address 295 AWY 50 Suite # 1

City, State & Zip Zephyr Cove NV 89448

Contact Chris Donley

Phone (775) 588-9069 Collector's Name _____

Fax _____ PWS/Project Name _____

P.O. Number _____ PWS/Project Number _____

Email Chris.donley@cardno.com

Billing Address (if different than Client Address)

Company _____

Address _____

City, State & Zip _____

Contact _____

Phone _____ Fax _____

Email _____

SAMPLE NO. OF CONTAINERS

DATE TIME PRES TYPE

20150917 43HDVC-5 HIDDEN 9/17 11:00 1 SW 1 X

20150917 43BPC-4 BIDU 9/17 12:35 1 SW 1 X

20150917 43HVC-2 PATSY's 9/17 1:25 1 SW 1 X

20150917 43HVC-1A Sky Meadows 9/17 6:55 1 SW 1 X

Instructions/Comments/Special Requirements:

Sample Matrix Key** DW = Drinking Water WW = Wastewater SW = Surface Water MW = Monitoring Well SD = Solid/Sludge SO = Soil HW = Hazardous Waste

*SAMPLE PRESERVATIVES: 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=HCl/VOA Vial

Temp Custody Seal # of Containers DATE TIME Samples Relinquished By Samples Received By

5.7°C Y N None 4 9/18/15 8:09am [Signature]

°C Y N None

°C Y N None

°C Y N None

WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). RD initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. RD initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. RD initial

Please contact your Project Manager for details. RD initial 301 2E

ANALYSIS REPORT											
Client:	Cardno Entrix - Heavenly Water Quality Sampling						Lab:	High Sierra Water Lab			
	701 University Ave. Suite 200							Collin Strassenburgh			
	Sacramento, CA 95825							PO Box 843			
	(916) 923-1097							Tahoe City, CA 96145			
	E-mail: chris.donley@cardno.com							Phone 530 584 2438			
								Fax 530 584 2439			
								E-mail: collin@highsierrawaterlab.com			
Report Date: 8/5/15 (file name: HV080515.xls)											
Site	ID	Date	Time	NO3/NO2-N (ppb)	SRP-P (ppb)	DP-P (ppb)	TP-P (ppb)	TKN (ppb)	TSS (mg/L)	Cond (µs/cm)	Turbidity (ntu)
Patsy's	HV-C2	7/16/2015	13:30	39			19	97	1.6		1.06
Bijou Park Creek	HV-C4	7/16/2015	12:30	240			91	284	8.0		17.4
Property Line	HV-C3	7/16/2015	11:45	3			20	95	2.0		0.52
Hidden	HV-H5	7/16/2015	10:40	10			22	92	1.6		0.85
Sky Meadow	HV-C1	7/16/2015	14:15	67			19	94	1.6		1.62
Edgewood Below	HV-E2	7/16/2015	15:15	59	6	18	21	93	1.6	138.2	1.20

ANALYSIS REPORT												
Client:	Cardno Entrix - Heavenly Water Quality Sampling						Lab:	High Sierra Water Lab				
	701 University Ave. Suite 200							Collin Strassenburgh				
	Sacramento, CA 95825							PO Box 843				
	(916) 923-1097							Tahoe City, CA 96145				
	E-mail: chris.donley@cardno.com							Phone 530 584 2438				
								Fax 530 584 2439				
								E-mail: collin@highsierrawaterlab.com				
Report Date: 9/8/15 (file name: HV090815.xls)												
Site	ID	Date	Time	NO3/NO2-N (ppb)	SRP-P (ppb)	DP-P (ppb)	TP-P (ppb)	TKN (ppb)	TSS (mg/L)	Cond (µs/cm)	Turbidity (ntu)	
Patsy's	HV-C2	8/19/2015	13:30	73			27	190	4.4		1.16	
Bijou Park Creek	HV-C4	8/19/2015	12:40	241			56	252	4.8		10.3	
Hidden	HV-H5	8/19/2015	10:50	23			25	94	3.2		0.70	
Sky Meadow	HV-C1	8/19/2015	14:15	35			18	99	2.8		1.01	
Edgewood Below	HV-E2	8/19/2015	15:05	31	6	17	51	383	17.2	134.9	11.6	

ANALYSIS REPORT												
Client:	Cardno Entrix - Heavenly Water Quality Sampling						Lab:	High Sierra Water Lab				
	701 University Ave. Suite 200							Collin Strassenburgh				
	Sacramento, CA 95825							PO Box 843				
	(916) 923-1097							Tahoe City, CA 96145				
	E-mail: chris.donley@cardno.com							Phone 530 584 2438				
								Fax 530 584 2439				
								E-mail: collin@highsierrawaterlab.com				
Report Date: 9/30/15 (file name: HV093015.xls)												
Site	ID	Date	Time	NO3/NO2-N (ppb)	SRP-P (ppb)	DP-P (ppb)	TP-P (ppb)	TKN (ppb)	TSS (mg/L)	Cond (µs/cm)	Turbidity (ntu)	
Patsy's	HV-C2	9/17/2015	13:25	53			18	63	2.0		1.21	
Bijou Park Creek	HV-C4	9/17/2015	12:35	233			58	197	4.4		8.26	
Hidden	HV-H5	9/17/2015	11:00	14			26	80	2.8		2.07	
Sky Meadow	HV-C1	9/17/2015	13:55	15			18	90	2.0		0.62	
Edgewood Below	HV-E2	9/17/2015	15:35	23	5	16	18	81	2.8	134.7	0.57	

Heavenly Mountain Resort Water Year
2015

APPENDIX B
RAW WATER QUALITY CONSTITUENTS
CA FILTER VAULTS WATER YEAR 2015

California Parking Lot - Stormfilter
Influent (43HVP-1a)

Table B-1 Heavenly Mountain Resort water year 2015 water quality monitoring data from influent station 43HVP-1a (North), California Parking Lot Filter Vault influent point one. This station is located within the CA parking lot.										
Date	Notes	Time	Turbidity (NTU)	Total Phosphorus (mg/L)	Nitrate Nitrogen (mg/L)	Nitrite Nitrogen (mg/L) ³	Total Kjeldahl Nitrogen (mg/L)	Total Nitrogen Calc. (mg/L)	Chloride (mg/L)	Oil & Grease (mg/L)
Lahontan Standards			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
First Quarter WY 2014-2015										
11/22/2014	¹	11:11	46	0.19	0.066	0.026	0.68	0.77	18	ND
12/2/2014	²	19:51	39	0.15	0.060	ND	0.39	0.45	19	ND
Second Quarter WY 2014-2015										
2/8/2015	³	16:42	-	0.095	0.12	0.031	0.6	0.71	56	2.2
Third Quarter WY 2014-2015										
5/7/2015		12:58	24	0.084	0.22	0.019	0.54	0.78	43	ND
5/15/2015	⁴	8:10	5.6	0.041	0.45	ND	0.24	0.69	61	ND
6/29/2015		No Sample collected due to automated equipment mishap.								
Fourth Quarter WY 2014-2015										
7/8/2015	⁵	14:25	64	0.086	0.19	ND	0.42	0.60	5.0	ND

¹ Reported Turbidity, Nitrate and Nitrite as Nitrogen constituent values were analyzed beyond the accepted holding time. Samples collected on a Saturday.

² Reported oil and grease value is estimated; The value failed to meet QC criteria for either precision or accuracy.

³ Turbidity was mistakenly left off of the chain of custody and it was determined that the sample was past the hold time upon discovery.

⁴ The North auto-sampler did not collect the storm surge on 5/14/15. The sample collected reflects the morning after tram sump water (groundwater).

⁵ The results for the laboratory control sample (LCS) for Oil and Grease were outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.

California Parking Lot - Stormfilter
Influent (43HVP-1b)

Table B-2		Heavenly Mountain Resort water year 2015 water quality monitoring data from influent station 43HVP-1b (South), California Parking Lot Filter Vault influent point two. This station is located within the CA parking lot.								
Date	Notes	Time	Turbidity (NTU)	Total Phosphorus (mg/L)	Nitrate Nitrogen (mg/L)	Nitrite Nitrogen (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Total Nitrogen Calc. (mg/L)	Chloride (mg/L)	Oil & Grease (mg/L)
Lahontan Standards			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
First Quarter WY 2014-2015										
11/22/2014	^{1,2}	13:18	30	0.096	0.080	0.026	0.38	0.49	18	ND
12/3/2014	²	17:30	34	0.14	0.078	0.017	0.39	0.48	20	ND
Second Quarter WY 2014-2015										
2/8/2015		No Sample collected due to automated equipment mishap.								
Third Quarter WY 2014-2015										
5/7/2015		12:48	27	0.072	0.11	0.020	0.65	0.78	27	ND
5/14/2015		22:22	19	0.046	0.14	ND	0.56	0.70	11	ND
6/29/2015	³	18:03	260	0.70	ND	0.021	9.7	9.7	11	ND
Fourth Quarter WY 2014-2015										
7/8/2015	⁴	14:22	24	0.096	0.18	ND	0.48	24	2.4	ND

¹ Reported Turbidity, Nitrate and Nitrite as Nitrogen constituent values were analyzed beyond the accepted holding time. Samples collected on a Saturday.

² Samples collected reflect grab samples collected during the storm event. The automated composite samples were not triggered during the event.

³ The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of total Kjeldahl Nitrogen (TKN) were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.

⁴ The results for the laboratory control sample (LCS) for Oil and Grease were outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.

California Parking Lot - Stormfilter
Effluent (43HVP-2)

Table B-3		Heavenly Mountain Resort water year 2015 water quality monitoring data from effluent station 43HVP-2, California Parking Lot Filter Vault effluent point. This station is located within the CA parking lot.								
Date	Notes	Time	Turbidity (NTU)	Total Phosphorus (mg/L)	Nitrate Nitrogen (mg/L)	Nitrite Nitrogen (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Total Nitrogen Calc. (mg/L)	Chloride (mg/L)	Oil & Grease (mg/L)
Lahontan Standards¹			20.0	0.10	N/A	N/A	N/A	0.5	N/A	2.0
First Quarter WY 2014-2015										
11/22/2014	^{2,3,4}	11:15	42	0.20	0.055	0.026	0.56	0.64	20	ND
12/2/2014	-	19:49	46	0.072	0.066	0.018	0.38	0.47	20	ND
Second Quarter WY 2014-2015										
02/08/15	^{4,5}	17:34	-	0.13	0.050	0.013	0.67	0.74	57	3.9
Third Quarter WY 2014-2015										
5/7/2015	^{6,7}	12:58	-	0.070	-	-	0.74	0.74	-	ND
5/14/2015	⁸	23:23	26	0.030	0.21	ND	0.57	0.78	24	ND
6/29/2015	⁶	18:13	220	0.30	ND	ND	4.4	4.4	17	ND
Fourth Quarter WY 2014-2015										
7/8/2015	^{6,9}	14:27	24	0.15	0.17	ND	0.70	0.88	4	ND
Annual Summary		Min	24	0.03	0.05	0.01	0.38	0.47	4	ND
		Max	220	0.3	0.21	0.026	4.4	4.4	57	3.9
		# of Samples	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
# of Noncompliance Samples			5.0	4.0	-	-	-	6.0	-	1.0
% of Noncompliance Samples			71%	57%	-	-	-	86%	-	14%

¹ Standards are maximum concentration for discharge to surface waters not to exceed, effective November 30, 2008.

² Reported Turbidity, Nitrate and Nitrite as Nitrogen constituent values were analyzed beyond the accepted holding time. Samples collected on a Saturday.

³ Reported oil and grease and Total Kjeldahl Nitrogen values are estimated; The sample matrix interfered with the analysis.

⁴ Spike recovery not calculated for Chloride, Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered.

⁵ Turbidity was mistakenly left off of the chain of custody and it was determined that the sample was past the hold time upon discovery.

⁶ The matrix spike/matrix spike duplicate values for oil and grease parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.

⁷ During transportation, the effluent bottle lid popped off. The carrier misplaced the bottle within the cooler and the bottle arrived to the laboratory empty.

Nitrate, nitrite, turbidity and chloride were not analyzed due to the lack of unpreserved water samples.

⁸ The North inlet sample was collected the next morning and reflects the sump/groundwater. Not indicative of the storm surge.

⁹ The results for the laboratory control sample (LCS) for Oil and Grease were outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.

7/28/2015

Cardno Entrix, Inc.
PO Box 1533
Zephyr Cove, NV 89448
Attn: Chris Donley

OrderID: 1507289

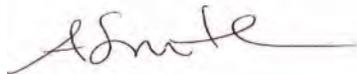
Dear: Chris Donley

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 7/9/2015. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,



Andy Smith
QA Manager

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Sparks, Nevada 89431
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EPA LAB ID: NV00932

Western Environmental Testing Laboratory

Report Comments

Cardno Entrix, Inc. - 1507289

Specific Report Comments

None

Report Legend

- B -- Blank contamination; Analyte detected above the method reporting limit in an associated blank.
- D -- Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.
- HT -- Sample analyzed beyond the accepted holding time.
- J -- The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- M -- The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.
- N -- There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.
- NC -- Not calculated due to matrix interference or very high sample concentration.
- QD -- The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.
- QL -- The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.
- S -- Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits.
- SC -- Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered.
- U -- The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit.

General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:

A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

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tel (702) 475-8899
fax (702) 622-2868
EPA LAB ID: NV00932

Western Environmental Testing Laboratory

Analytical Report

Cardno Entrix, Inc.

PO Box 1533

Zephyr Cove, NV 89448

Attn: Chris Donley

Phone: (775) 588-9069 Fax: (775) 588-9219

Date Printed: 7/28/2015

OrderID: 1507289

Customer Sample ID: HV-P1A (North)

Collect Date/Time: 7/8/2015 14:25

WETLAB Sample ID: 1507289-001

Receive Date: 7/9/2015 16:20

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Total Phosphorous as P	SM 4500-P E	0.086	mg/L	1	0.010	7/21/2015	NV00925
Total Suspended Solids (TSS)	SM 2540D	72	mg/L	1	1	7/15/2015	NV00925
Total Nitrogen	Calc.	0.60	mg/L	1	0.22	7/23/2015	NV00925
Turbidity (Nephelometric)	EPA 180.1	64	NTU	5	0.50	7/10/2015	NV00925
Oil & Grease (SGT-HEM)	EPA 1664	ND QL	mg/L	1	2.0	7/20/2015	NV00925
Anions by Ion Chromatography							
Chloride	EPA 300.0	5.0	mg/L	1	0.10	7/9/2015	NV00925
Nitrate Nitrogen	EPA 300.0	0.19	mg/L	1	0.010	7/9/2015	NV00925
Nitrite Nitrogen	EPA 300.0	ND	mg/L	1	0.010	7/9/2015	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	0.42	mg/L	1	0.20	7/23/2015	NV00925

Customer Sample ID: HV-P1B (South)

Collect Date/Time: 7/8/2015 14:22

WETLAB Sample ID: 1507289-002

Receive Date: 7/9/2015 16:20

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Total Phosphorous as P	SM 4500-P E	0.096	mg/L	1	0.010	7/21/2015	NV00925
Total Suspended Solids (TSS)	SM 2540D	68	mg/L	1	1	7/15/2015	NV00925
Total Nitrogen	Calc.	0.65	mg/L	1	0.22	7/23/2015	NV00925
Turbidity (Nephelometric)	EPA 180.1	24	NTU	5	0.50	7/10/2015	NV00925
Oil & Grease (SGT-HEM)	EPA 1664	ND QL	mg/L	1	2.0	7/20/2015	NV00925
Anions by Ion Chromatography							
Chloride	EPA 300.0	2.4	mg/L	1	0.10	7/9/2015	NV00925
Nitrate Nitrogen	EPA 300.0	0.18	mg/L	1	0.010	7/9/2015	NV00925
Nitrite Nitrogen	EPA 300.0	ND	mg/L	1	0.010	7/9/2015	NV00925
Flow Injection Analyses							
Total Kjeldahl Nitrogen	EPA 351.2	0.48	mg/L	1	0.20	7/23/2015	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

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SPARKS

475 E. Greg Street, Suite 119
 Sparks, Nevada 89431
 tel (775) 355-0202
 fax (775) 355-0817
 EPA LAB ID: NV00925 - ELAP No: 2523

ELKO

1084 Lamoille Hwy
 Elko, Nevada 89801
 tel (775) 777-9933
 fax (775) 777-9933
 EPA LAB ID: NV00926

LAS VEGAS

3230 Polaris Ave. Suite 4
 Las Vegas, Nevada 89102
 tel (702) 475-8899
 fax (702) 622-2868
 EPA LAB ID: NV00932

Customer Sample ID: HV-P2 (Out)
 WETLAB Sample ID: 1507289-003

Collect Date/Time: 7/8/2015 14:27

Receive Date: 7/9/2015 16:20

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
<u>General Chemistry</u>							
Total Phosphorous as P	SM 4500-P E	0.15	mg/L	1	0.010	7/21/2015	NV00925
Total Suspended Solids (TSS)	SM 2540D	64	mg/L	1	1	7/15/2015	NV00925
Total Nitrogen	Calc.	0.88	mg/L	1	0.22	7/24/2015	NV00925
Turbidity (Nephelometric)	EPA 180.1	24	NTU	5	0.50	7/10/2015	NV00925
Oil & Grease (SGT-HEM)	EPA 1664	ND	M,QL mg/L	1	2.0	7/20/2015	NV00925
<u>Anions by Ion Chromatography</u>							
Chloride	EPA 300.0	4.0	mg/L	1	0.10	7/9/2015	NV00925
Nitrate Nitrogen	EPA 300.0	0.17	mg/L	1	0.010	7/9/2015	NV00925
Nitrite Nitrogen	EPA 300.0	ND	mg/L	1	0.010	7/9/2015	NV00925
<u>Flow Injection Analyses</u>							
Total Kjeldahl Nitrogen	EPA 351.2	0.70	mg/L	1	0.20	7/24/2015	NV00925

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475 E. Greg Street, Suite 119
 Sparks, Nevada 89431
 tel (775) 355-0202
 fax (775) 355-0817
 EPA LAB ID: NV00925 - ELAP No: 2523

ELKO

1084 Lamoille Hwy
 Elko, Nevada 89801
 tel (775) 777-9933
 fax (775) 777-9933
 EPA LAB ID: NV00926

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3230 Polaris Ave. Suite 4
 Las Vegas, Nevada 89102
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 fax (702) 622-2868
 EPA LAB ID: NV00932

Western Environmental Testing Laboratory QC Report

QCBatchID	QCType	Parameter	Method	Result	Units
QC15070412	Blank 1	Chloride	EPA 300.0	ND	mg/L
		Nitrate Nitrogen	EPA 300.0	ND	mg/L
		Nitrite Nitrogen	EPA 300.0	ND	mg/L
QC15070526	Blank 1	Turbidity (Nephelometric)	EPA 180.1	ND	NTU
QC15070741	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND	mg/L
QC15070800	Blank 1	Oil & Grease (SGT-HEM)	EPA 1664	ND	mg/L
QC15070811	Blank 1	Total Phosphorous as P	SM 4500-P E	ND	mg/L
QC15070938	Blank 1	Total Kjeldahl Nitrogen	EPA 351.2	ND	mg/L
QC15071052	Blank 1	Total Kjeldahl Nitrogen	EPA 351.2	ND	mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Recovery	Units
QC15070412	LCS 1	Chloride	EPA 300.0	10.7	10.0	107	mg/L
		Nitrate Nitrogen	EPA 300.0	0.523	0.500	105	mg/L
		Nitrite Nitrogen	EPA 300.0	0.513	0.500	103	mg/L
QC15070526	LCS 1	Turbidity (Nephelometric)	EPA 180.1	4.74	5.00	95	NTU
QC15070741	LCS 1	Total Suspended Solids (TSS)	SM 2540D	195	200	98	mg/L
QC15070741	LCS 2	Total Suspended Solids (TSS)	SM 2540D	196	200	98	mg/L
QC15070800	LCS 1	Oil & Grease (SGT-HEM)	EPA 1664	6.00	10.0	60	mg/L
QC15070811	LCS 1	Total Phosphorous as P	SM 4500-P E	0.240	0.250	96	mg/L
QC15070938	LCS 1	Total Kjeldahl Nitrogen	EPA 351.2	0.932	1.00	93	mg/L
QC15071052	LCS 1	Total Kjeldahl Nitrogen	EPA 351.2	0.928	1.00	93	mg/L

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result	Units	RPD
QC15070526	Duplicate	Turbidity (Nephelometric)	EPA 180.1	1507285-001	1.46	1.26	NTU	15 %
QC15070526	Duplicate	Turbidity (Nephelometric)	EPA 180.1	1507282-001	ND	ND	QD NTU	32 %
QC15070741	Duplicate	Total Suspended Solids (TSS)	SM 2540D	1507280-001	101	102	mg/L	1 %
QC15070741	Duplicate	Total Suspended Solids (TSS)	SM 2540D	1507298-005	40.0	40.0	mg/L	<1%

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result	MS Result	MSD Result	Spike Value	Units	MS % Rec.	MSD % Rec.	RPD
QC15070412	MS 1	Chloride	EPA 300.0	1507199-002	7.73	9.04	9.06	1.25	mg/L	105	106	<1%
		Nitrate Nitrogen	EPA 300.0	1507199-002	ND	0.544	0.553	0.500	mg/L	108	110	2%
		Nitrite Nitrogen	EPA 300.0	1507199-002	ND	0.123	0.127	0.125	mg/L	98	102	3%
QC15070412	MS 2	Chloride	EPA 300.0	1507289-003	4.00	5.42	5.44	1.25	mg/L	114	115	<1%
		Nitrate Nitrogen	EPA 300.0	1507289-003	0.172	0.705	0.713	0.500	mg/L	106	108	1%
		Nitrite Nitrogen	EPA 300.0	1507289-003	ND	0.123	0.124	0.125	mg/L	99	100	1%
QC15070800	MS 1	Oil & Grease (SGT-HEM)	EPA 1664	1507289-003	ND	M, 4.40	NA	10.0	mg/L	NC	NA	NA
QC15070811	MS 1	Total Phosphorous as P	SM 4500-P E	1507287-001	0.085	M 0.263	0.265	0.250	mg/L	NC	NC	NC
QC15070811	MS 2	Total Phosphorous as P	SM 4500-P E	1507362-002	0.146	0.389	0.385	0.250	mg/L	98	96	1%
QC15070938	MS 1	Total Kjeldahl Nitrogen	EPA 351.2	1507283-001	0.384	1.29	1.39	1.00	mg/L	91	101	7%
QC15070938	MS 2	Total Kjeldahl Nitrogen	EPA 351.2	1507284-001	0.099	M, 1.26	1.10	1.00	mg/L	NC	NC	NC
QC15071052	MS 1	Total Kjeldahl Nitrogen	EPA 351.2	1507295-001	ND	M 1.24	1.01	1.00	mg/L	NC	NC	NC
QC15071052	MS 2	Total Kjeldahl Nitrogen	EPA 351.2	1507295-003	ND	M 1.13	1.06	1.00	mg/L	NC	NC	NC

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

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Heavenly Mountain Resort Water Year
2015

APPENDIX C
EFFECTIVE SOIL COVER PARADIGM
SHIFT MEMO

MEMORANDUM

FROM: Kevin Drake, Integrated Environmental Restoration Services, Inc.
Frank Papandrea, Heavenly Mountain Resort

TO: Bud Amorfini, Lahontan Regional Water Quality Control Board
Sue Norman, USFS – Lake Tahoe Basin Management Unit
David Landry, Tahoe Regional Planning Agency

RE: Proposed changes to Heavenly Mountain Resort’s Effective Soil Cover Evaluation Program

CC: Andrew Strain, Heavenly Mountain Resort
Chris Donley, Cardno ENTRIX

Problem Statement

For many decades, the success of erosion control projects has been defined largely in terms of plant cover or other form-based measures of vegetation response. At the core of Heavenly’s Cumulative Watershed Effects (CWE) implementation program is the goal of establishing “effective soil cover.” The term “effective soil cover” has its roots in the Universal Soil Loss Equation (USLE), an erosion model developed in and for agricultural settings, not high elevation forested settings like Heavenly. A core assumption in the USLE model is that control of erosion is dependent on the presence of vegetative cover. A growing body of research from Heavenly projects and throughout the Tahoe Basin has shown that effective erosion control is, instead, more dependent on a range of other readily-measurable variables including total cover (mulch, rock, vegetation, etc), soil density, infiltration, and slope and surface roughness than it is on vegetative cover alone (IERS/Grismer and Hogan, 2002-2009). Moreover, short-term plant establishment has been shown to be an insufficient (and sometimes misleading) predictor of long-term restoration success (Herrick et al. 2006) and erosion resistance (Grismer et al. 2008). Heavenly has gone to great lengths and made large financial investments in labor and infrastructure to repeatedly fertilize, seed and irrigate disturbed soil areas in an effort to establish vegetation. However, by using applied adaptive management, testing new treatment approaches, and directly measuring erosion reductions, Heavenly has demonstrated a range of cost-effective treatment and monitoring approaches over the past few years and hopes to formalize agency support for these approaches through circulation of this memo.

Current Assessment Methods and Objectives

Current methods for evaluating effective soil cover (ESC) include GIS analysis of aerial images to develop a bare soil to vegetation ratio, followed by field verification of vegetation cover and other site characteristics at 10 sites around the mountain. The ratio and field verifications are then used to extrapolate the effective soil cover in other areas at Heavenly (refer to 2008 Effective Soil Cover Workplan for further details), which is compared from year to year to assess changes in ESC and, by extension, changes in watershed erosion rates. This is largely a compliance-oriented exercise intended to understand changes in extrapolated or assumed erosion rates, but it does not directly lead to fixing specific erosion problems. These assessment efforts have been done in good faith but do not answer the fundamental question: *are we actually reducing erosion?*

The primary objectives of the current Effective Soil Cover Evaluation Program (from the 2011 Comprehensive Monitoring Report) are to:

1. Determine if changes in cover result in changes in runoff and sediment volume from ski runs and other project infrastructure.

Current State of Knowledge: *research at Heavenly and throughout the Tahoe area has consistently shown that erosion reductions are closely related to total cover (including mulch, rocks, etc), and other primary variables, specifically infiltration, but not necessarily vegetative cover alone.*

2. Evaluate utilization of soil amendments/treatments to increase infiltration capacity for those areas resistant to revegetation efforts, or where revegetation is ineffective.

Current State of Knowledge: *research at Heavenly and throughout the Tahoe area has shown that high-carbon soil amendments (such as wood chips), when combined with soil loosening, can increase infiltration rates and support immediate and long-term reductions in runoff and erosion rates.*

Proposed Assessment Methods and Objectives

Prioritize Treatments

Rather than assessing vegetation cover at 10 sites around the mountain, Heavenly proposes to use the erosion-focused rapid assessment (EfRA) process described in the *Watershed Management Guidebook* (Drake et al. 2012). This methodology focuses on identifying the primary sources of erosion (“hot spots”) through a simple GIS exercise followed by on-the-ground assessment and prioritizing treatments within a watershed context. That is, areas with high erosion potential (or actual observed erosion) and high hydrologic connectivity to surface waters are generally ranked as higher priorities and hot spots with lower erosion potential and/or connectivity to surface water are ranked as lower priorities. We also intend to integrate the USFS’ road risk analysis ratings for Heavenly roads into the treatment prioritization framework. This approach is based on developing an understanding of water flow patterns in the watershed and addressing the root cause(s) of erosion issues (often a failed water bar or other concentrated drainage features) rather than using modeling and extrapolation to make statements about the theorized “condition” of the entire watershed. Ultimately, this approach is about actually fixing erosion problems. We propose to begin this effort of identifying and prioritizing hot spots in the CA-1 watershed (Heavenly Valley Creek) in 2013 and expand to other Heavenly watersheds in the coming years.

Measure Outcomes

Heavenly has already been using monitoring techniques that directly measure erosion reductions and indices of a site’s erosion resistance. These measurement methods are typically used before implementation of erosion control treatments and repeated one year after treatments to assess the effectiveness of a project at reducing erosion and rebuilding erosion resistance at a particular site.

Below is a brief description of the primary assessment approaches we propose using to measure erosion resistance and treatment effectiveness at Heavenly restoration sites. These methods can be used individually or in combination as assessment “tiers”, as described in Table 1, below. The exact monitoring approach will be adjusted where appropriate to best suit site conditions, assessment and management needs, and treatment goals for specific projects and/or watersheds. Monitoring will be more intensive on some projects and less intensive on others, depending on the site’s erosion risk and confidence in results from past projects with similar treatments.

- **Visual Erosion Assessment:** the process of visually identifying physical signs of erosion from direct or indirect field evidence in order to trace them to their source, characterize their nature and cause(s), and use this information to develop appropriate treatments.

- **Cone Penetrometer:** relatively fast and easy to measure and provides important index of soil density/compaction.
- **Cover Characterization:** assess percent total cover, mulch cover, and plant cover using photo grid method and/or ocular estimates. These methods are far more rapid than transect-based approaches and since vegetation cover alone has been shown to have little to no correlation with sediment yield reductions at Heavenly, it is not necessary to be overly precise with plant cover measurements. Dominant vegetation species will be noted, as well as presence of any noxious weeds.
- **Soil Assessment:** field assessment of soil color, structure/texture, and other edaphic factors that provide insights into longer-term erosion resistance and the site's ability to eventually support an appropriate vegetation community. May also include collecting soil samples before treatment (to determine soil deficiencies) and then again 2-3 years post-treatment¹ for lab analysis of key indicators of soil "capital" such as organic matter and nitrogen.
- **Runoff Simulation:** less time required than rainfall simulation and provides useful information about erosion processes and a site's erosion resistance, particularly with the coarse granitic soils at Heavenly (simulates snowmelt rather than rainfall). Runoff simulation is typically conducted on plots 1 meter wide and 2-4 meters in length, which enables assessment of runoff and erosion processes that are likely to be more representative of larger areas. Erosion measurements include: surface runoff rate (ft/min), time and distance to rilling, rill characterization (#, soil loss), as well as site description elements such as slope angle, cover composition and surface roughness.
- **Rainfall Simulation:** provides direct measurement of soil infiltration rate (in/hr), sediment yield (lbs/acre/inch), time to runoff, and other key erosion-related factors. Rainfall simulation is conducted on 1 square meter plots (smaller than runoff simulation plots) and resulting data is readily comparable to other sites and the large database of rainfall simulation data collected on past Heavenly projects and other projects throughout the Tahoe Basin.

¹ Analysis of soil post-treatment soil samples is best done 2-3 years following treatment, since decomposition of high-carbon soil amendments (e.g. wood chips), which are commonly used at Heavenly, takes at least several years in Tahoe's arid climate.

Table 1. Heavenly Erosion Assessment Tiers

Tools	Tier 1 - Visual	Tier 2 – Soil/Site Condition	Tier 3 - Performance
Visual Erosion Assessment	X	X	X
Cone Penetrometer		X	X
Cover Characterization (mulch cover, veg cover, veg composition)		X	X
Soil Assessment		X Visually assess texture, color, root penetration, soil development, etc.	X Same as Tier 2 + collect samples for analysis (organic matter, N)
Runoff/Rainfall Simulation			X
Purpose	Identify erosion problems and trace them to their source(s).	Characterize the nature/cause of erosion areas and develop appropriate treatments. This level of assessment will be applied to most sites before/after treatment and can be efficient at larger scales.	Directly assess erosion processes and post-treatment erosion reductions. This level of assessment will be applied at a smaller number of selected sites where new types of treatments and/or site conditions are being assessed.
Level of Effort	Low	Low to moderate	Moderate to intensive
Spatial Scale	Small catchment to whole watershed	Plot scale up to project treatment area (< 1 acre)	Plot scale up to project treatment area (< 1 acre)

Proposed Treatment Objectives

- To prioritize treatment types and locations based on water flow, connectivity and cost-effectiveness
- To maximize hydrologic function (surface flow patterns, infiltration)
- To stabilize soils (surface protection, minimize runoff)
- To re-establish native vegetation where appropriate²
- To minimize irrigation and fertilizer use to greatest extent possible

Proposed Monitoring Objectives

- To quantitatively assess erosion reductions and indices of long-term erosion resistance
- To use monitoring data to determine the cost-effectiveness of different restoration treatments
- To use monitoring data to improve effectiveness of future restoration treatments

² Vegetation re-establishment goals will be determined on a project-specific basis. For instance, vegetation is typically more integral for creating erosion-resistant site conditions in an SEZ or on very steep slopes, whereas vegetation may be a lower priority on a high-elevation project near the top of the mountain. Vegetation establishment trajectories will also be different for sites with access to irrigation versus sites without access to irrigation.

Regulatory Alignment

The proposed monitoring methods described here are consistent with existing Monitoring and Reporting Program requirements and are already described in Appendix 3-1(d) of Heavenly's Master Plan Amendment FEIS (Mitigation of Soil Disturbance Effectiveness Monitoring). We believe that the monitoring methods described above do not require any amendments to existing regulatory documents at this time and get closer to the intent of these regulations than current monitoring program elements.

Reporting

Annual outputs from Heavenly's proposed erosion-focused assessment approach will include:

- A prioritized annual work list with erosion- and water quality-focused prioritization criteria (with corresponding map)
- A map showing erosion hot spots and completed projects (with accompanying photographs)
- A summary of project-specific erosion reductions and effectiveness monitoring results

These deliverables will be included in the Mitigation and Monitoring Program Annual Report each spring.

The Heavenly team welcomes your feedback and looks forward to working with you to protect and improve water quality at Heavenly Mountain Resort.

David L. Landry

Senior Planner-Tahoe Regional Planning Agency, Planning Department

dlandry@trpa.org

775-589-5214

Signature

Date

Handwritten signature and date in blue ink. The signature is written over a horizontal line, and the date "1/2/24" is written below it.

The proposed change to the effective soil cover evaluation program is consistent with the current amended monitoring and reporting program (MRP No. 2003-0032-A2) and is acceptable to the Water Board.

Bud Amorfini

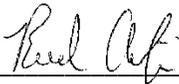
California Regional Water Quality Control Board-Lahontan Region

Engineering Geologist

2501 Lake Tahoe Blvd. South Lake Tahoe, CA 96150

bamorfini@waterboards.ca.gov

530-542-5463

Signature 

Date 12/30/2013

References

- Arst, R., and M. Hogan. 2008. Monitoring and Assessment of Erosion Control and Treatments in and around the Lake Tahoe Basin. Prepared by IERS for Caltrans.
- Claassen, V.P., and M.P. Hogan. 2002. Soil Nutrients Associated with Revegetation of Disturbed Sites in the Lake Tahoe Basin. *Restoration Ecology* 10, 2: 195-203.
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- Drake, K. 2013. Heavenly Mountain Resort Restoration and Monitoring 2012 Summary Report. Prepared by IERS for Heavenly Mountain Resort.
- Grismer, M.E., and M.P. Hogan. 2005. Evaluation of Revegetation/Mulch Erosion Control Using Simulated Rainfall in the Lake Tahoe Basin: 3. Treatment Assessment. *Land Degradation & Dev.* 16: 489-501.
- Grismer, M.E., C. Schnurrenberger, R. Arst and M.P. Hogan. 2008. Integrated Monitoring and Assessment of Soil Restoration Treatments in the Lake Tahoe Basin. *Environ. Monitoring & Assessment* .150: 365-383.
- Herrick, J.E., G. E. Schuman and A. Rango. 2006. Monitoring ecological processes for restoration projects. *J. Nature Conservation* 14:161-171.

Heavenly Mountain Resort Water Year
2015

APPENDIX D
FACILITIES MONITORING &
APPLICATION CHECKLIST



November 12, 2015

Mr. Bud Amorfini
Environmental Scientist
Lahontan Regional Water Quality Control Board
2501 Lake Tahoe Boulevard
South Lake Tahoe, CA 96150

Re: Heavenly Mountain Resort 2015 Fourth Quarter Snow Conditioning and Snowmaking Enhancement Monitoring

Dear Mr. Amorfini:

Pursuant to the Amended Monitoring and Reporting Program No. 2015-0021, Heavenly is required to submit monthly snow conditioning and snow enhancement monitoring logs. Instead of providing a number of zero reported usage forms for salt application on the mountain during the fourth quarter, this letter and the table below summarize the usage over the past three months (July, August and September) at the following sites: Top of the Gondola, World Cup Race Courses, Terrain Park, and Adventure Peak. April typically ends the ski season resort activities and salt was not used during the summer months. Chapter 8 of the Environmental Monitoring Program Annual Report provides a water year to date summary of the amount of huck salt applied for the 2014/2015 Water Year.

Table 1-1 The Location and the Application Amount of Huck Salt (Fourth Quarter)

Month/Year	Top of the Gondola (lbs.)	World Cup Race Course (lbs.)	Terrain Park (lbs.)	Adventure Peak – Tubing Area (lbs.)
July 2015	0	0	0	0
August 2015	0	0	0	0
September 2015	0	0	0	0
Totals	0 lbs.	0 lbs.	0 lbs.	0 lbs.

Should you require additional information or have questions regarding this report and its contents, please contact Frank Papandrea at 775-586-2315.

Sincerely,

Frank Papandrea
Heavenly Environmental Manager

HEAVENLY SKI RESORT

DEICERS and ABARSIVES APPLICATION and RECOVERY

Monthly Summary Report

(MONITORING AND REPORTING PROGRAM NO.R6T-2003-0032)

Quantity of ice control agents and abrasives used on Heavenly property and on CSLT streets. When the Dischargers apply deicers and/or abrasives on parking lots, base facilities, private roads, or City of South Lake Tahoe roads to the California Base area, the Dischargers shall keep a daily log and report a monthly summary of the following to Brandy Thompson for Quarterly reporting to LRWQCB:

Month and Year: July 2015 **Reporter:** Ryan Smith

Location Name: Heavenly California Base and City of South Lake Tahoe Roads

Total Monthly Application: 0 lbs

Total Monthly Recovery: 0 lbs

Location of Disposal Facilities: Carson Landfill (by Tahoe Refuse)

Ryan Smith
Employee Signature

Supervisor Signature

**HEAVENLY SKI RESORT
 DEICERS and ABRASIVES APPLICATION
 (MONITORING AND REPORTING PROGRAM NO.R6T-2003-0032)**

DAILY LOG

MONTH/YEAR: July 2015

LOCATION NAME: California Main Lodge

For days when Heavenly Ski Resort (discharger) applies abrasives or ice control agents on parking lots and roadways, Heavenly Personnel shall record the following **daily use** for **weekly** submittal to supervisors and **monthly** submittal to Brandy Thompson for input into Quarterly reporting to LRWQCB:

Location Codes:

- H/UL – Cal Base Upper Lot
- H/LL – Cal Base Lower Lot
- H/W – Entrance Road (Wildwood above Saddle)
- C/WN CSLT – Wildwood – Needle Peak
- C/SR CSLT - Ski Run
- C/K CSLT – Keller
- C/S CSLT-Sherman Way
- C/R CSLT- Regina
- Other – **Describe:**

Material Codes

- C – Cinders
- NaCl - Salt
- S - Sand
- Other – **Describe:**

<u>Date/Time</u>	<u>Quantity (lbs)</u>	<u>Location Code</u>	<u>Type of Material</u>
	-		
	-		
	-		

Total Monthly APPLICATION Heavenly (lbs?) cinders 0 salt 0 sand___ other___

Total Monthly APPLICATION in CSLT (lbs?) cinders 0 salt 0 sand___ other___

Submit Weekly to Supervisor. Time period covered 7/1/15 to 7/31/15

Ryan Smith 08/07/2015
Employee Signature/DATE

Supervisor Signature/DATE

**HEAVENLY SKI RESORT
CALIFORNIA PARKING LOT, LODGE and ROADS
MONITORING CHECKLIST
(MONITORING AND REPORTING PROGRAM NO.R6T-2003-0032)**

Date: July 2015

Inspector: Ryan Smith

Complete the following inspection at the **CA Parking Lot, CA Base Lodge, and associated roads, at least once monthly** and **after significant storm events**. Turn in Checklists to Supervisor for Submittal to Brandy Thompson for input into Quarterly reports to LRWQCB.

Were any of the following observed?

a. Drop Inlets (CA Parking Lot and Roads)

- 1) Clogged by debris, ice, or sediment?
- 2) Runoff movement into the infiltration gallery?
- 3) Damaged by vehicles or snow plow?

b. Drainage Collection System (CA Parking Lot, Roads)

- 1) Clogged by debris, ice, or sediment?
- 2) Movement of water through pipes, channels, and appurtenances impeded?
- 3) Drainage collection system damaged?
- 4) Inadequate energy dissipation?

c. Sediment Traps and Vaults (CA Parking Lot and Roads)

- 1) Sediment accumulated in each chamber of trap, vaults, or galleries? **If yes**, estimate depth and volume.
- 2) Traps and Vaults recently cleaned? List date of last cleaning.
- 3) Presence of sheen, foam, trash or scum?

d. Erosion Control (CA Parking Lot, Lodges, and Maintenance Shops)

- 1) Vegetation appears unhealthy?
- 2) Gully or rill erosion on slopes?
- 3) Sediment buildup at toes of slopes?
- 4) Vegetation damaged by vehicles or heavy foot traffic?

Yes	No	Comments
Describe Problems, Locations and Corrective Actions		
	X	
X		Trickle
	X	
Describe Problems, Locations and Corrective Actions		
X		Near the base of the ramp drain is slow.
	X	Near the base of the ramp. Cruz construction is scheduled to rebuild drain to correct problem.
	X	
	X	
Describe Problem and Corrective Actions		
	X	Sediment trap at wildwood gate cleaned out 7/7/15
X		7/7/15
	X	
Please Note Locations and Corrective Actions		
	X	
	X	
	X	
	X	

c. Culvert Outlet (west of Wildwood Avenue)

- 1) Inadequate energy dissipation?
- 2) Trash or debris needs to be removed from drainage way?

e. Upstream Drainage Diversion (Located on Perfect Ride Run)

- 1) Structures not in place?
- 2) Structures not operational?

f. Spilled Chemicals, Paints, Fuels, Sealants, Oils, Greases, Antifreeze, etc? (All locations)

g. Sediment/Sand Buildup in CA Parking Lot?

h. Grease Interceptor Not Operating Properly? (CA Base Lodge)

	X	Water running clear
	X	Clean
	X	
	X	
	X	
	X	Swept 5/1
	X	

Describe any problems/activities, dates and times of problems/activities and the personnel to which problems were reported:

Documentation of resulting actions and dates problems corrected:

Sediment trap at Wildwood cleaned on 7/7/15

N/A : Not applicable

INSPECTION PURPOSE AND GOALS:

The purpose of the inspection is to identify actual or potential erosion and surface runoff on the project site and to identify BMP maintenance needs so that corrective measures may be immediately undertaken.

Any erosion, surface runoff problems, wastewater disposal problems, or other adverse conditions, which are found on the subject property, shall be clearly described and the corrective measures proposed by the Dischargers (Heavenly) shall be included in the quarterly monitoring report. **In the event that no such problems are found on the property, a statement certifying this condition must be included for each monthly inspection.**

PLEASE ADD ADDITIONAL INFORMATION IF NECESSARY AND ATTACH PHOTO DOCUMENTATION

Contact Brandy Travers at 775-586-2314 or btravers@vailresorts.com with any questions/concerns.

HEAVENLY SKI RESORT

DEICERS and ABARSIVES APPLICATION and RECOVERY

Monthly Summary Report

(MONITORING AND REPORTING PROGRAM NO.R6T-2003-0032)

Quantity of ice control agents and abrasives used on Heavenly property and on CSLT streets. When the Dischargers apply deicers and/or abrasives on parking lots, base facilities, private roads, or City of South Lake Tahoe roads to the California Base area, the Dischargers shall keep a daily log and report a monthly summary of the following to Brandy Thompson for Quarterly reporting to LRWQCB:

Month and Year: August 2015 Reporter: Ryan Smith

Location Name: Heavenly California Base and City of South Lake Tahoe Roads

Total Monthly Application: 0 lbs

Total Monthly Recovery: 0 lbs

Location of Disposal Facilities: Carson Landfill (by Tahoe Refuse)

Ryan Smith
Employee Signature

Supervisor Signature

**HEAVENLY SKI RESORT
 DEICERS and ABRASIVES APPLICATION
 (MONITORING AND REPORTING PROGRAM NO.R6T-2003-0032)**

DAILY LOG

MONTH/YEAR: August 2015

LOCATION NAME: California Main Lodge

For days when Heavenly Ski Resort (discharger) applies abrasives or ice control agents on parking lots and roadways, Heavenly Personnel shall record the following **daily use** for **weekly** submittal to supervisors and **monthly** submittal to Brandy Thompson for input into Quarterly reporting to LRWQCB:

Location Codes:

- H/UL – Cal Base Upper Lot
- H/LL – Cal Base Lower Lot
- H/W – Entrance Road (Wildwood above Saddle)
- C/WN CSLT – Wildwood – Needle Peak
- C/SR CSLT - Ski Run
- C/K CSLT – Keller
- C/S CSLT-Sherman Way
- C/R CSLT- Regina
- Other – **Describe:**

Material Codes

- C – Cinders
- NaCl - Salt
- S - Sand
- Other – **Describe:**

<u>Date/Time</u>	<u>Quantity (lbs)</u>	<u>Location Code</u>	<u>Type of Material</u>
	-		
	-		
	-		

Total Monthly APPLICATION Heavenly (lbs?) cinders 0 salt 0 sand___ other___

Total Monthly APPLICATION in CSLT (lbs?) cinders 0 salt 0 sand___ other___

Submit Weekly to Supervisor. Time period covered 8/1/15 to 8/31/15

Ryan Smith 09/09/2015
 Employee Signature/DATE

Supervisor Signature/DATE

**HEAVENLY SKI RESORT
CALIFORNIA PARKING LOT, LODGE and ROADS
MONITORING CHECKLIST
(MONITORING AND REPORTING PROGRAM NO.R6T-2003-0032)**

Date: August 2015

Inspector: Ryan Smith

Complete the following inspection at the **CA Parking Lot, CA Base Lodge, and associated roads, at least once monthly** and **after significant storm events**. Turn in Checklists to Supervisor for Submittal to Brandy Thompson for input into Quarterly reports to LRWQCB.

Were any of the following observed?

a. Drop Inlets (CA Parking Lot and Roads)

- 1) Clogged by debris, ice, or sediment?
- 2) Runoff movement into the infiltration gallery?
- 3) Damaged by vehicles or snow plow?

b. Drainage Collection System (CA Parking Lot, Roads)

- 1) Clogged by debris, ice, or sediment?
- 2) Movement of water through pipes, channels, and appurtenances impeded?
- 3) Drainage collection system damaged?
- 4) Inadequate energy dissipation?

c. Sediment Traps and Vaults (CA Parking Lot and Roads)

- 1) Sediment accumulated in each chamber of trap, vaults, or galleries? **If yes**, estimate depth and volume.
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- 1) Vegetation appears unhealthy?
- 2) Gully or rill erosion on slopes?
- 3) Sediment buildup at toes of slopes?
- 4) Vegetation damaged by vehicles or heavy foot traffic?

Yes	No	Comments
Describe Problems, Locations and Corrective Actions		
	X	
	X	
	X	
Describe Problems, Locations and Corrective Actions		
X		Near the base of the ramp drain is slow.
	X	Near the base of the ramp. Cruz construction is scheduled to rebuild drain to correct problem.
	X	
	X	
Describe Problem and Corrective Actions		
	X	Sediment trap at wildwood gate cleaned out 7/7/15
	X	Scheduled for this month.
	X	
Please Note Locations and Corrective Actions		
	X	
	X	
	X	
	X	

c. Culvert Outlet (west of Wildwood Avenue)

- 1) Inadequate energy dissipation?
- 2) Trash or debris needs to be removed from drainage way?

e. Upstream Drainage Diversion (Located on Perfect Ride Run)

- 1) Structures not in place?
- 2) Structures not operational?

f. Spilled Chemicals, Paints, Fuels, Sealants, Oils, Greases, Antifreeze, etc? (All locations)

g. Sediment/Sand Buildup in CA Parking Lot?

h. Grease Interceptor Not Operating Properly? (CA Base Lodge)

	X	
	X	
	X	
	X	
	X	
	X	

Describe any problems/activities, dates and times of problems/activities and the personnel to which problems were reported:

Documentation of resulting actions and dates problems corrected:

N/A : Not applicable

INSPECTION PURPOSE AND GOALS:

The purpose of the inspection is to identify actual or potential erosion and surface runoff on the project site and to identify BMP maintenance needs so that corrective measures may be immediately undertaken.

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DEICERS and ABRASIVES APPLICATION
(MONITORING AND REPORTING PROGRAM NO.R6T-2003-0032)**

DAILY LOG

MONTH/YEAR: September 2015

LOCATION NAME: California Main Lodge

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- C/K CSLT – Keller
- C/S CSLT-Sherman Way
- C/R CSLT- Regina
- Other – **Describe:**

Material Codes

- C – Cinders
- NaCl - Salt
- S - Sand
- Other – **Describe:**

<u>Date/Time</u>	<u>Quantity (lbs)</u>	<u>Location Code</u>	<u>Type of Material</u>
	-		
	-		
	-		

Total Monthly APPLICATION Heavenly (lbs?) cinders 0 salt 0 sand____ other____

Total Monthly APPLICATION in CSLT (lbs?) cinders 0 salt 0 sand____ other____

Submit Weekly to Supervisor. Time period covered 9/1/15 to 6/30/15

Ryan Smith 10/09/2015
Employee Signature/DATE

Supervisor Signature/DATE

**HEAVENLY SKI RESORT
CALIFORNIA PARKING LOT, LODGE and ROADS
MONITORING CHECKLIST
(MONITORING AND REPORTING PROGRAM NO.R6T-2003-0032)**

Date: September 2015

Inspector: Ryan Smith

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- 1) Clogged by debris, ice, or sediment?
- 2) Movement of water through pipes, channels, and appurtenances impeded?
- 3) Drainage collection system damaged?
- 4) Inadequate energy dissipation?

c. Sediment Traps and Vaults (CA Parking Lot and Roads)

- 1) Sediment accumulated in each chamber of trap, vaults, or galleries? **If yes**, estimate depth and volume.
- 2) Traps and Vaults recently cleaned? List date of last cleaning.
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- 1) Vegetation appears unhealthy?
- 2) Gully or rill erosion on slopes?
- 3) Sediment buildup at toes of slopes?
- 4) Vegetation damaged by vehicles or heavy foot traffic?

Yes	No	Comments
Describe Problems, Locations and Corrective Actions		
	X	Clean Harbors completing vacuuming all Vaults on 9/28
	X	
	X	
Describe Problems, Locations and Corrective Actions		
	X	Swept 9/13
	X	10/8 completion of improved French Drain and DI
	X	
	X	
Describe Problem and Corrective Actions		
	X	Sediment trap at wildwood gate cleaned out 7/7/15
	X	9/28/2015
	X	
Please Note Locations and Corrective Actions		
	X	
	X	
	X	
	X	

c. Culvert Outlet (west of Wildwood Avenue)

- 1) Inadequate energy dissipation?
- 2) Trash or debris needs to be removed from drainage way?

e. Upstream Drainage Diversion (Located on Perfect Ride Run)

- 1) Structures not in place?
- 2) Structures not operational?

f. Spilled Chemicals, Paints, Fuels, Sealants, Oils, Greases, Antifreeze, etc? (All locations)

g. Sediment/Sand Buildup in CA Parking Lot?

h. Grease Interceptor Not Operating Properly? (CA Base Lodge)

	X	
	X	Cleared 10/7/2015
	X	
	X	
	X	
	X	
	X	

Describe any problems/activities, dates and times of problems/activities and the personnel to which problems were reported:

Documentation of resulting actions and dates problems corrected:

N/A : Not applicable

INSPECTION PURPOSE AND GOALS:

The purpose of the inspection is to identify actual or potential erosion and surface runoff on the project site and to identify BMP maintenance needs so that corrective measures may be immediately undertaken.

Any erosion, surface runoff problems, wastewater disposal problems, or other adverse conditions, which are found on the subject property, shall be clearly described and the corrective measures proposed by the Dischargers (Heavenly) shall be included in the quarterly monitoring report. **In the event that no such problems are found on the property, a statement certifying this condition must be included for each monthly inspection.**

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Pacific Stormwater Solutions, LLC

P.O. Box 12246
Santa Rosa, Ca. 95406
Phone : 707.544.5012 - www.pacstorm.com

Stormwater Inspection Report 2015



Project Name:	Heavenly Ski Resort	Weather Conditions:	Clear
Project Address:	1504 Wildwood Ave, South Lake Tahoe	Number of BMPs Inspected:	Four (4)
Inspection Date:	6/4/2015	Number of Pages:	Four

REPORT INDEX

This report contains information regarding the results of inspection of BMP(s) for the above referenced project.

The following information is provided for each BMP inspected:

BMP Type
Product Name (if applicable)
Inspection Date
Date of Last Inspection (or install date if not previously inspected)
BMP & Site Description
BMP Condition
Pollutant Load Description
Additional Observations/Comments
BMP Photos (as appropriate)
Recommended Actions

Based on the results of the inspection it is recommended that:



No further action is required at this time. **Next inspection should be performed prior to:**



Cleaning of system(s) recommended. Review page two & Three.

INSPECTION RESULTS

GPS Coordinates: See sheet 3 & 4 Model & Size: _____
Unit location: Parking lot/Wildwood _____
Vault StormFilter
Manhole StormGate
Catchbasin HDS
Date installed / Last Service: Nov-12 Media ZPG
Sediment Depth - Cart bay: See sheet 3 & 4 Cart # See photos
Sediment Depth - Forebay: See sheet 3 & 4 Other _____
Water Depth: See Sheet 3 & 4 Site Contact Tom Fortune
Excessive Oil: No
Internal Condition of unit: Internal components appear in good condition

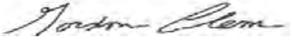
INSPECTION SUMMARY

Systems appear to be working properly. Maintenance recommended on three of the four systems on this report at this time.

This certifies the information contained on this report is accurate and was detailed using accepted industry procedures.

Inspector's Name: Gordon Clem

Company: Pacific Stormwater BMP Solutions,LLC

Signature: 

Date: 7/28/2015

Title/Qualifications: CPSWQ

Project Name: Heavenly Ski Resort

Page 3

ATTACHMENT:

System Number: #3 & #9

(list site designation if available)



Unit #3 - 7 Phosphorous Cart MH

6" Sediment/21" water

Maintenance recommended due to high water level



Unit #9 - 7 Phosphorous Cart MH

4" Sediment/Impacted media

Maintenance recommended- see note below

Notes: Unit #3# maintenance recommended due styrofoam cup blocking influent pipe. Unclogged pipe and water drained very slow through filter. Unit #9 Maintenance is recommended due to high scumline above top of filters.

Stormwater Inspection Report

Project Name: Heavenly Ski Resort

Page 4

ATTACHMENT:

System Number: Wildwood Ave unit & Unit #4

(list site designation if available)



Wildwood Ave Unit - 42 ZPG Cart vault



12" Sediment/Carts spent

Maintenance recommended



#4 unit - 114 ZPG cartridge vault



Maintenance not recommended



less than .5" sediment. Media loose and unimpacted.

Notes: Wildwood Ave unit requires maintenance due to very high scum line and excessive sediment. Unit #4 maintenance is not recommended due to -.5" of sediment and thin scum line partially up filters. Suspect minimal sediment due to cup blocking unit #3

Heavenly Mountain Resort Water Year
2015

APPENDIX E
EROSION CONTROL & FACILITIES
MAINTENANCE MONITORING

Heavenly Mountain Resort
 Erosion Control and Facilities Maintenance Monitoring
 Inspection Log

Quarter Fourth Year 2015

Location*	Date Inspected	Inspector's Name	Notes/Observations/ Any Problems Identified	Corrective Measures Taken	Schedule for Completion of Corrective Measures
A.	7-19 & 7-22-15	Frank P.	<p>Powderbowl vegetation treatment area and Pioneer Poma restorations sites from 2012 and 2013 look really good. Sprinklers in place on Pioneer Poma, and 277 Sewer Line restoration areas, but are not being used. No irrigation was used at these 2 sites in 2015. Large double rill observed at 277 Sewer line restoration site in July 2015 between 277 road and TOT road, Infiltration/vegated swale and wood chips restoration (Full Hogan) put in place, and rills were fully repaired in late September 2015. Work Completed on October 2nd, 2015</p>	<p>Full Hogan Restoration at the Top of Patsy's Chair. 23 pounds of seed, and 53 pounds of Biolsol incorporated into soil. 10+ Cu Yards of Pine Chips, and 3+ Cu Yards of Pine Needles used at this site.</p>	<p>Project completed, and stable even after significant rain events in Early-Mid October.</p>
B.	N/A	Frank P.	<p>All 12", 24", and 36" culverts inspected were clear and free of any obstructions on 6/26/15 when annually inspected.</p>	<p>None</p>	

Location*	Date Inspected	Inspector's Name	Notes/Observations/ Any Problems Identified	Corrective Measures Taken	Schedule for Completion of Corrective Measures
C.	9-14-15	Frank P.	Designated roadways are being used by employee vehicles and 3 rd party vendors. Rope corridors will remain in place until early October 2015	N/A	
D.	9-14-15	Frank P.	Rope closures are in place, on most of the roadway corridors, delineating the roads. Irrigation equipment is also in place at a number of key areas. Irrigation equipment is not being used at Lower Cat track, or Maggie's corner in 2015, TOG (Tamarack Lodge) grasses are being irrigated less often than in past summer.	N/A	
E.	9-30-15	Frank P.	Energy dissipaters on culverts in good shape	N/A	
F.	9-30-15	Frank P.	Sediment Basins have adequate capacity in most areas.	N/A	

Location*	Date Inspected	Inspector's Name	Notes/Observations/ Any Problems Identified	Corrective Measures Taken	Schedule for Completion of Corrective Measures
H.	9-30-15	Frank P.	Rip Rap at various locations on the mountain in great shape. No failures to speak of. New Rip Rap installed below 3 main Water Bars on Hellwinkles on 10-1-15	New Rip Rap installed, High Priority Hotspot in CA-1	
I.	9-14-15	Frank P.	Lower water Bars on Double Down and Liz's completed on 9/10-9/13/2015 for the maintenance and restoration projects as part of the EIS high priority hot spots projects in Sky Basin.	Full restoration in these two Water Bars complete. Now we have vegetated swales in place instead of an erosive water bar that convey water.	
J.	9-30-15	Frank P	All Infrastructure lines on the mountain performing properly. No failures reported or observed at this time	N/A	

Location*	Date Inspected	Inspector's Name	Notes/Observations/ Any Problems Identified	Corrective Measures Taken	Schedule for Completion of Corrective Measures
K.	9-30-15	Frank P.	No unprotected stockpiles of soils or materials observed on the mountain this summer. Wattles in place at the base of stockpiles of gravel and dirt. Most stockpiles have been utilized by September 30 th , 2015	N/A	
L.	9-14-15	Frank P.	Infiltration trenches functioning properly	N/A	
M.	9-30-15	Frank P.	Gullies and rills on slopes and roadways not an issue at this time. After any major rain events our maintenance Crew's addressed and reported problems right away, especially on the maintenance roads.	N/A	

Location*	Date Inspected	Inspector's Name	Notes/Observations/ Any Problems Identified	Corrective Measures Taken	Schedule for Completion of Corrective Measures
N	9-30-15	Frank P.	CML Storm vaults filter replacements are scheduled with Pacific Stormwater BMP Solutions for mid Sept 2015. Clean Harbors is Scheduled to conduct DI maintenance and sediment removal in the CML parking lot drains in early Sept. 2015 as well. Clean harbors does maintenance in advance of the CML Vaults Cartridge replacements	Scheduled 3 rd party vendors to complete the routine maintenance at the storm vaults and Drop Inlets at the California Parking Lot. It is now completed.- September 2015	

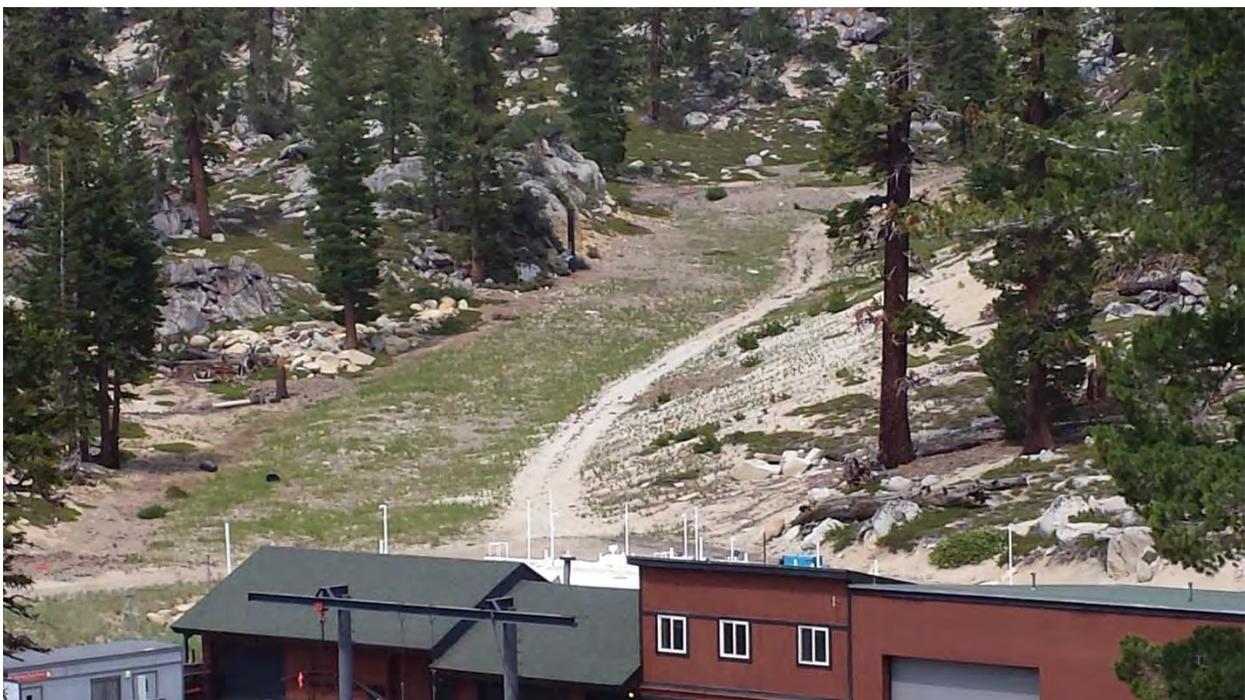
- A. Re-vegetated Areas
- B. Erosion at Culverts and Drainage Crossing (all culverts > 36" should be inspected annually at a minimum)
- C. Designated Roadways
- D. Closures and use controls on closed roadways
- E. Energy Dissipaters on culverts
- F. Sediment basins/irrigation ponds
- G. Rock-Lined Channels
- H. Mechanical stabilization measures (i.e. Riprap and gabions)
- I. Degraded Water Bars
- J. Erosion from Water Supply, sewer, snowmaking, irrigation pipes and holding tanks
- K. Unprotected soil piles
- L. Infiltration trenches
- M. Gully/Rill erosion on slopes
- N. Other erosion control and storm water runoff facilities

Water Year 2015 4th Quarter (July, Aug., Sept.)

Powder bowl Treatment area, 6-26-15: No Irrigation applied or needed in 2015



View of Pioneer-Poma Treatment from the Tram Road, Upper Vehicles Shop in foreground, 6-26-15:



Pioneer-Poma Restoration area 6-27-14, Vegetation is visible and growing:



Pioneer-Poma Restoration area 7-29-15, Vegetation is flourishing. June/July rains are helping to reduce any need for irrigation in 2015. Vegetation is well established now over 18 months after project started.



Double Down Lower Run before Treatment 7-29-15:



Double Down Lower after Full Restoration Treatment. 2 full run width Pine Needle Filter Berms above Infiltration/Vegetated Swale.



Double Down Lower Infiltration Swale Completed September 2nd. 2015



Clean Harbors DI Cleaning California Parking Lot, Late September 2015:



Finished Wood Chip Mulch on Maggie's Shoulders Sept. 30th, 2015:



Hellwinkles Fall 2015 Restoration work:



Sky Meadows Restorations of High Priority Hotspots:



Lower Liz's Full Hogan restoration with Shred Vac from IERS. We rented this unit for 2 week in 2015:



Heavenly Mountain Resort
Hellwinkle's Road Segment Photos

Lower Waterbar



Riprap armoring below waterbar outlet



Additional pine needle wattle protection below riprap

Middle Waterbar



Pine needle wattle and riprap below waterbar outlet



Second layer of wattle protection below riprap outlet

Upper Waterbar



Pine needle wattles, added riprap below waterbar outlet



Additional pine needle wattle added below riprap

Heavenly Mountain Resort Water Year
2015

APPENDIX F
FACILITIES & WATERSHED
AWARENESS LETTER



June 8, 2015

Mr. Bud Amorfini
Environmental Scientist
State of California Regional Water Control Board Lahontan Region
2501 Lake Tahoe Blvd
South Lake Tahoe, CA 96150

Dear Mr. Amorfini:

HEAVENLY SKI RESORT UPDATED WASTE DISCHARGE REQUIREMENTS
BOARD ORDER NO. R6T-2003, WDID NO. 6A090033000-VERIFICATION OF
FACILITIES AND WATERSHED AWARENESS TRAINING

This letter verifies the 2015 Facilities and Watershed Awareness training that was held at Heavenly Mountain Resort on May 28, 2015. A copy of the agenda and attendance list is attached.

Thank you for attending the meeting and speaking on behalf of your organization. Please contact me at 775.586.2313 if you have any further questions or comments.

Sincerely,

A handwritten signature in black ink that reads 'ANDREW STRAIN'.

Andrew Strain
Vice President of Planning and Governmental Affairs

/bt

Enclosures

cc: Jonathan Cook-Fisher, USDA Forest Service Lake Tahoe Basin Management Unit



2015 Facilities & Watershed Awareness Training

May 28, 2015



Purpose/Agenda

- Review Heavenly's Watershed Protection Commitment & Your Role
- Review the Summer Rules of the Road
- Meet Our Agency Partners
- Provide Contractor Awareness
- Review Wildland Fire Awareness & Response Procedures



Our Commitment

- USDA Forest Service: Our partner in outdoor recreation & resource management
- Tahoe Regional Planning Agency: The Master Plan, Mitigation & Monitoring, Project Permit Conditions
- State of California Regional Water Quality Control Board, Lahontan Region: Waste Discharge Requirements (WDRs)
- Ourselves: – Do Right and Do Good



Agency Partners

- TRPA-Sarah Jones (BMP's) and David Landry (Sr. Planner)
- Lahontan-Bud Amorfini (Engineering Geologist)
- Consultant- Kristen Roaldson (BMP's 3rd Party Inspector, w/ RCI)
- LTBMU - Forest Service



Major Erosion Control & BMP Project Locations

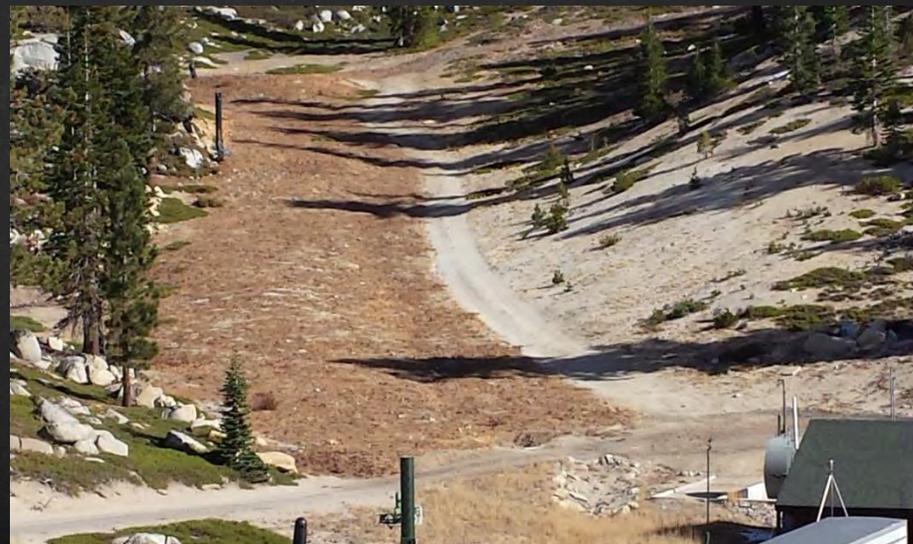
- CA Road Shoulders below Cal Dam
- Stabilize and improve erosion resistance on road shoulders treatments-rip and chip, seed, fertilize. Fix water bars,
 - New pine needle wattles at end of water bars have been effective
- Sky Meadows Erosion Hotspots
- Sky chute, Double Down lower, Behind Lower Canyon Lift House 20 Projects
- Adventure Peak/Summer Activities
- Coaster, Climbing Wall, Tubing Lift Modifications, and roadway work, Mid Station Canopy Tours
- Big Dipper and Orions Ski trails treatments
- Maintain effectiveness of ski run BMP's, including water bars and re-vegetation/cover.



Pictures of Recent Restoration improvements

Pioneer/Poma prior to
treatment

Pioneer/Poma after
treatment





Recent Restorations

Nearing completion of this nearly $\frac{3}{4}$ acre site 2013

Finished Project Grasses growing in summer 2014





Powderbowl Restoration Site-

In 2012 prior to treatment

In late 2014 after treatment





On Mt BMP's ongoing Maintenance

Infiltration basin 2012

Infiltration basin 2013





More BMP Project Locations

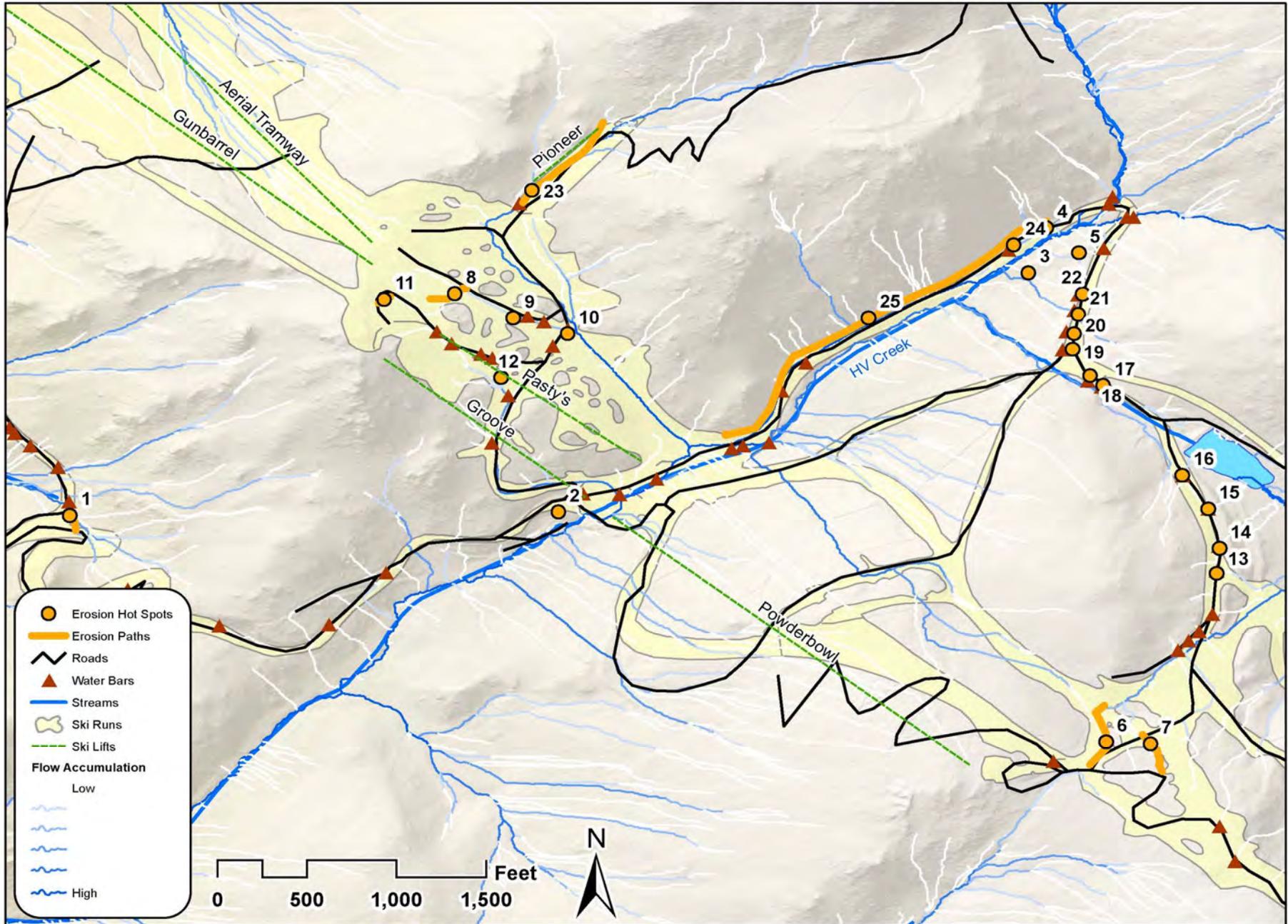
- TOG Drainage
- Top Of Aries Ski Run-Chips and Needle cover below top of Comet Lift
- Hellwinkles Bottom section-Inslope road from last water bar down, to a new drop basin
- Facility Specific BMP Maintenance- Canyon Express Lift Operators Booth, Sky Meadows BMP's, ropes, and delineation near the restroom



Maggies Pits Vacuumed out in October 2014

After picture highlights the improvement in sediment capacity







Wattles

Straw wattle with silt fence

Pine Needle Wattle





Implemented and effective?





Implemented and effective?





CML Storm Filters

Over 200 filters replaced in
2014

Full cartridge replacement of
all 456 filter since installation
in 2008, completed in 2014





CML Storm Filters continued

Dozens of cubic yards of spend filter media and sediment removed in 2014

Sacrificial filters before being replaced with 14 new phosphorus filter media, which is showing positive improvements in WQ





Tahoe Draba

Interpretive Signage at Top of Tamarack Express



Photo of a plant from Heavenly





Protect Tahoe Draba Populations

Full grown plants

Draba like to grow in disturbed areas, under drip lines of rocks



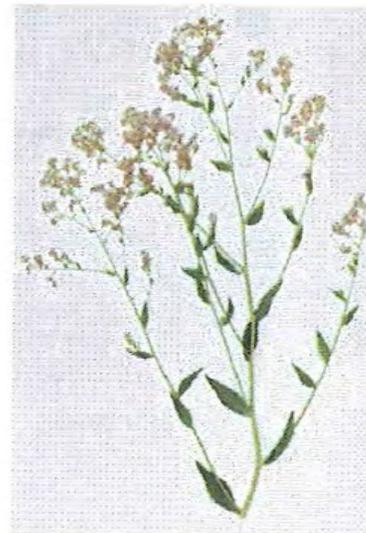


Invasive Weeds are known to exist on top of Heavenly Mountain. Siting and treatments by the FS have occurred the last few summers. Top of Tamarack Lift

Tall Whitetop Identification: Tall whitetop (also called perennial pepperweed) has many stems. It reproduces from rhizomes (root-like under-ground stems) and from seed. In Truckee, this species is common in many of the round-abouts, as well as, low, wet areas.



Tall Whitetop showing root connection



Tall Whitetop in flower



Bull Thistle

Canada Thistle



Bull Thistle flower



Canada Thistle flowers are smaller than most other thistle flowers



Pine Needle Wattle Initiative

Manufacturing by trails crew began in 2013!

On mountain use for erosion control, in 2014 over 600 Ft built





Pine Needle Wattles

Pine Needle Wattles installed near
Heavenly Valley Creek Fall 2013

Pine needle wattles a success in
2014, after large precipitation
events





Important takeaways for you to ponder, with regard to BMP's:

- Is it working? (rather than "are we in trouble?")
- Source control – we're trying to stop the "bleeding" at the source rather than chasing it downstream.
- Water flow – its all connected
- Prioritization – address the highest risk spot first (e/g/ nearest to creek, most erosive, Problem spots, etc)



Keep Your Eyes Open During & Immediately After Rain and Thunderstorms (Listen to Level 1-4 from Dispatch on Radio)
These Are the “Events” That Can Cause Environmental Damage
If You See Damage Occurring Call Dispatch on the Radio
Immediately
This includes the Base Areas, particularly Cal Base





Summer Rules of the Road

- Drive on the Designated Roads only
- Park only within Roped Designated Parking Areas
- If you feel that you can't do your job because of this, tell your supervisor FIRST before driving into any closed areas
- If you see someone not complying, tell them about it - IT IS UP TO US
- Just because you drive an ATV/Rhino does not mean you can drive onto a ski slope or on a decommissioned road or any trails
- When accessing the mountain all vehicles MUST be in 4WD to prevent erosion on the roads, and stay at or below 10 mph. Be especially aware of Fugitive Dust



More Summer Rules of the Road

- Stay out of erosion control projects & stream zone restoration sites
- Report anything that looks like an obvious erosion or sediment problem to your supervisor.
- All outside contractors and vendors must have a Mountain Access Permit issued by the Dispatch Dept.
- Prior to accessing the mountain roads anyone from outside of the Tahoe Basin will need to spray the bottom of their vehicle to prevent the spread of noxious weeds
- If you don't see a mountain access permit, stop them & ask to see their permit. Even if you see Utility trucks Like SW Gas or Liberty, ask to see their permit. If no Permit Send them down to Dispatch.



Summer Rules of the Road





New Water Quality Program

- Best Practice initiative that is company wide
- Using Northstar as a Model
- CA Resorts do a great job of managing storm water and implementing BMP's
- CO is using us as a template to initiate their new program
- New Rain Shut Down Process



New Rain Shut Down Process

- Weather Forecast and Construction Activity Guidelines
- The weather forecast should be checked daily on the NOAA forecast:
- www.noaa.gov (South Lake Tahoe, CA)
- **Days with 10% - 49% Chance of Rain or a Chance of Thunderstorms – Tier 1, Be prepared to Shut-Down active construction sites w/in 1 Hour**
- **Days with 50% or More Chance of Rain – Tier 2, Be prepared to Shut-Down Site immediately.**



Construction Rain Shut Down Process

- Know the Weather Forecast
- Listen closely to the radio
- Grading Operations and Exposed Soils—Pay attention to
- Stockpile BMP's supplies-KGID, Boulder, & Deicer Storage Area
- Vehicle Access-open and closed roads
- BMP Inspections – Pre & Post Storm—Take Pictures!



Heavenly Earthwork Notification Form



Earthwork Project Notification			
Project Name			
Date			
Project Manager			
Project Location			
Approximate Area of Disturbance (sq. ft.)			
Project Start and Estimated Completion Date			
Regulatory Plans & Permit Needs: USFS, TRPA, Lahotan, 404/401			
Utilities Located (Yes / No)			
Sensitive Resources On Site (i.e. Wetlands)			
Attached Site Plan (Yes / No)			

Any projects that disturb the ground in any form and utilize equipment for the process are required to submit this form to Environmental for review prior to construction.

Re-Vegetation Plan			
Note			



Heavenly Hot Work Permit

Required for any hot work outside of a designated weld shop.

Know the PAL code for the day.

Issued by James Grant, Barrett Burghard, Curtis Kezich.

Must be posted on site.

VAIL RESORTS
HEALTH & SAFETY
HOT WORK PERMIT

THIS PERMIT IS REQUIRED TO BE POSTED AND VISIBLE IN ANY UNDESIGNATED HOT WORK AREA BEING USED FOR WELDING AND CUTTING OPERATIONS

LOCATION:

DATE OF ISSUE:

TIME OF ISSUE:

TYPE OF WORK

Welding, Cutting, Grinding

Other Heat, Flame, Spark Producing Tools)

Other

GENERAL PRECAUTIONS

Is site free of combustible and/or flammable materials?
35 foot clear zone - floor, walls, work materials, radiant/ conductive heat transfer? yes no n/a

Are surrounding combustible materials properly shielded/guarded?
Flame-proof covers where needed? Non-combustible screens in shared spaces? yes no n/a

Is mechanical ventilation required?
Space less than 10,000 cubic feet - Room with ceiling height less than 16' - Cross-ventilation obstructed yes no n/a

Could atmosphere be flammable/explosive?
If "YES" atmosphere must be tested. yes no n/a

Fire-fighting equipment inspected and ready for use?
Extinguishers on-site? Charged? Proper type? yes no n/a

Means of contacting fire department in an emergency? yes no n/a

Is proper PPE available and in use?
Gloves, Leathers, Shields, Eye Protection, Respiratory protection, etc. yes no n/a

*If any shaded boxes are checked, action must be taken prior to beginning work

FIRE WATCH

A TRAINED FIRE WATCH MUST BE EMPLOYED IF OPERATIONS OCCUR WITHIN 35' OF COMBUSTIBLE MATERIAL

FIRE WATCH REQUIREMENTS:
 Fire suppression equipment on site
 Current (annual) training with suppression equipment
 Current (annual) training in emergency procedures
 Remain on site for 1/2 hour after operations conclude

Is a trained fire watch in position? yes no n/a

→ **CONFINED SPACE ?** yes no ←

If "yes", this is a Permit-Required Confined Space Entry
**Hot Work Permit must be displayed with
 Confined Space Entry Permit!**

Precautions for Hot Work in Permit-Required Confined Spaces

Mandatory Forced-Air Ventilation

Continuous Air-Quality Monitoring OR

Historical Monitoring Data can be provided
(data must have been collected during similar Hot Work activities)

Gas Cylinders outside of Space & secured

Cylinders OFF & hoses CLEARED during breaks

The area of operations has been examined and all appropriate precautions have been taken.

Work authorized by: _____

Signature: _____

Date: _____ Time: _____

This permit is valid for a single shift up to a 12-hour duration

Sep-10



Absolutely NO SMOKING

- Due to EXTREME wild fire danger, and the ongoing Drought smoking is prohibited anywhere on the mountain at any time.
- This includes NO Smoking at any time in any company or 3rd Party vehicles.



Wildland Fire Awareness





Lastly Don't Forget - Green Soldier Recognition in June and July





Questions, Comments?





5/28/15-BMP's/Facilities and Watershed training

	LEGAL FIRST NAME - PLEASE PRINT CLEARLY	LAST NAME - PRINT CLEARLY	PLEASE	Employee ID	Contact- Cell or E-mail
1	Andy	Noble		216827	andy andy@valley.com
2	Kory	Martin		209382	kmartin3@vailresorts.com
3	BRAD	LEIGHT		130272	Brad
4	CHAS	ECKERT		175121	Chas
5	Roger	TAVAREZ		130274	Roger
6	RITAEL	LIZOLA		142438	Rita
7	Eric	Williams		144938	Eric
8	Joey	Wrightman		217802	Joey
9	Brian	Cottelham		131284	Brian
10	Chris	Hansen		148370	Chris
11	Stan	Griffin		160188	Stan
12	Deryk	Porter		213256	Deryk
13	Oliver	Lacey		219112	Oliver
14	William	Brown		235234	William
15	Bryon	Sneebe		181239	Bryon
16	Marc	Bugs		128604	Marc
17	Sean	Maloney		185794	Sean
18	Brian	Belser		211898	Brian
19	Star	Pais			Star
20	James	Clancy		139283	James
21	Tyler	Lehman		166415	Tyler
22	Charley	Hanger		128609	Charley
23	Ryan	Smith		197095	Ryan
24	Shenja	Lanz		130267	Shenja
25	GARY	BURDA		128648	Gary

GARY BURDA

129344

129344



5/28/15-BMP's/Facilities and Watershed training

	LEGAL FIRST NAME - PLEASE PRINT CLEARLY	LAST NAME - PRINT CLEARLY	PLEASE	Employee ID	Contact- Cell or E-mail
1	Lupe	Barricatos		126889	
2	JACOB	Blazek		224147	
3	David	Hager		200421	dhager@vailresorts.com
4	John	Wigman		154102	
5	Ralph	Bowman		128674	
6	Kyle	Henderson		154995	
7	JIMI	HERBST		149482	
8	JACK	ALLEN		206778	
9	MARK	LUNBERG		128572	
10	DEAN	SCATER		153959	dslater@vailresorts.com
11	Andrew	Cabiness		219167	
12	Frank	Duarte		203832	
13	Zee	Jorgensen		154373	
14	John	Hegson		161763	
15	Christan	Broderick		204061	
16	Ryan Albertson	Albertson		161603	
17	William	Ackermann		128613	
18	Phil	Demus		128897	
19	Dave	Zebco		128632	DZebco@vailresorts.com
20	VINNY	VALOZ		135335	
21	Jimi	SESTOLA		211831	
22	SCOTT	ADAMS		136545	
23	Randall	Cooper		177670	Rcooper1@vail
24	Phil	Domaniz		175256	
25	Jeff	Eards		131753	
	Troy	Beagle		128562	
	Brandy	Thomson		173724	



5/28/15-BMP's/Facilities and Watershed training

	LEGAL FIRST NAME - PLEASE PRINT CLEARLY	LAST NAME - PRINT CLEARLY	PLEASE	Employee ID	Contact- Cell or E-mail
1	STEVE	McBRIDE		128573	6958
2	McLean	Pettigrew		203004	6262
3	Bud	Amerfini		201290	Letoutan
4	James	Wilson			
5	John	Fontanelli			
6	Jacob	Giusto		198430	
7	Steve	Steele		142433	55steele@vailresorts.com
8	Jon	Hart		215101	jhart11@vailresorts.com
9	Jesse	Plate		212568	4449
10	Jeff	Reich		129026	6941
11	Michelle	Peterlin		142376	x2400
12	Peter	Spellman		128922	x6219
13	Michelle	Baxter		182938	x4430
14	Matt	Hummel		149726	x2323
15	Curtis	Kezich		128566	6271
16	Jeff	Ashley		185130	4430
17	Steve	Kremer		129876	6940
18	Kate	Peery		Cruz Construction	
19	Steve	BRECHER		Cruz Const.	
20	Jeff	LOCCISTO		155320	x4437
21	Patrick	Giordino		145024	
22	Alyson	Borawski		150235	x4447
23	CRAL	ATRINGER		128596	
24	Tal	Hymas		195296	
25	GRAC	REDFORDS		142570	2323

Kelli
 Joe
 Travis
 Renzi
 CARMICHAEL
 Gonthier
 128597
 128914
 6970
 6941
 travis.gonthier@gmail.com



5/28/15-BMP's/Facilities and Watershed training

	LEGAL FIRST NAME - PLEASE PRINT CLEARLY	LAST NAME - PRINT CLEARLY	PLEASE	Employee ID	Contact- Cell or E-mail
1	Glen	Reed		195512	
2	Chris	Williams		194981	
3	Damian	Garcia		128683	
4	ERIC	BATES		130290	
5	Miles	Becherer		229928	mbecherer@gmail.com
6	Arnando	Mendoza		129060	mandmendoza@telcel.com
7	Barrett	Burghard		128574	bburghard@vailresorts.com
8	Julia	Reguarth			jreguarth@vail.
9	Liesl	Kenney		216260	lkenney@vailresorts.
10	Barbara	Tenney		234426	310-990-6694
11	Kristin	Roaldson		NA	kristin@rci-nv.com
12	Emily	Harmon		NA	emily@rci-nv.com
13	Kulen	Flannagan		NA	kulen@rci-nv.com
14	Fawn	Clark		175145	ilwck@VailResorts.com
15	MCKENNA	DINNELL		230353	TOTARYOY@GMAIL.COM
16	Gary	Rawlings		128581	
17	Janis	Brown		130289	jbrown@vailresorts.com
18	Sakana	Lay		223692	SAA#1@Vailresorts.com
19	CASSIN	ANDREWS		18262	Czassim@gmail.com
20	RICH	MADON		130257	
21	Brandon	Swartz		178167	bswartz@vailresorts.com
22	Dana	Pg		182330	dpaugh@vailresorts.com
23	Zane	Matz		207198	zane@yahoo.com
24	Emmett	Richmond		172253	ERichmond@vailresorts
25	Andy	White		128395	

Day
 ERIC
 Alec
 Schumpert
 MEZA
 Griswold
 179 885
 147609
 166409



5/28/15-BMP's/Facilities and Watershed training

	LEGAL FIRST NAME - PLEASE PRINT CLEARLY	LAST NAME - PLEASE PRINT CLEARLY	PLEASE	Employee ID	Contact- Cell or E-mail
1	Tom Fortune			180197	tfortune@va,resources.com
2	Joshua	Davis		226495	joshdavis101@netmail.com
3	Will	Ramos		148700	SFWill2001@yaho.com
4	TIM	COOLBAUGH		SIERRA VALLEY ENERGY	530-308-8164
5					
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6/08/15-BMP's Hands On Training 7:15am

	LEGAL FIRST NAME - PLEASE PRINT CLEARLY	LAST NAME - PLEASE PRINT CLEARLY	PLEASE	Employee ID
1	GRAEME	GROVER		128648
2	Bryan	Steele		181239
3	Mac	Dinnell		230353
4	Glen	Griffith J. r		160188
5	Zoe	Jorgensen		15713
6	/	MA		201290
7	Matt	Eston		212026
8	Emmett	Richmond		172253
9	Kezich	Curtis		128566
10	Kyle	Henderson		154995
11	JAKOB	Blazek		224147
12	Raxid	Gierden		145034
13	Bill	Ackermann		128613
14	Barr H	Burghard		128574
15	MAHO	ATRINGER		128596
16	Sean	Maloney		185794
17	Glen	K		195512
18	Brian	Callahan		131284
19	BROWNIE			235234
20	Bared	STRY		119344
21	Don	Abicht		128681
22	Shengr	Lanz		130269
23	Chris	Williams		194981
24	James	Wilson		201290
25	Dave	Zebu		128632



6/08/15-BMP's Hands On Training 7:15am

	<u>LEGAL FIRST NAME -</u> PLEASE PRINT CLEARLY	<u>LAST NAME -</u> PLEASE PRINT CLEARLY	PLEASE	<u>Employee ID</u>
1	Joni	HURLES		195096
2	CRALG	ALTRINGER		128596
3	MEZA	ERIC		147609
4	Philip	Domanic		175256
5	Alec	GRISVOLD		166409
6	Zane	Motz		207198
7	Joff	Earls		131753
8	Andri	Villure		128595
9	John	FOOT		193625
10	JOE	CARMICHAEL		128914
11	JOSH	WESSON		161763
12	Christian	Brockerson		204061
13	Jon	Hart		215101
14	Chris	Young		221345
15	JACOB	Blazek		224147
16	Rick	Powers		128904
17	RUSSELL	HODGSON		146939
18	Sean	Leslie		155506
19	RYAN	Smith		197095
20	Dan	Schembr		179885
21	Vance	VALDES		135335
22				
23				
24				
25				

Heavenly Mountain Resort Water Year
2015

APPENDIX G
2015 ANNUAL ROADWAY MAINTENANCE
MAPPING



January 15, 2016

Garrett Villanueva
Acting Regional Trail Program Manager
LTBMU Forest Service
Pacific Southwest Regional Office

Re: Heavenly Mountain Resort - Road Maintenance Summer Through August 31st, 2015

13N52i-- .5 Miles of Roads Improved in August (From Ridge Bowl Run uphill to past the Sky Spring)
13N40A--.3 Miles of Roads Maintained after summer storms June/July (Road to the top of First Ride chair, WB Maintenance and fixing the native road.)
1240.1--.7 Miles, Roundabout Road Maintained and repaired in July and August (multiple switchbacks repaired on roundabout road, rills repaired with road base near west bowl switchback, native material roadway improved and re-graded in the Cut)
13N52A--Orion's--.3 Miles, native Road Maintained native road re-graded and repaired.
13N5--Pepi's--.2 Miles, Road Maintained repair with road base (from the top of Northbowl Chair to 100 Dollar Saddle fuel farm area)
12N41--Groove Road--.1 mile, Road Maintained road base added to road and reconquered WB's.
13N52--Cal Dam to Sky Chute, --.2 miles, Road Maintained Mix of new road base surface added to existing road base, and resurfacing of native roadway. Repairs to WB's were completed.
12N41B--TOT Road repairs, --.2 miles, Road Maintained road base and WB's repaired and re-graded in June.

			ML1	ML2	ML3	ML4	ML5
Roads Improved			0	.5	0	0	0
Roads Maintained			0	2	0	0	0
Roads Decommissioned			0	0	0	0	0

I have a total of 2.5 miles of Heavenly FS roads that I have estimated to have been repaired, maintained, and resurfaced in house. This occurred between May and August 2015.

Should you require additional information or have questions regarding this report and its contents, please contact myself or Chris Donley of Cardno. at 916-386-3845.

Sincerely,

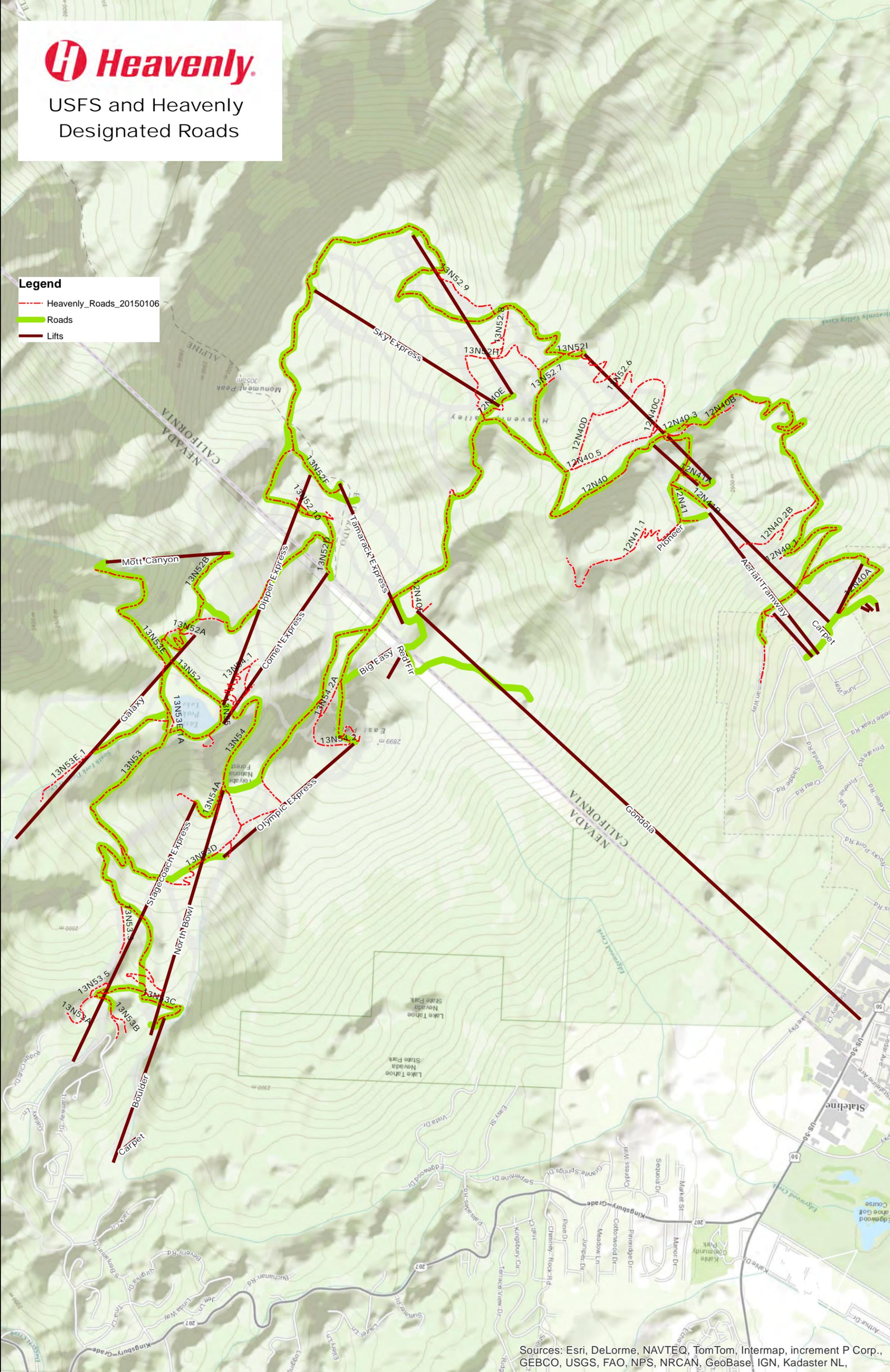
Frank Papandrea
Heavenly Environmental Manager



USFS and Heavenly Designated Roads

Legend

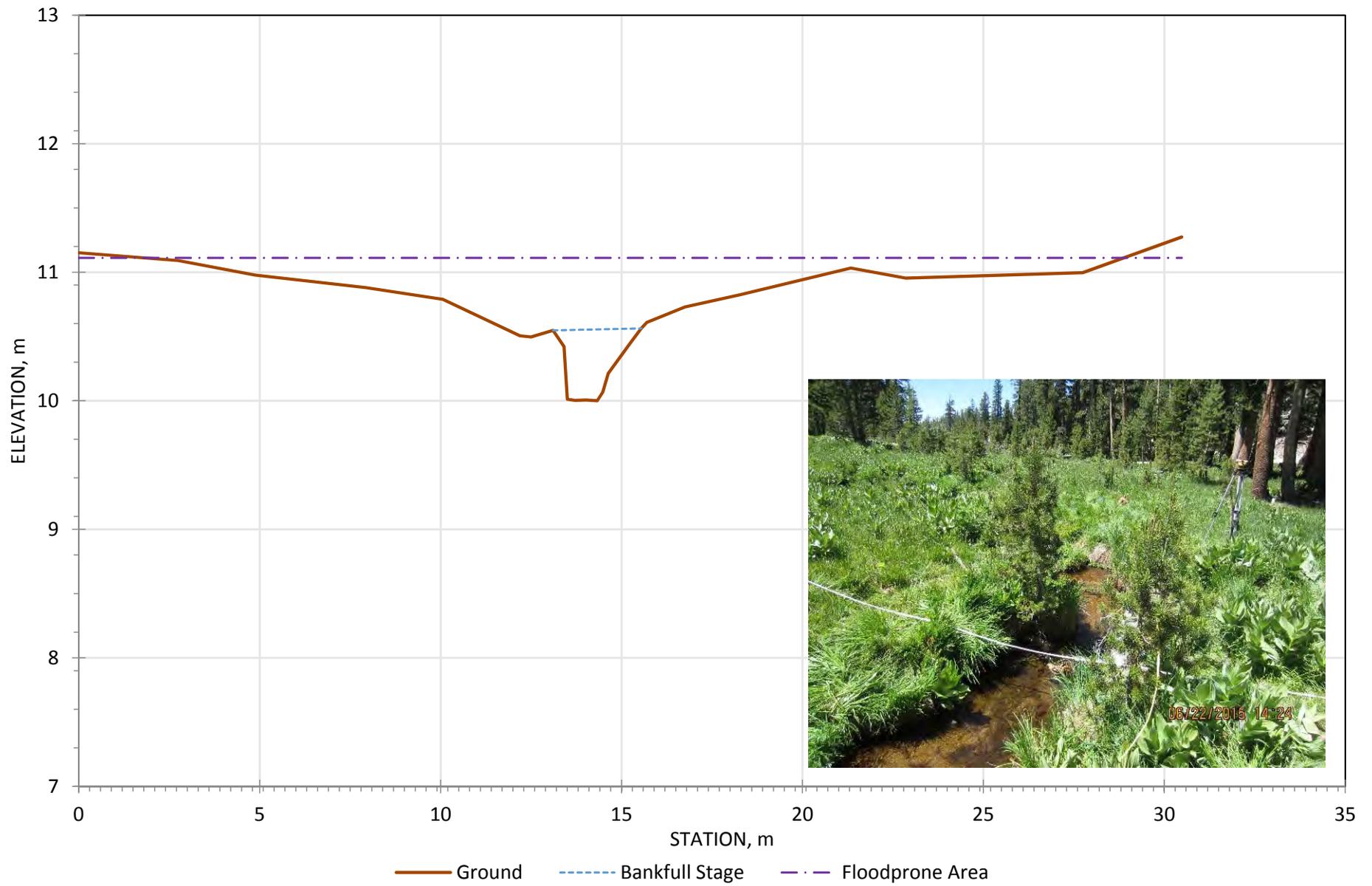
- Heavenly_Roads_20150106
- Roads
- Lifts



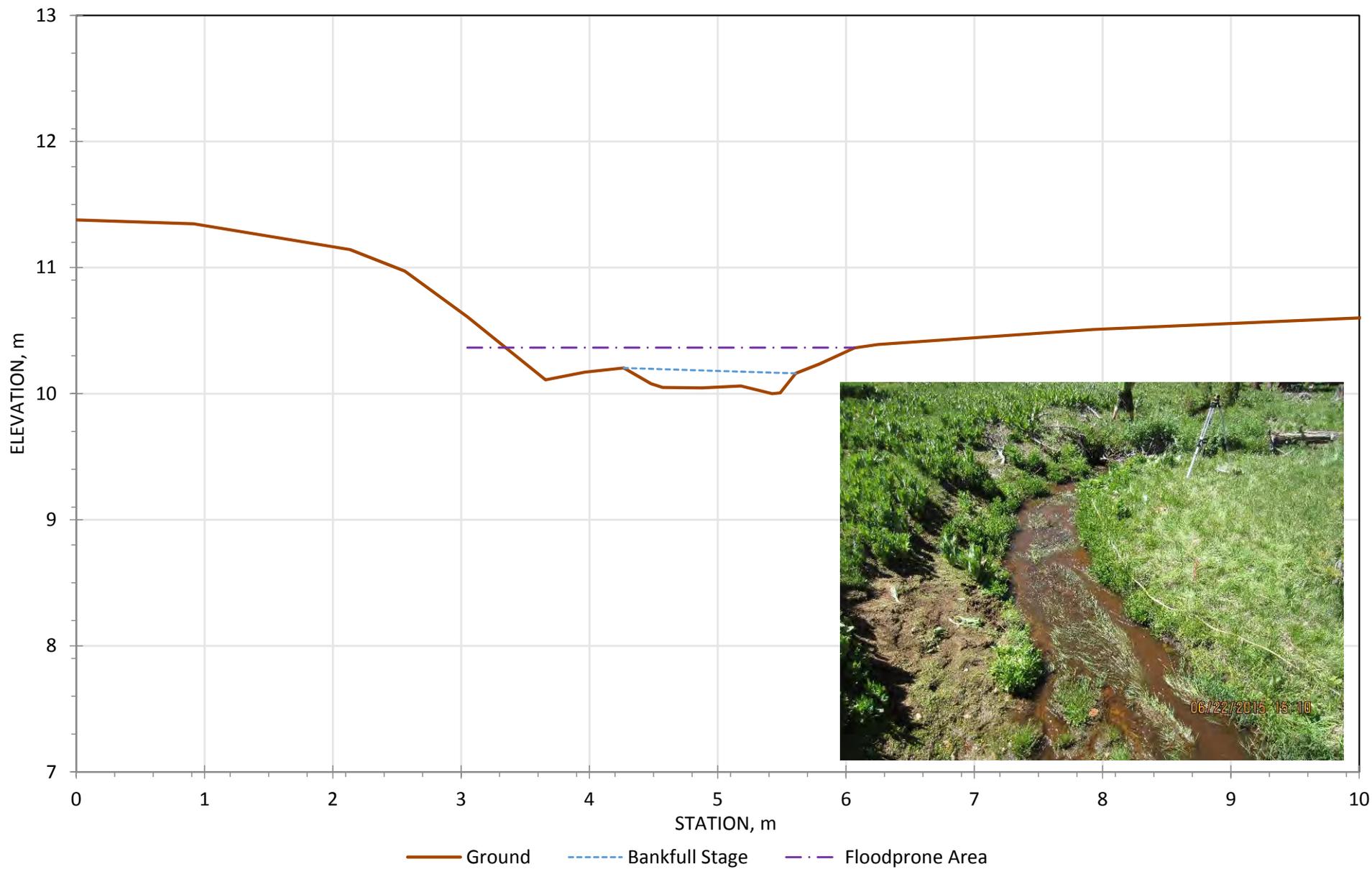
Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL,

Heavenly Mountain Resort Water Year
2015

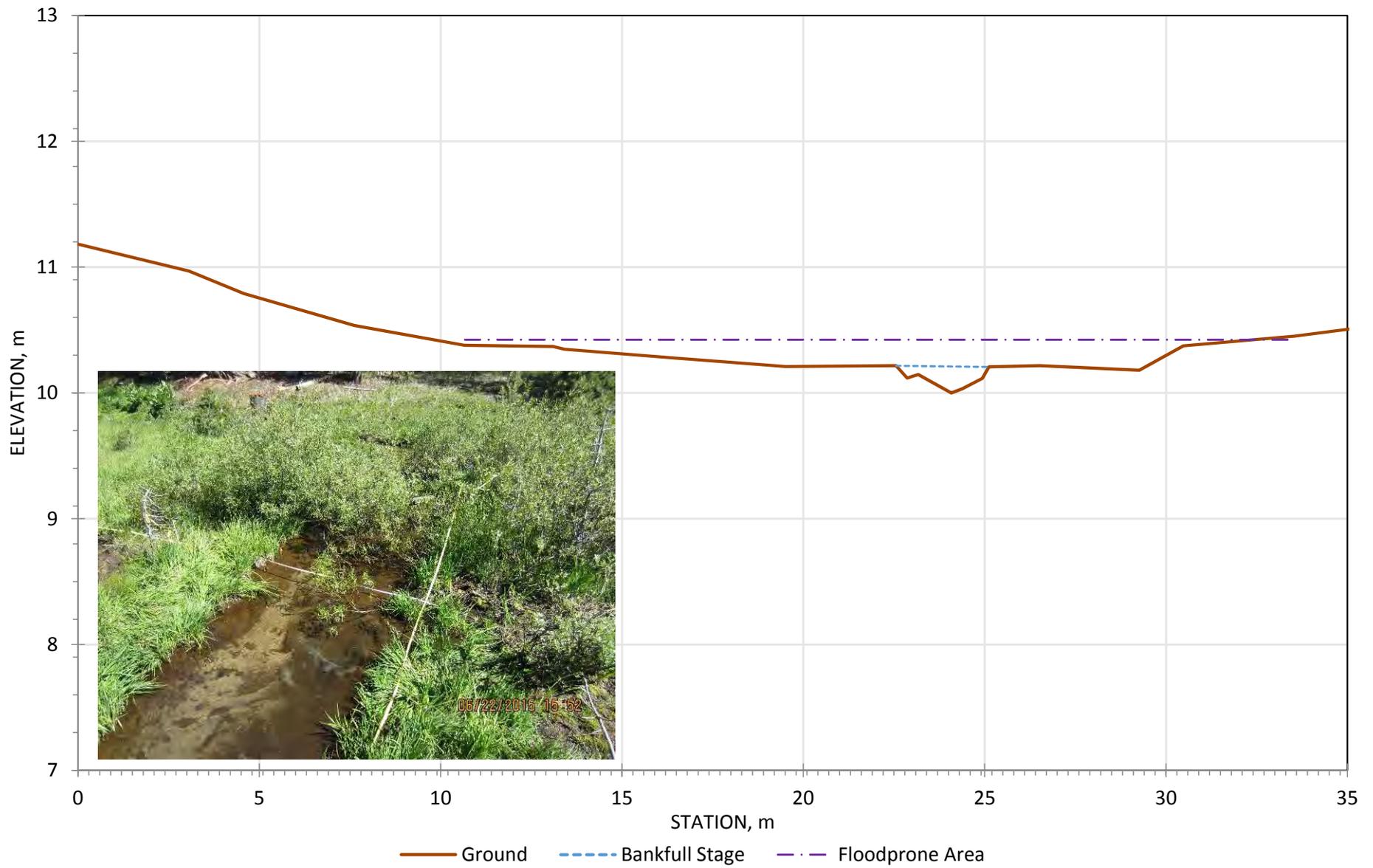
APPENDIX H
2015 SCI RIPARIAN DATA



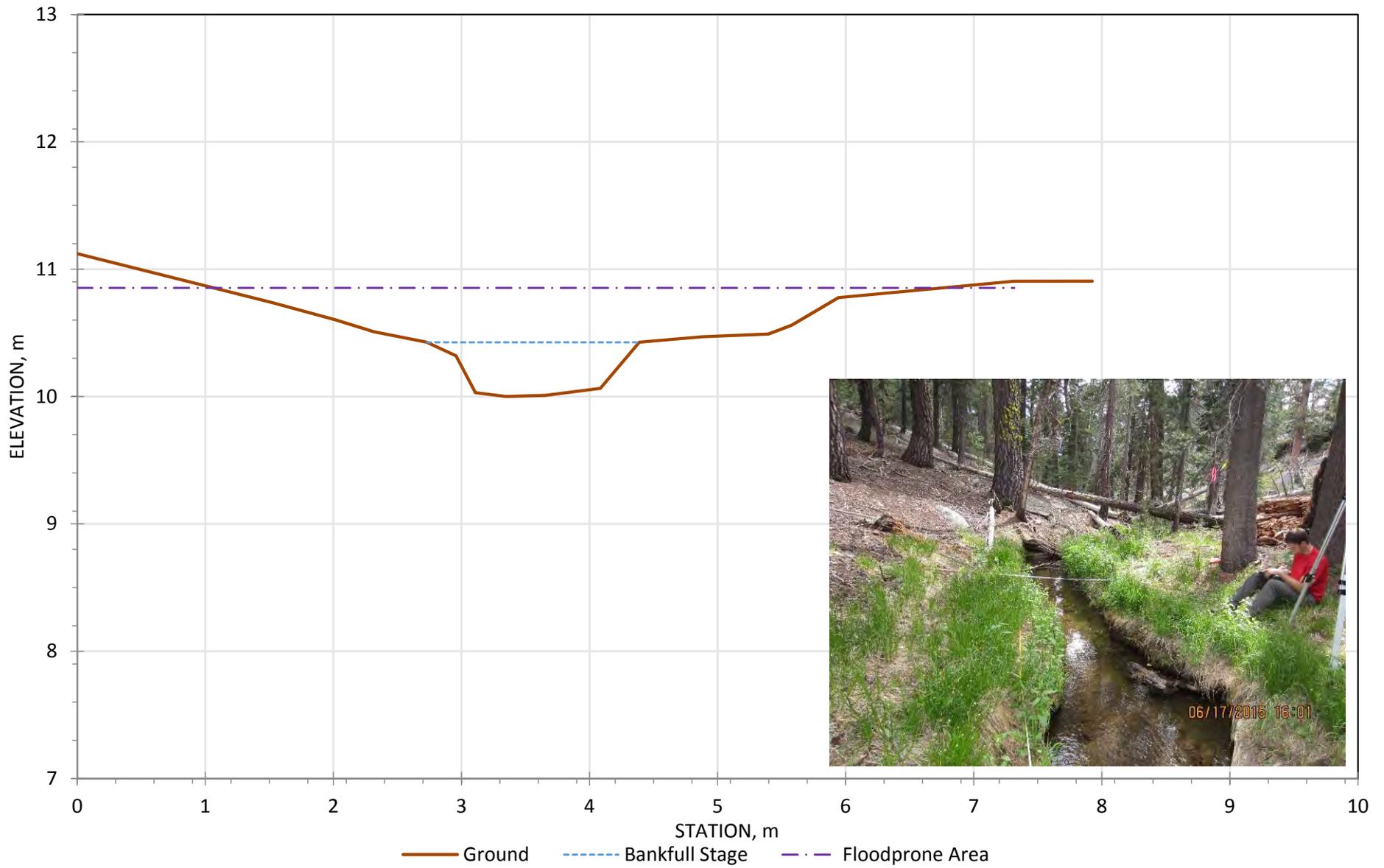
Cross-section number 1 (XS-1) HVC-1, Sky Meadows, along Heavenly Valley Creek



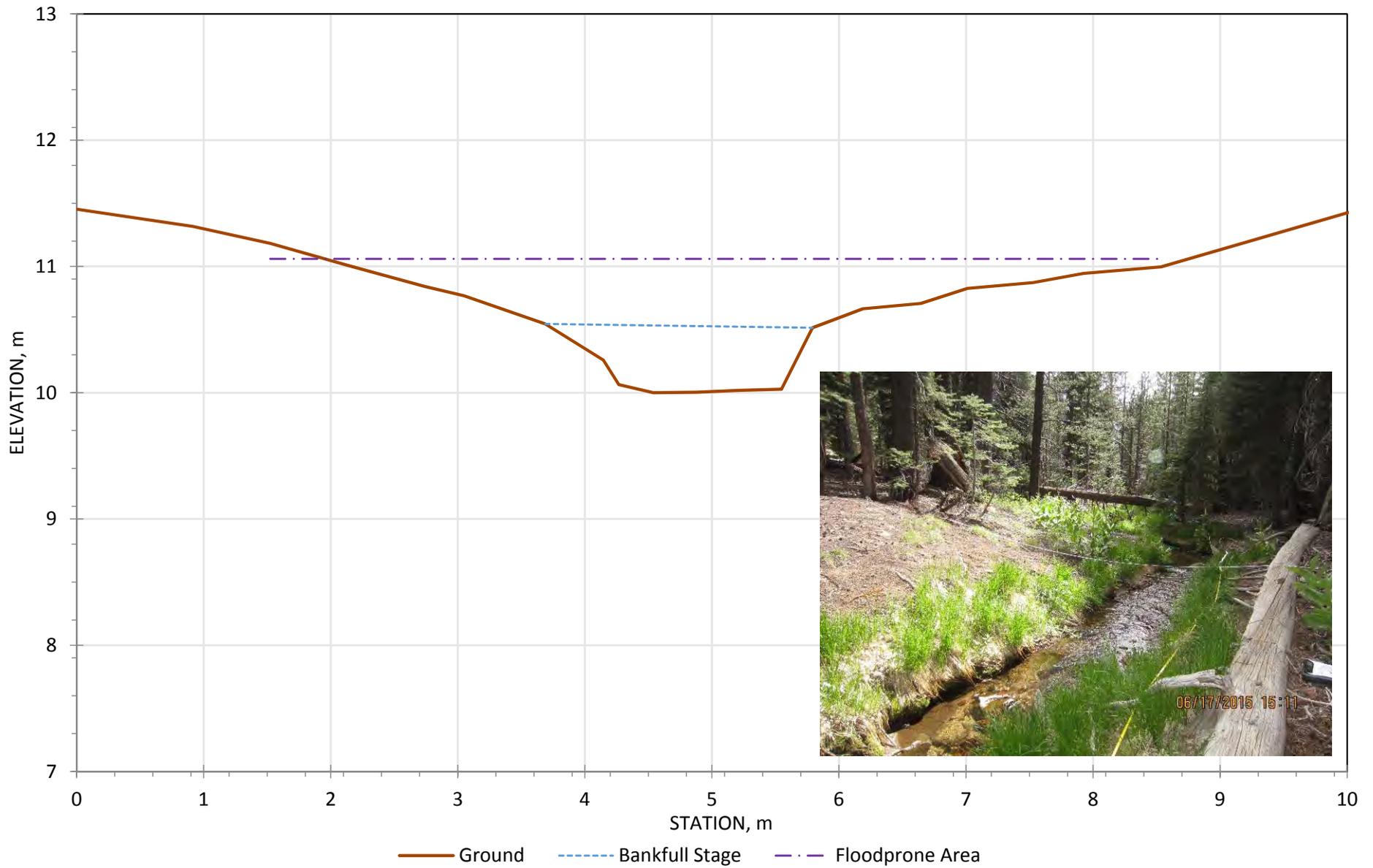
Cross-section number 2 (XS-2) HVC-1, Sky Meadows, along Heavenly Valley Creek



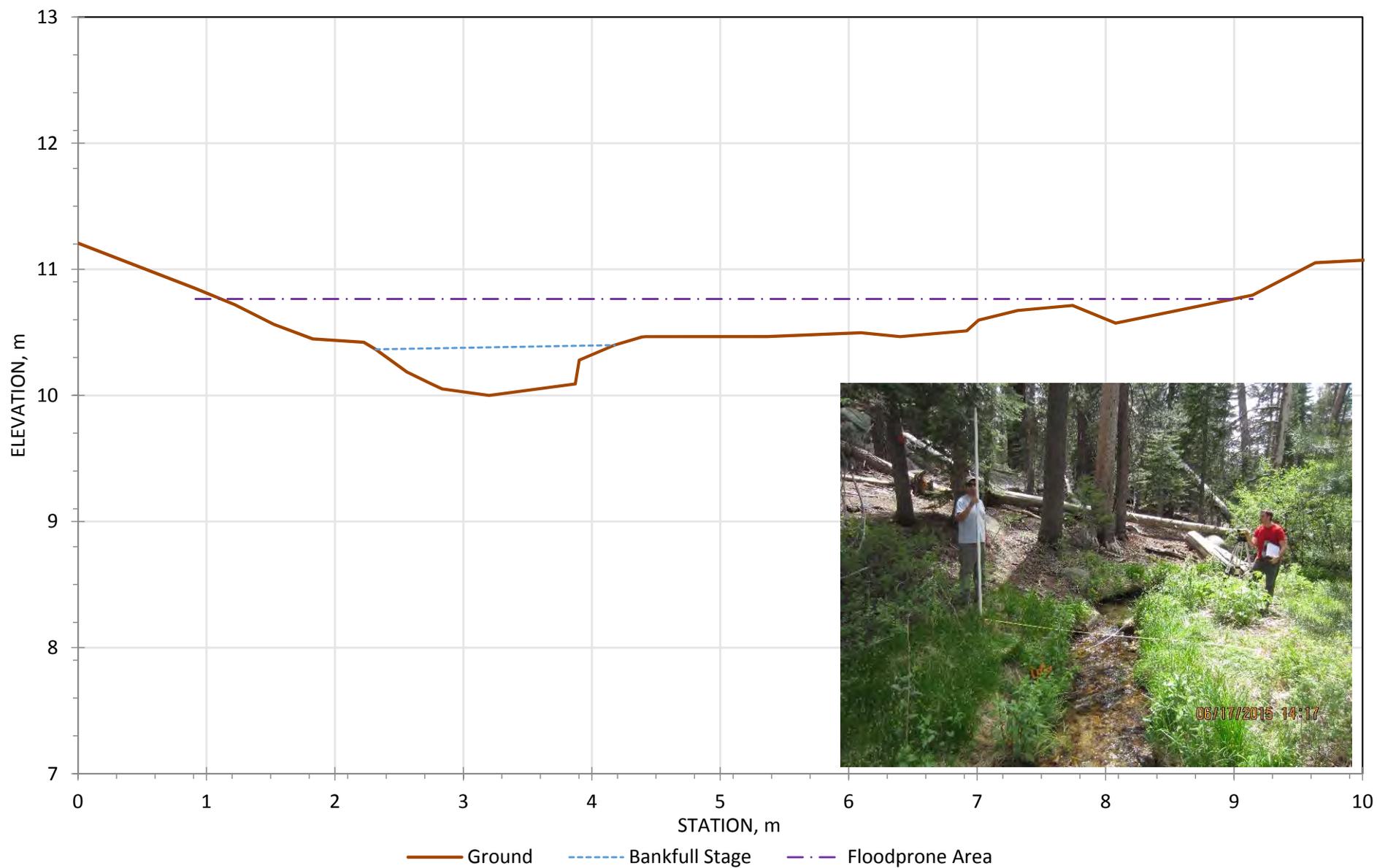
Cross-section number 3 (XS-3) HVC-1, Sky Meadows, along Heavenly Valley Creek



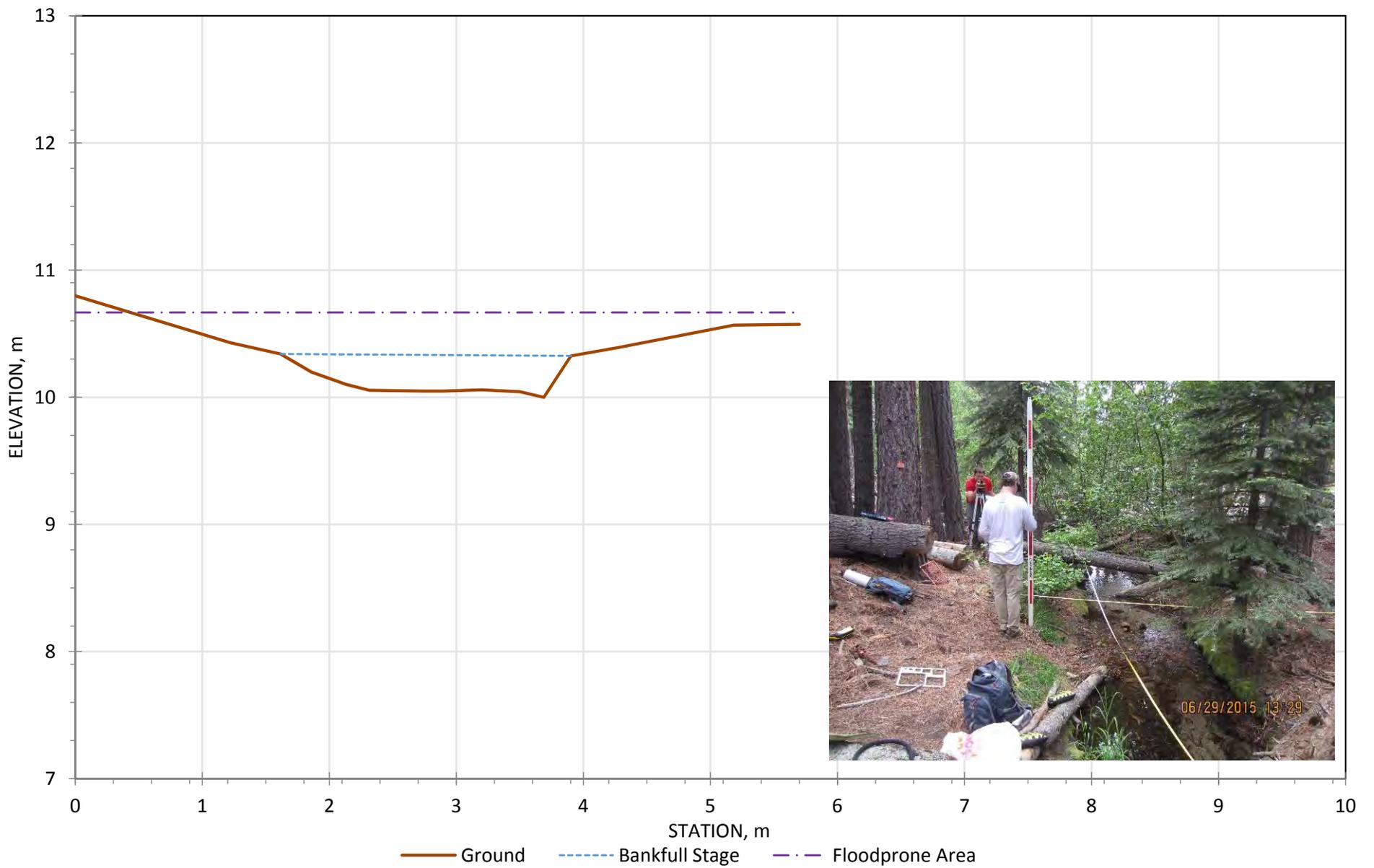
Cross-section number 1 (XS-1) HVC-2, Below Patsy's, along Heavenly Valley Creek



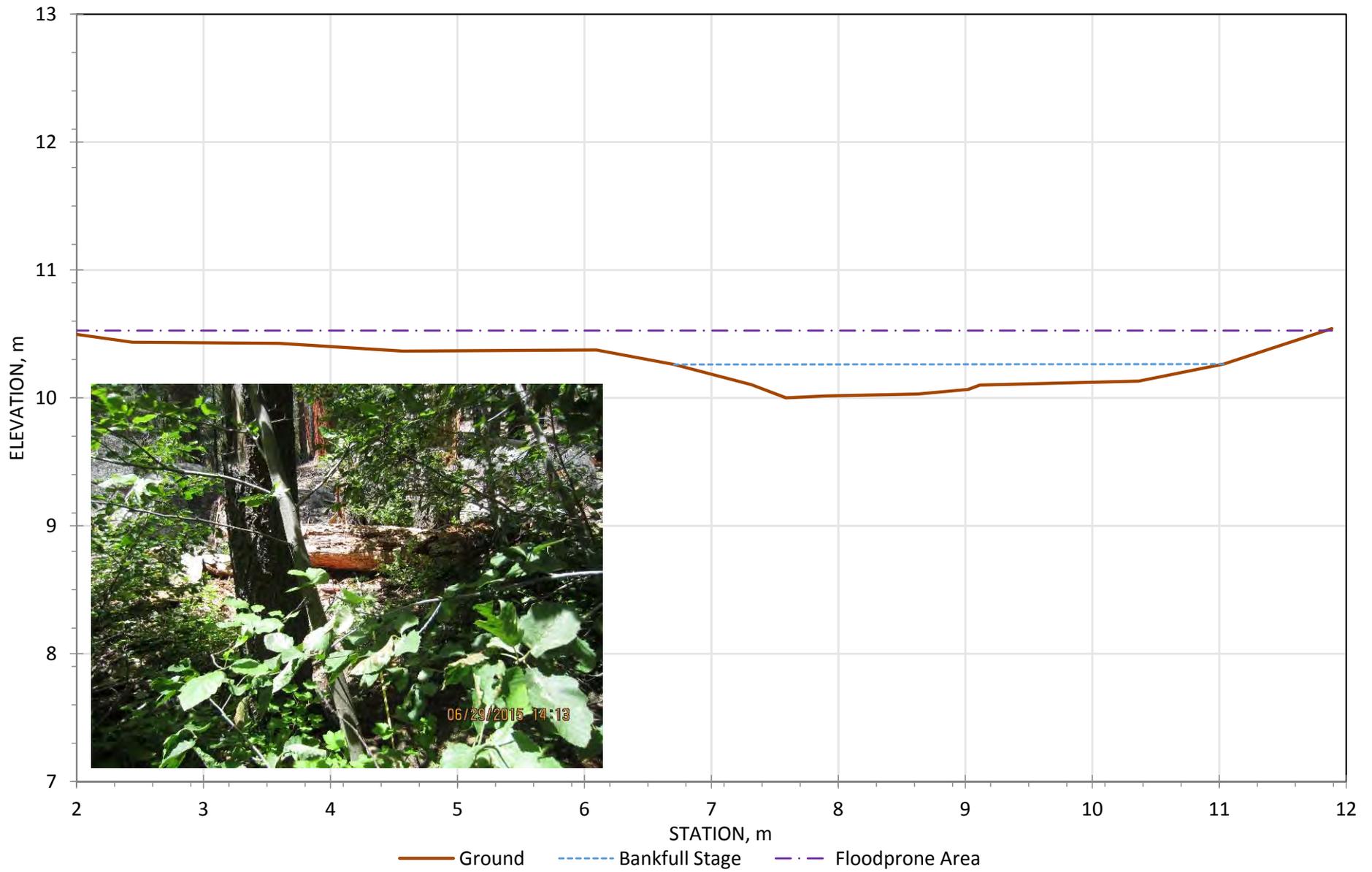
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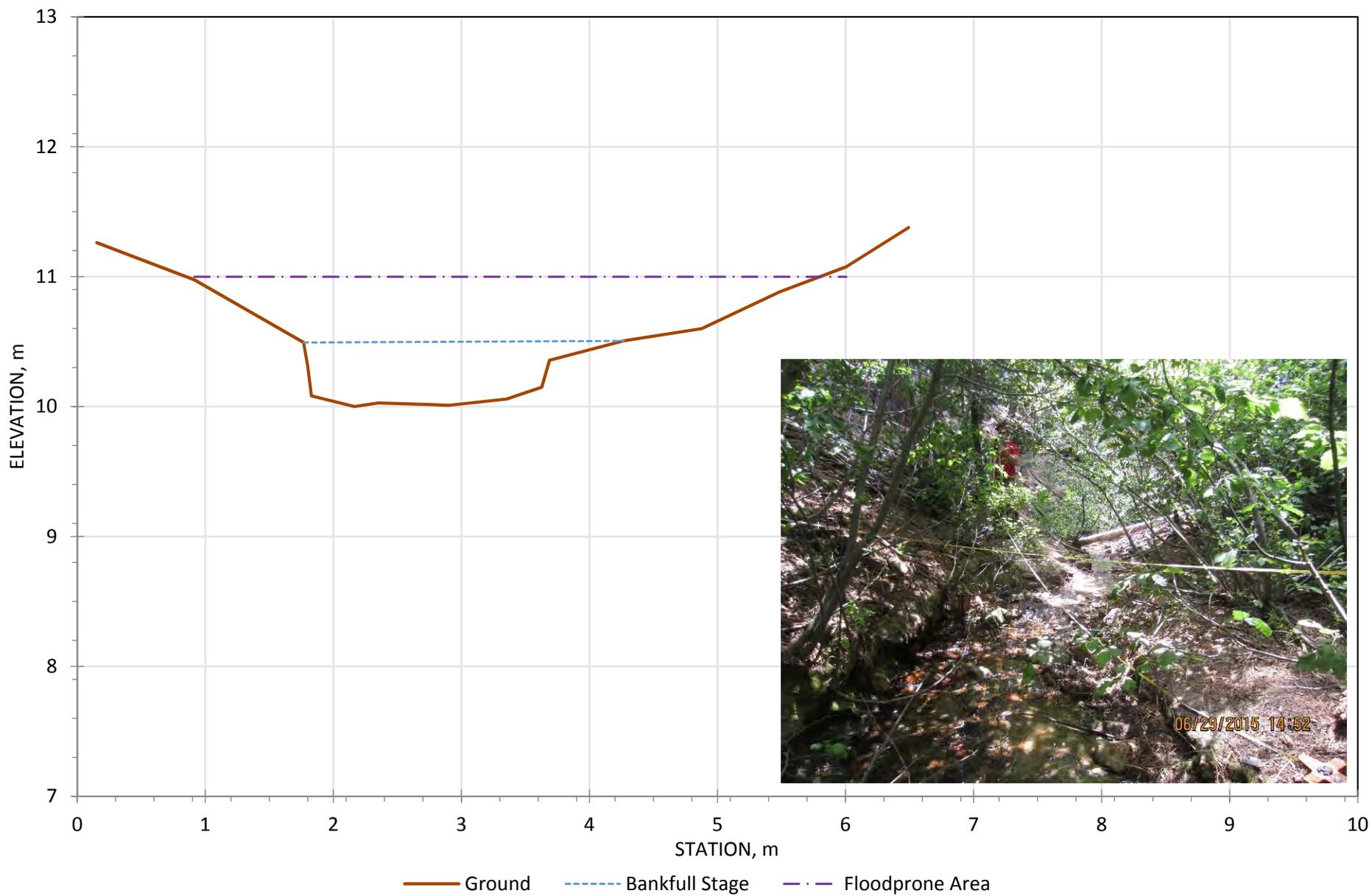
Cross-section number 3 (XS-3) HVC-2, Below Patsy's, along Heavenly Valley Creek



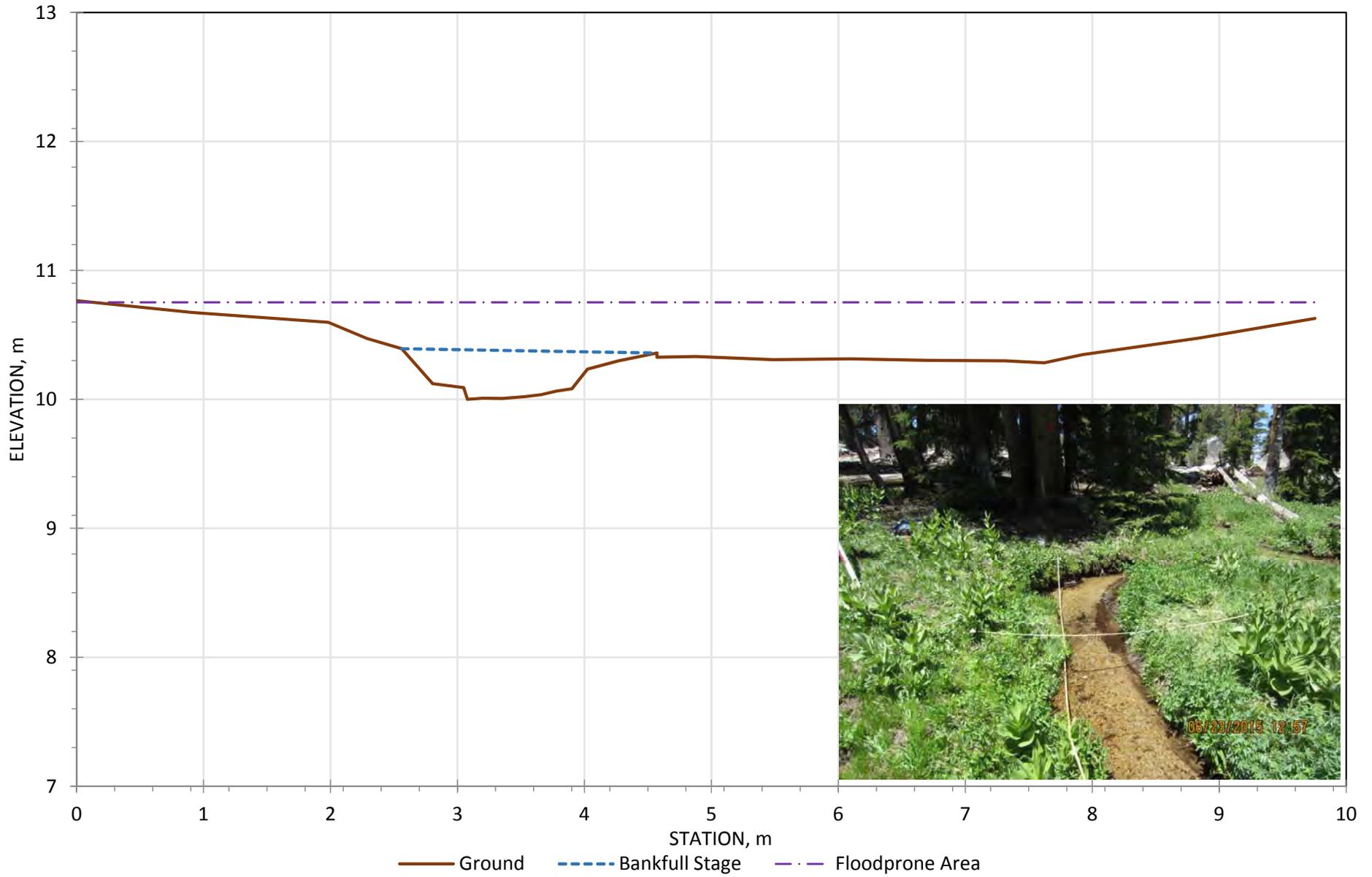
Cross-section number 1 (XS-1) HVC-3, Property Line, along Heavenly Valley Creek



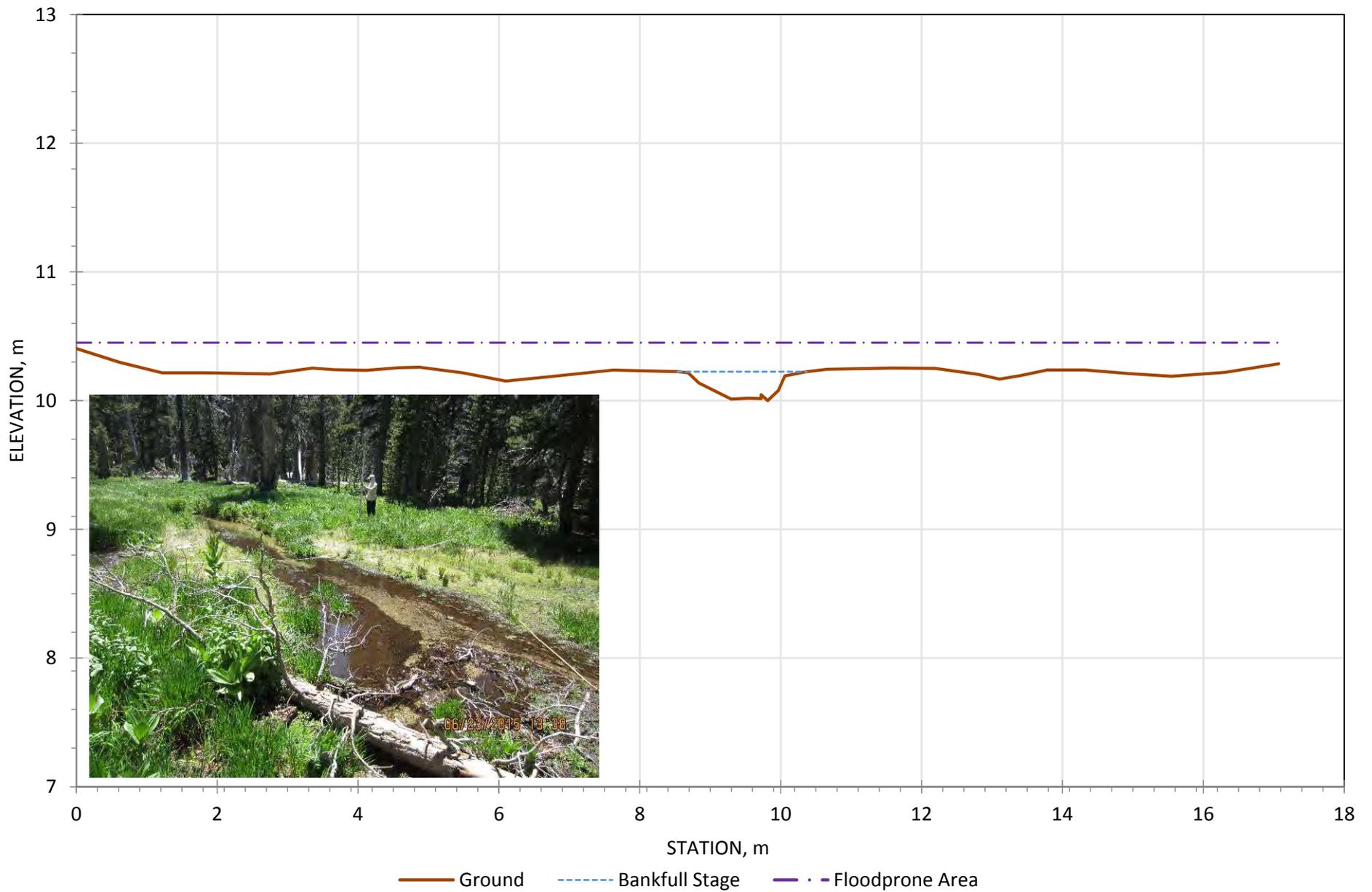
Cross-section number 2 (XS-2) HVC-3, Property Line, along Heavenly Valley Creek



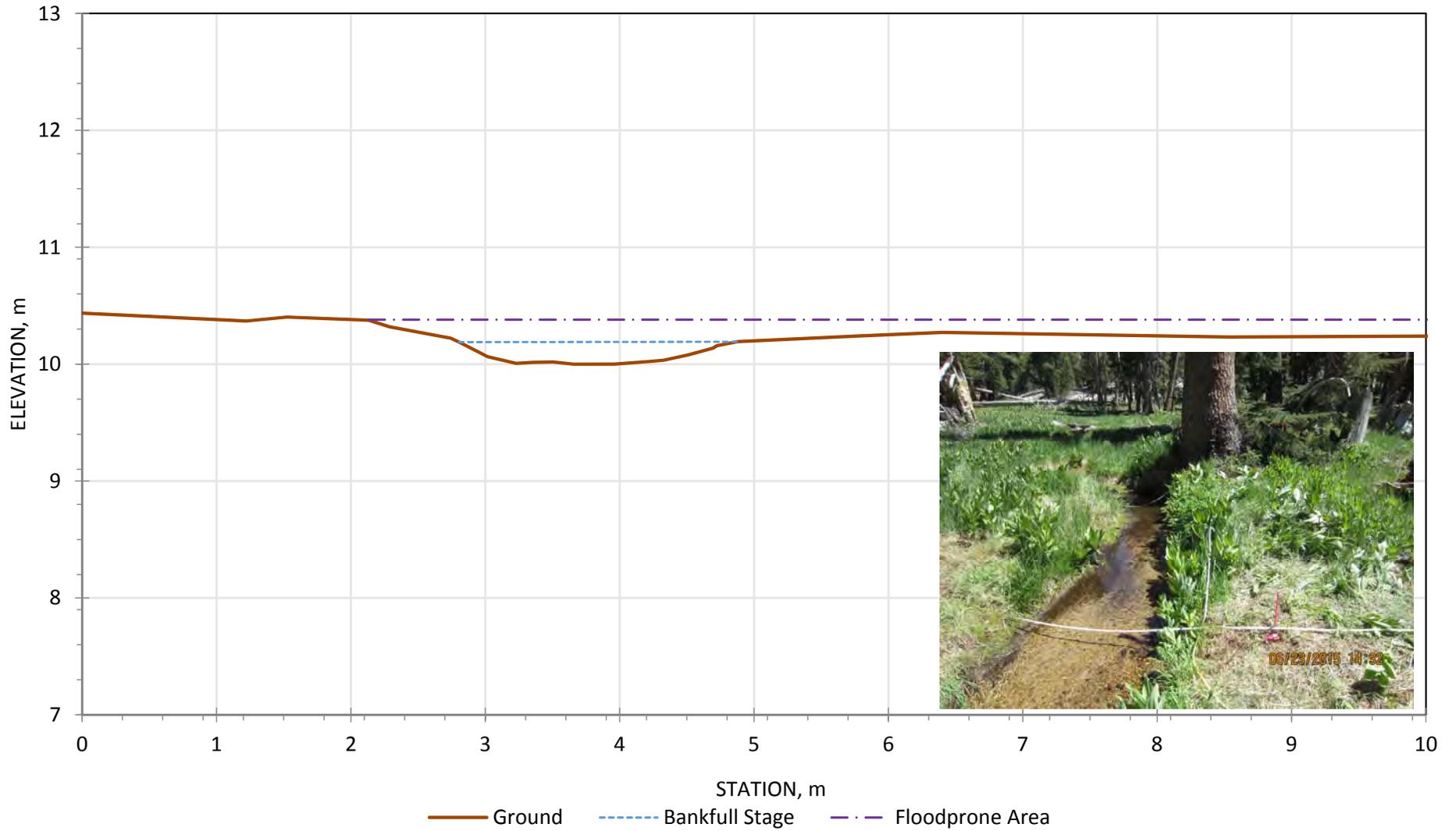
Cross-section number 3 (XS-3) HVC-3, Property Line, along Heavenly Valley Creek



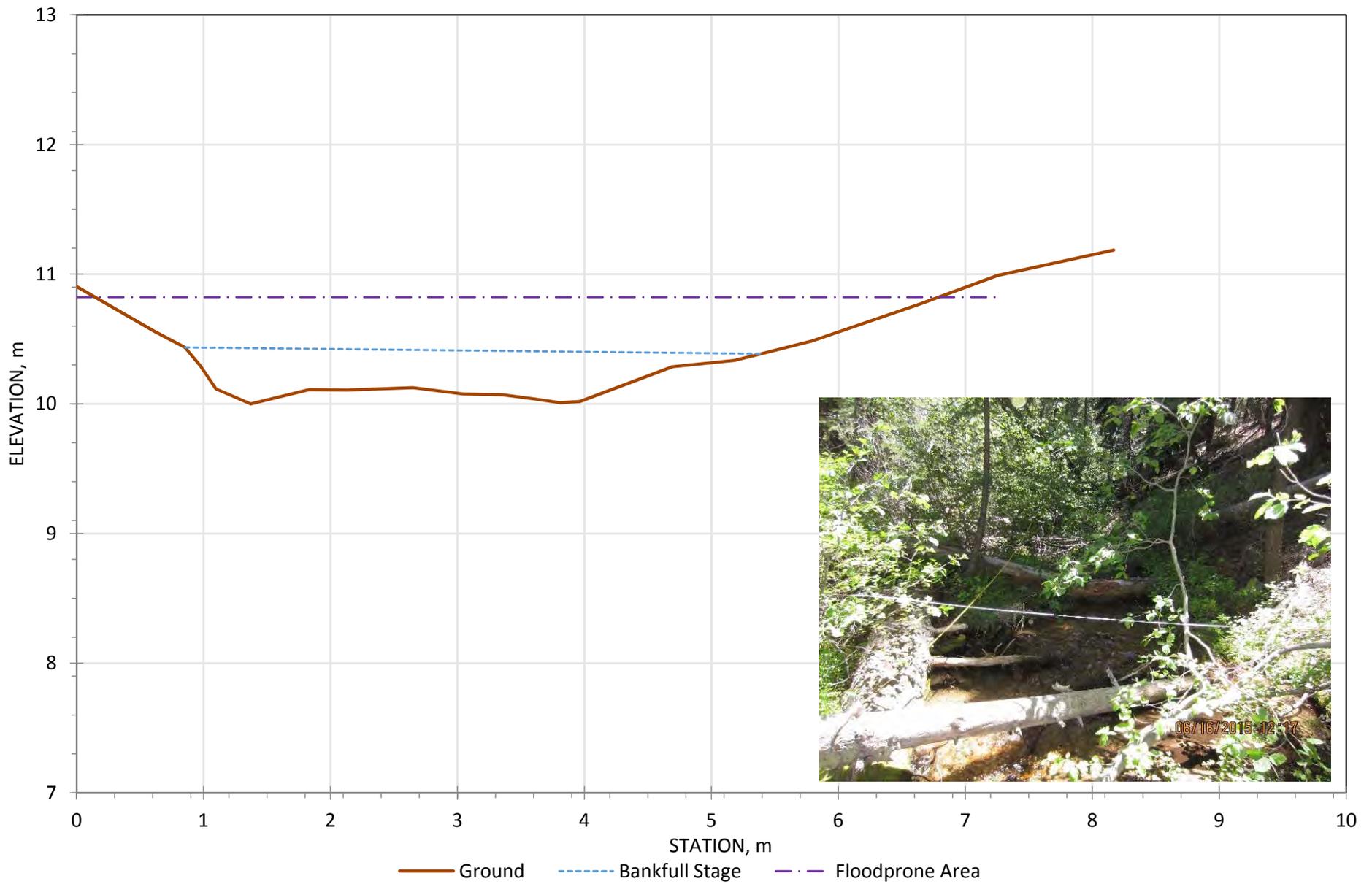
Cross-section number 1 (XS-1) HDVC-1, Upper Hidden, along Hidden Valley Creek



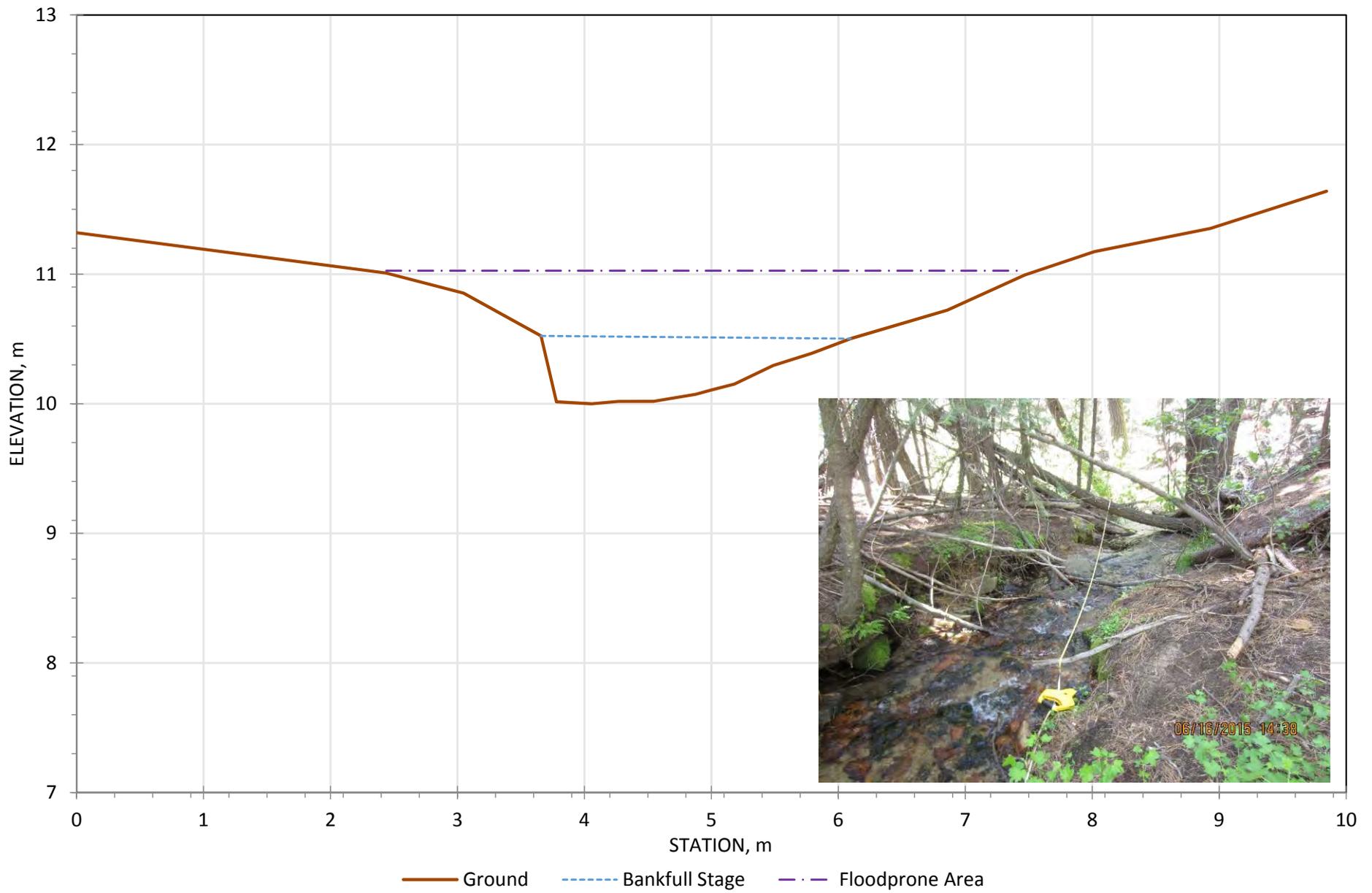
Cross-section number 2 (XS-2) HDVC-1, Upper Hidden, along Hidden Valley Creek



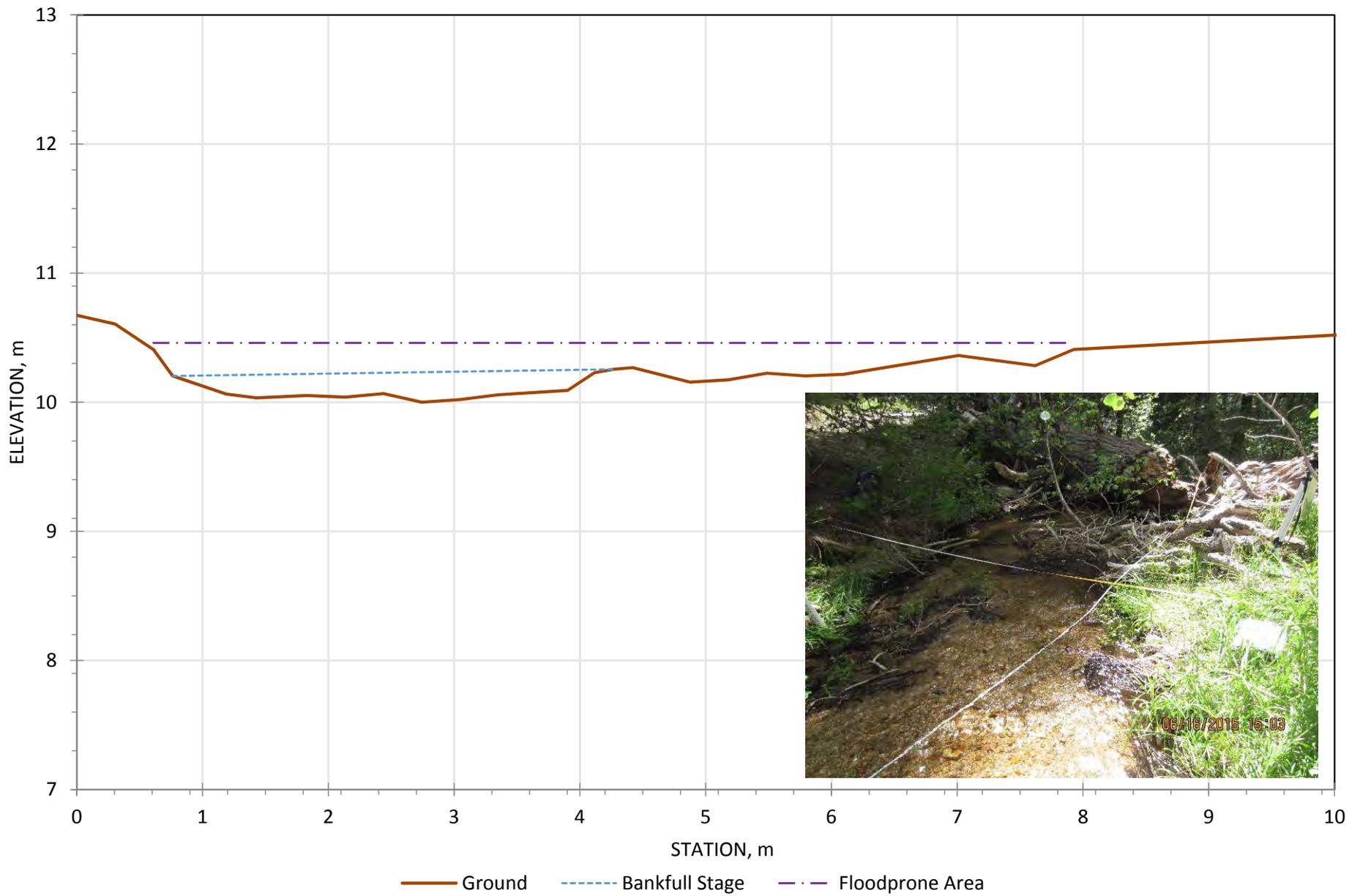
Cross-section number 3 (XS-3) HDVC-1, Upper Hidden, along Hidden Valley Creek



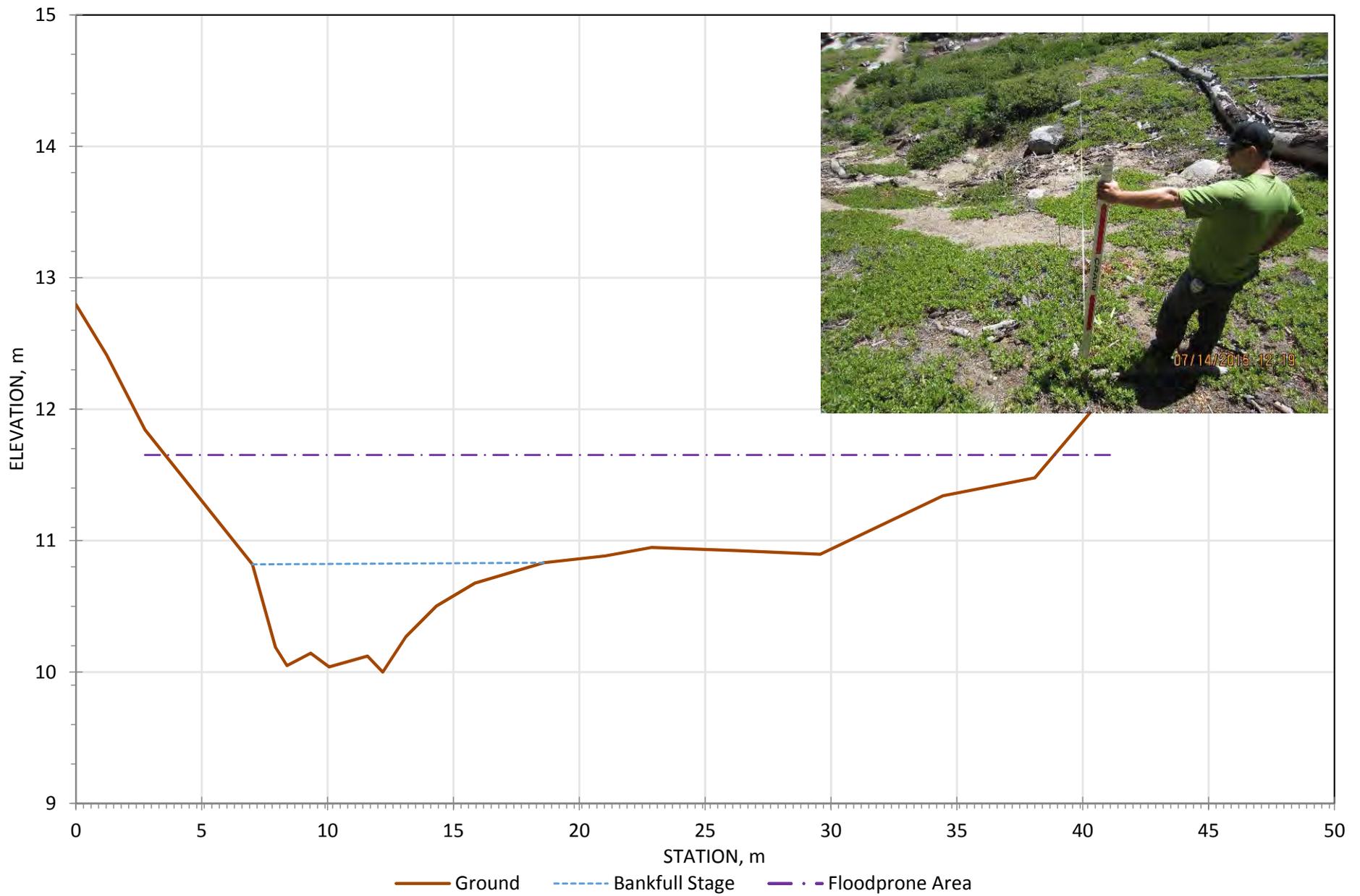
Cross-section number 1 (XS-1) HDVC-2, Lower Hidden, along Hidden Valley Creek



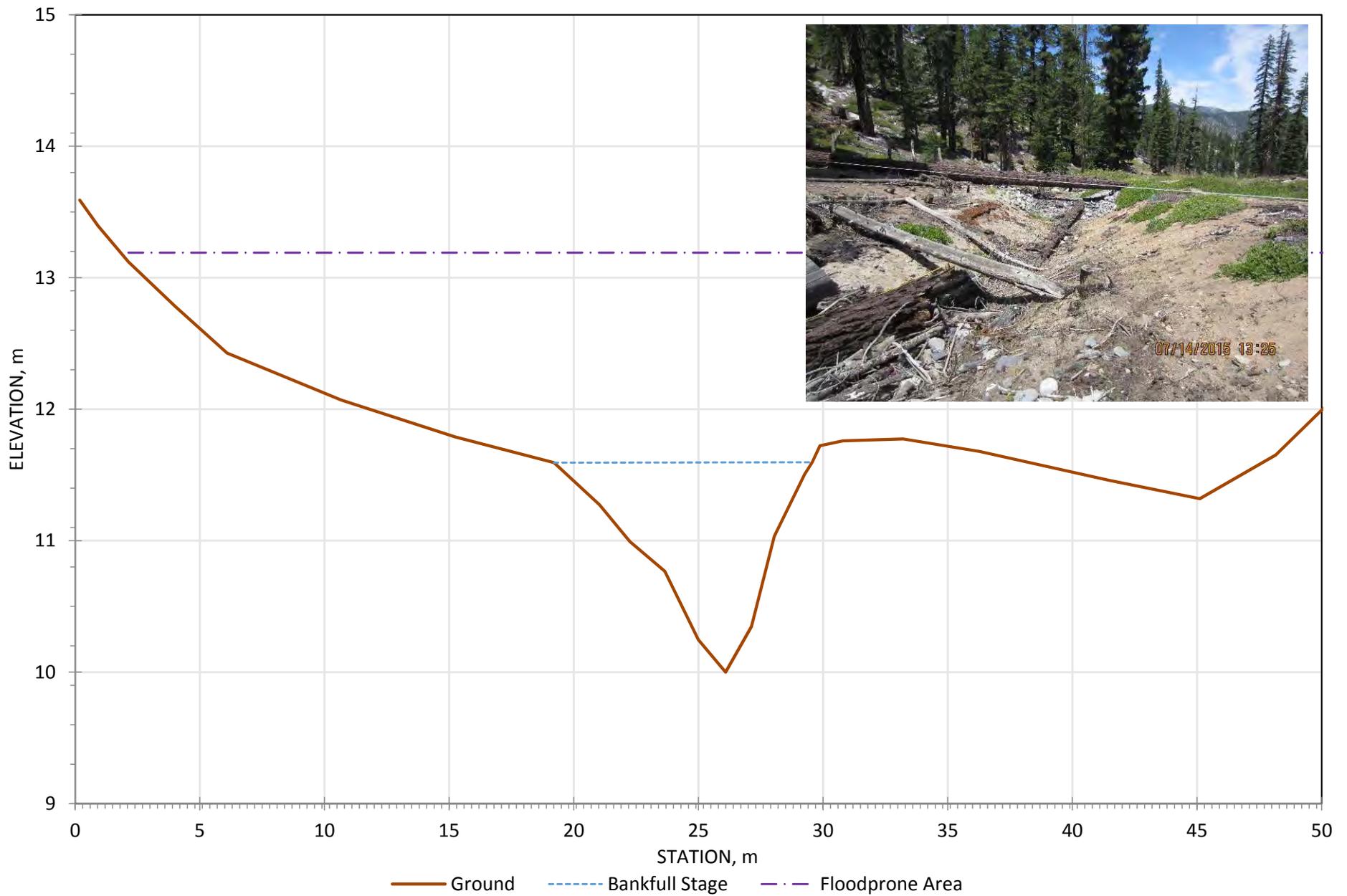
Cross-section number 2 (XS-2) HDVC-2, Lower Hidden, along Hidden Valley Creek



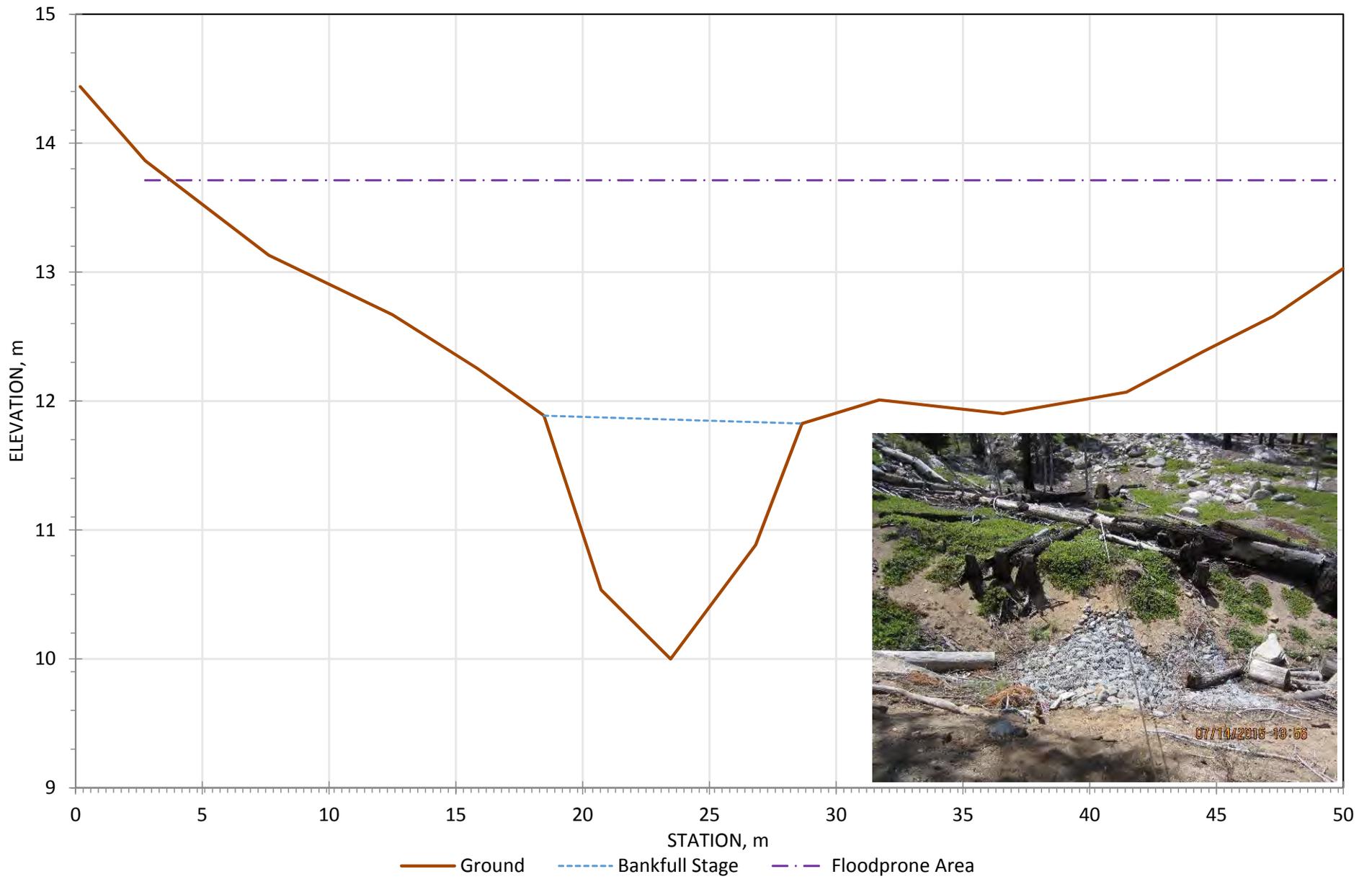
Cross-section number 3 (XS-3) HDVC-2, Lower Hidden, along Hidden Valley Creek



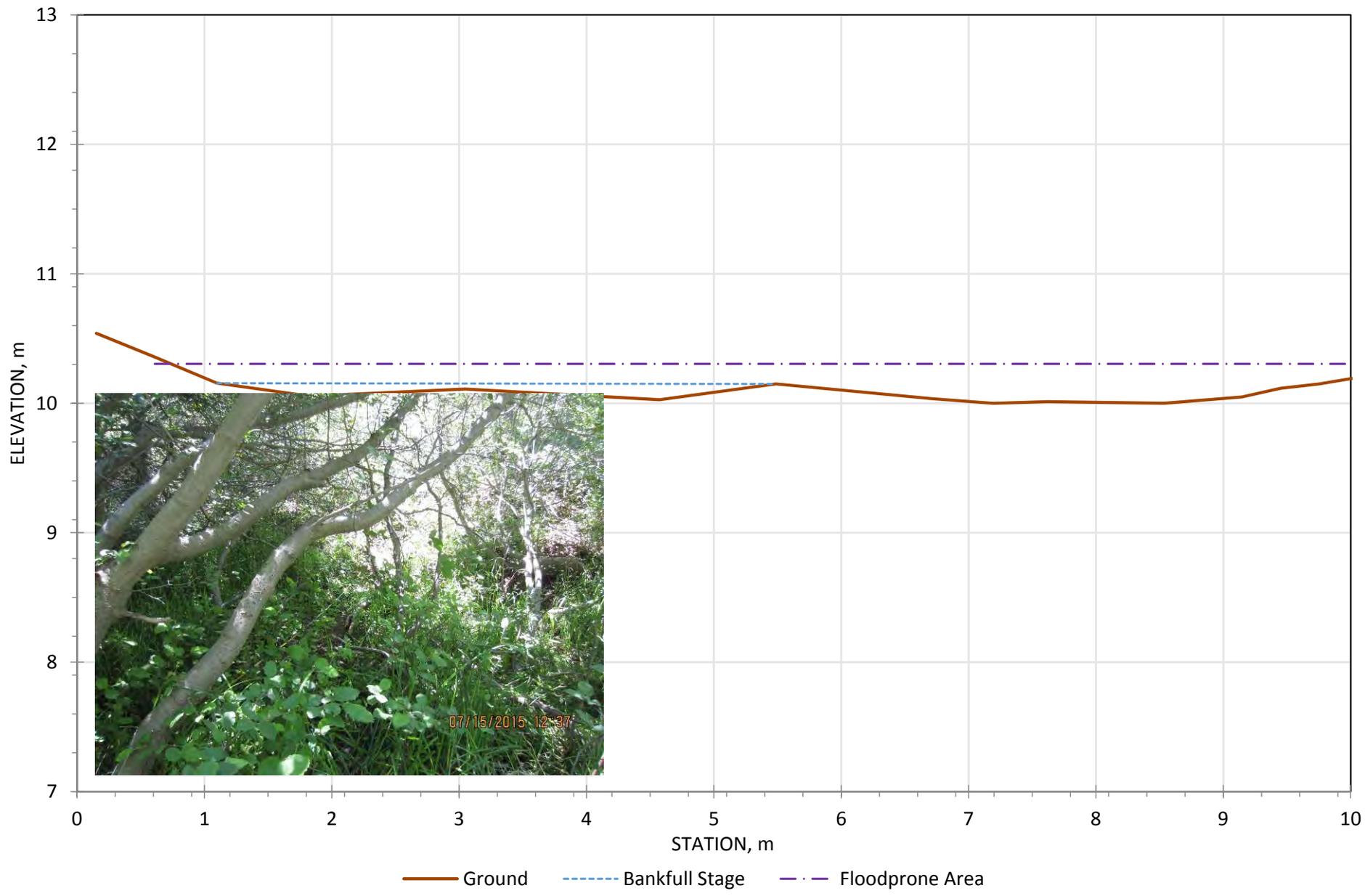
Cross-section number 1 (XS-1) EC-1, Upper Edgewood, along Edgewood Creek



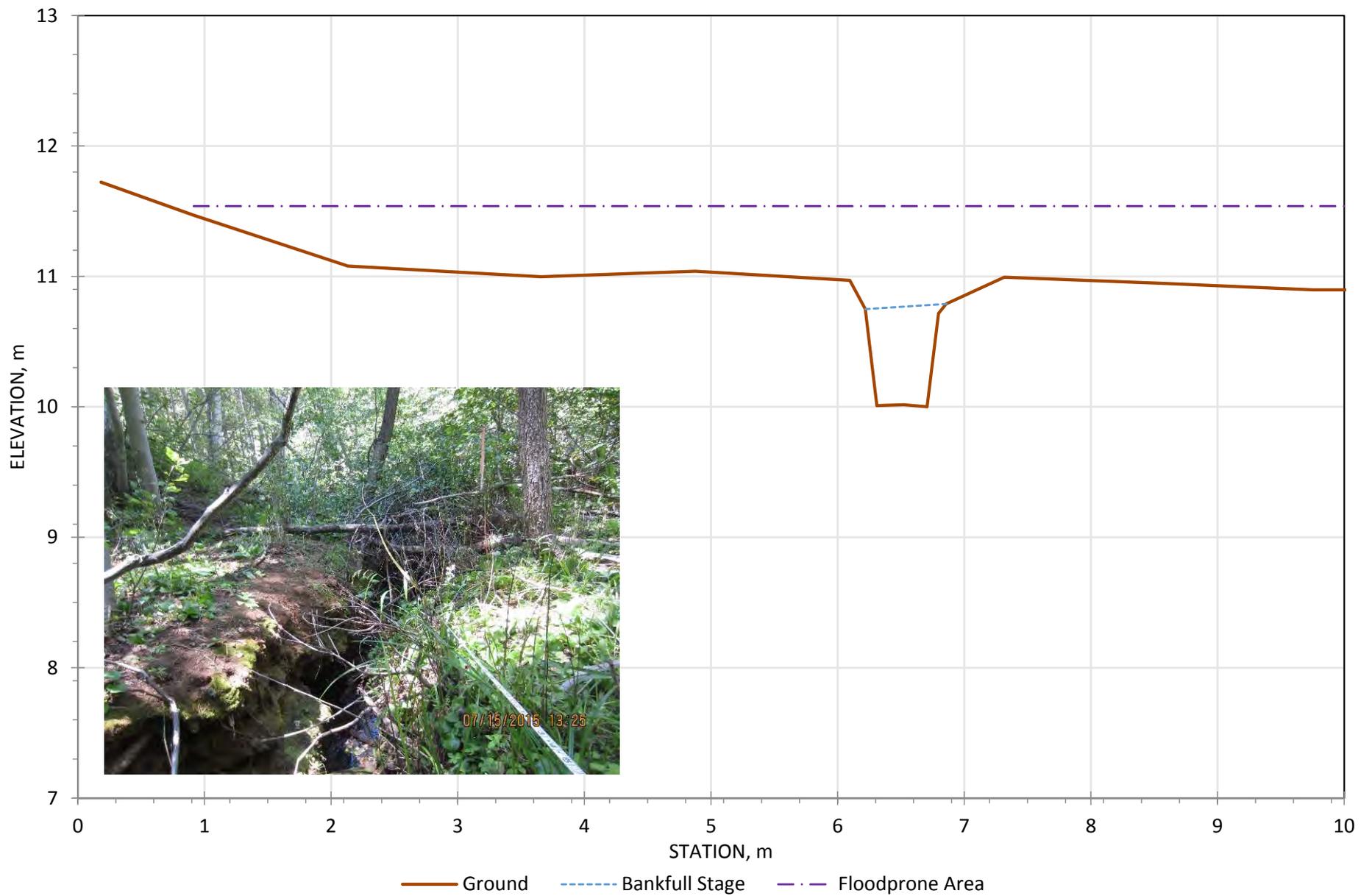
Cross-section number 2 (XS-2) EC-1, Upper Edgewood, along Edgewood Creek



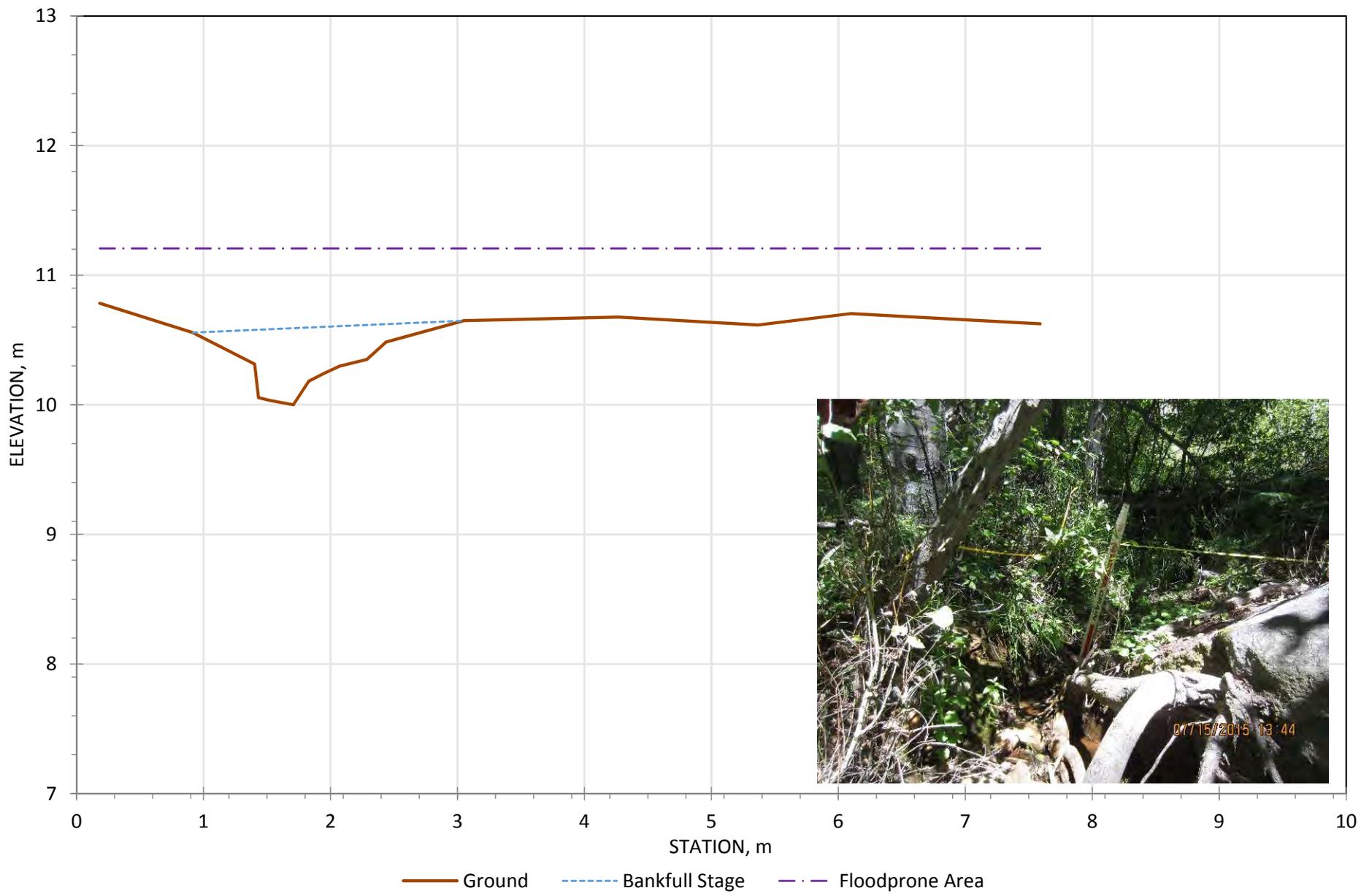
Cross-section number 3 (XS-3) EC-1, Upper Edgewood, along Edgewood Creek



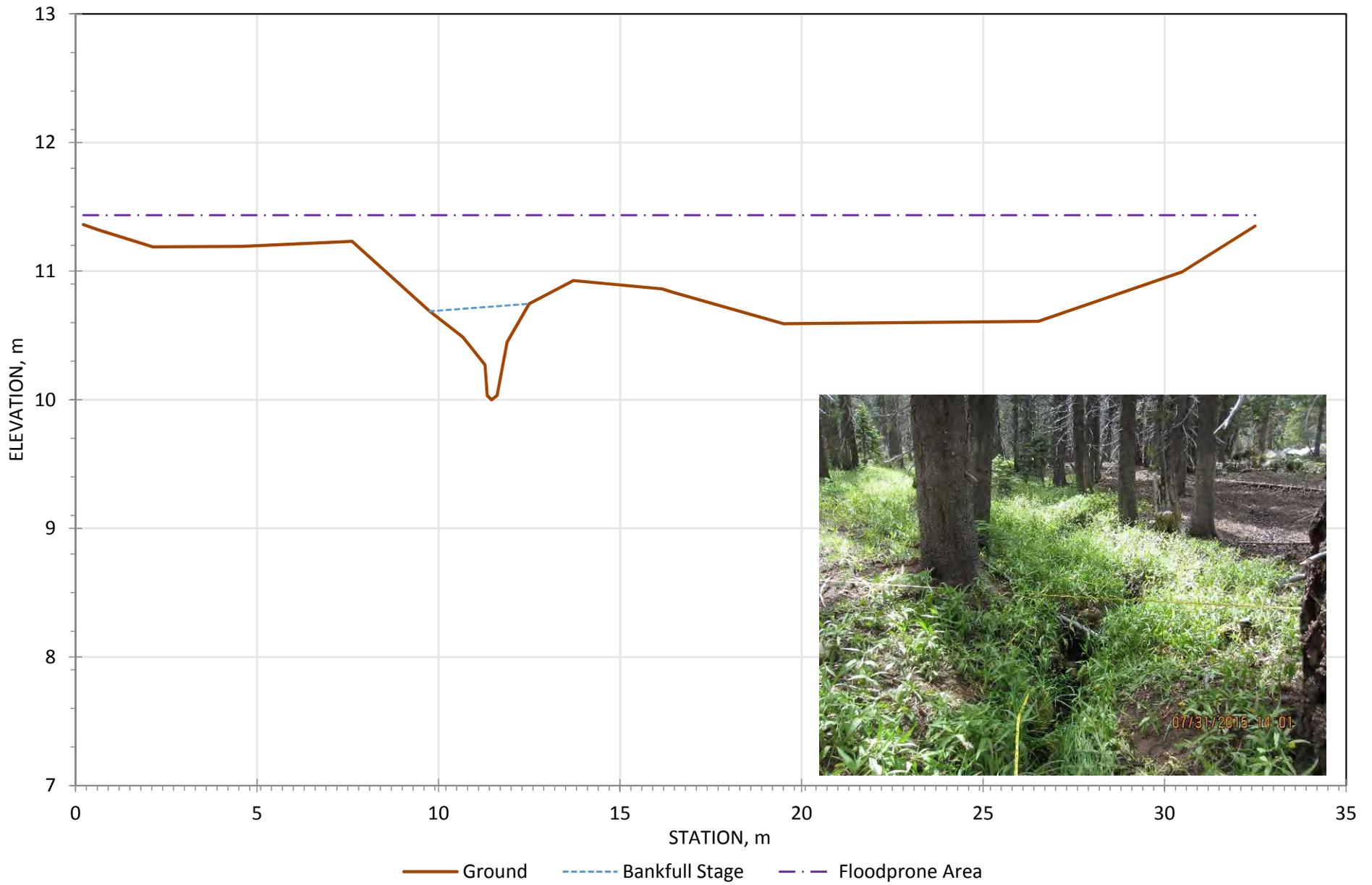
Cross-section number 1 (XS-1) EC-2, Lower Edgewood, along Edgewood Creek



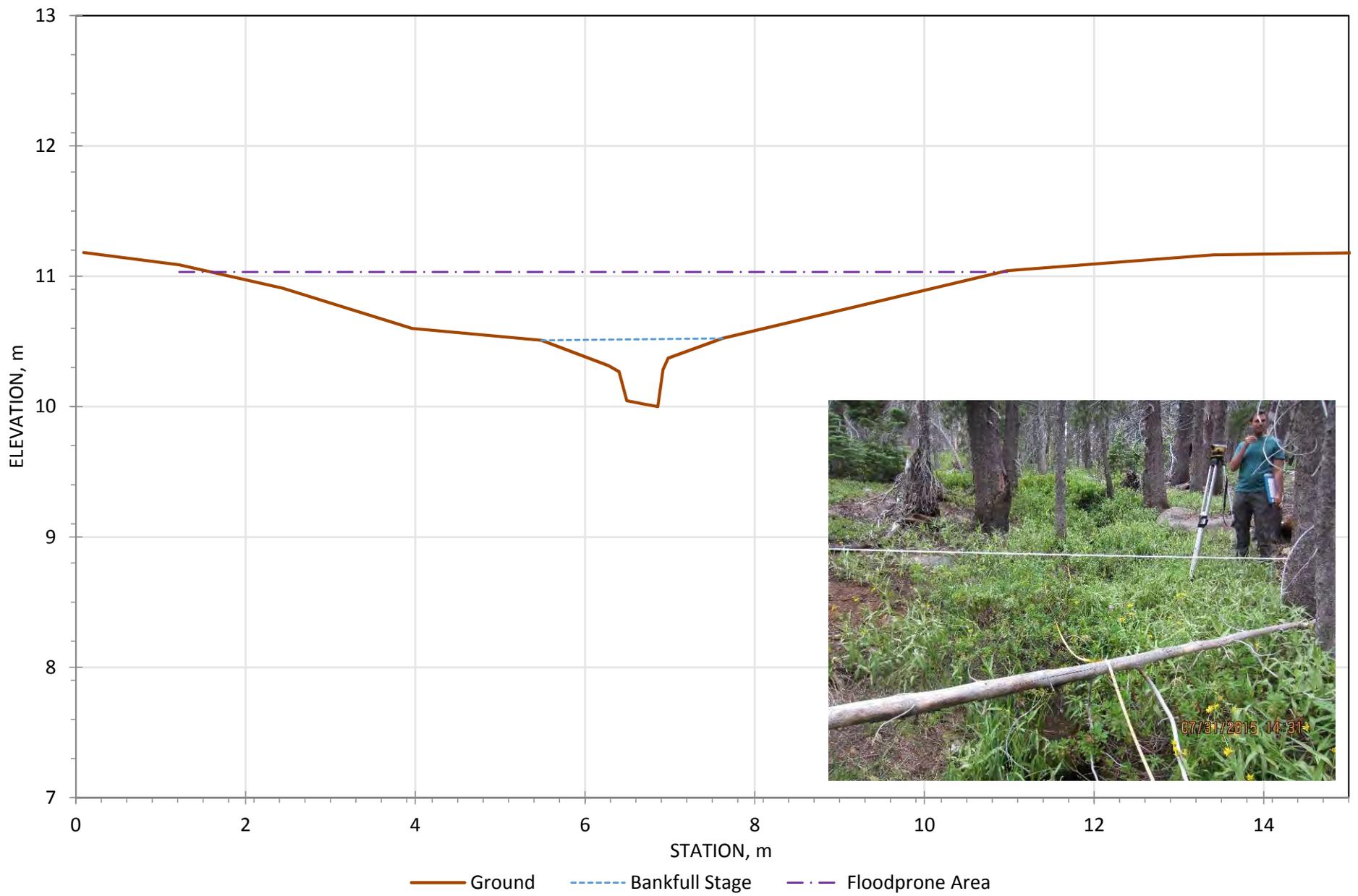
Cross-section number 2 (XS-2) EC-2, Lower Edgewood, along Edgewood Creek



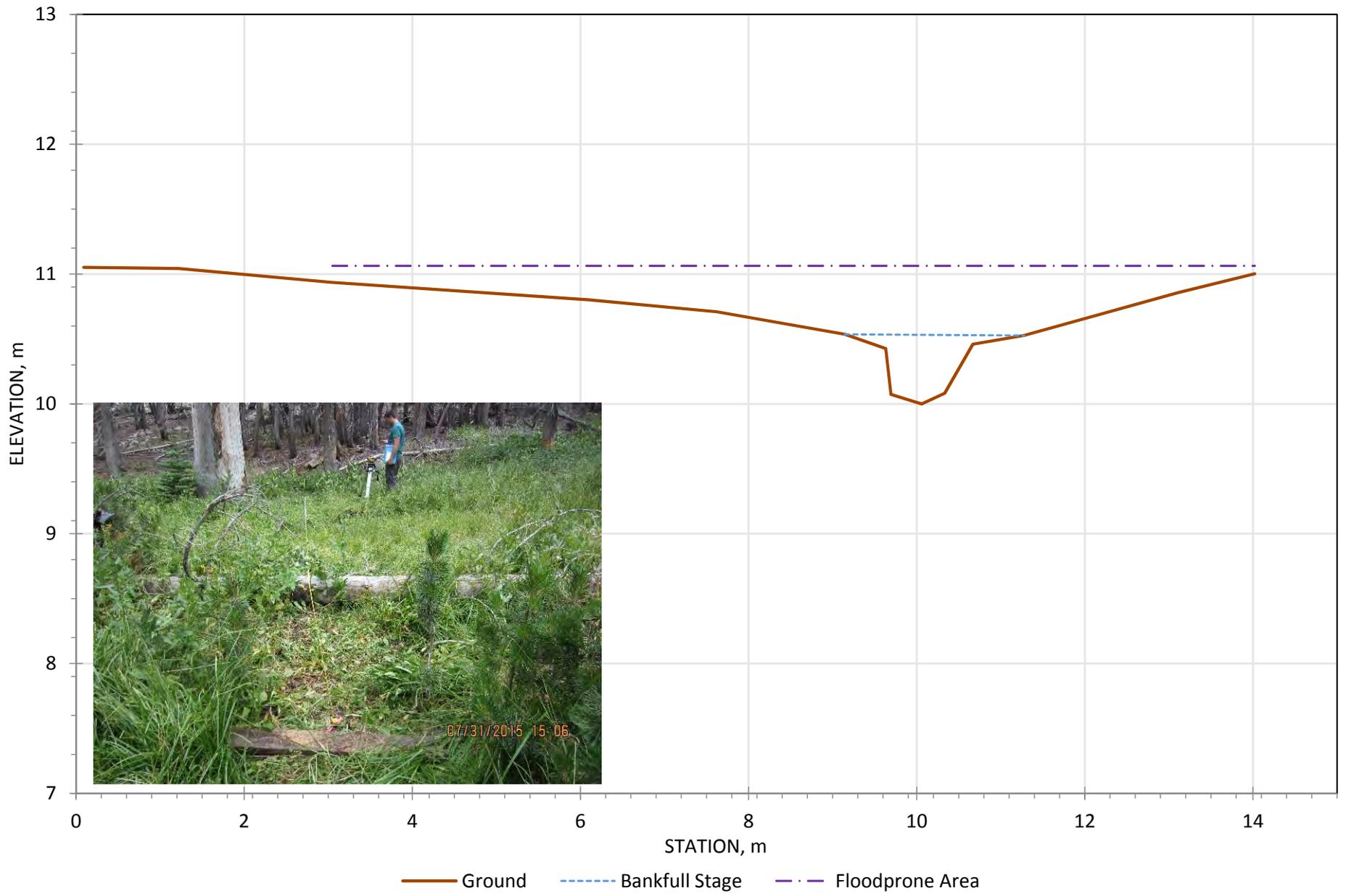
Cross-section number 3 (XS-3) EC-2, Lower Edgewood, along Edgewood Creek



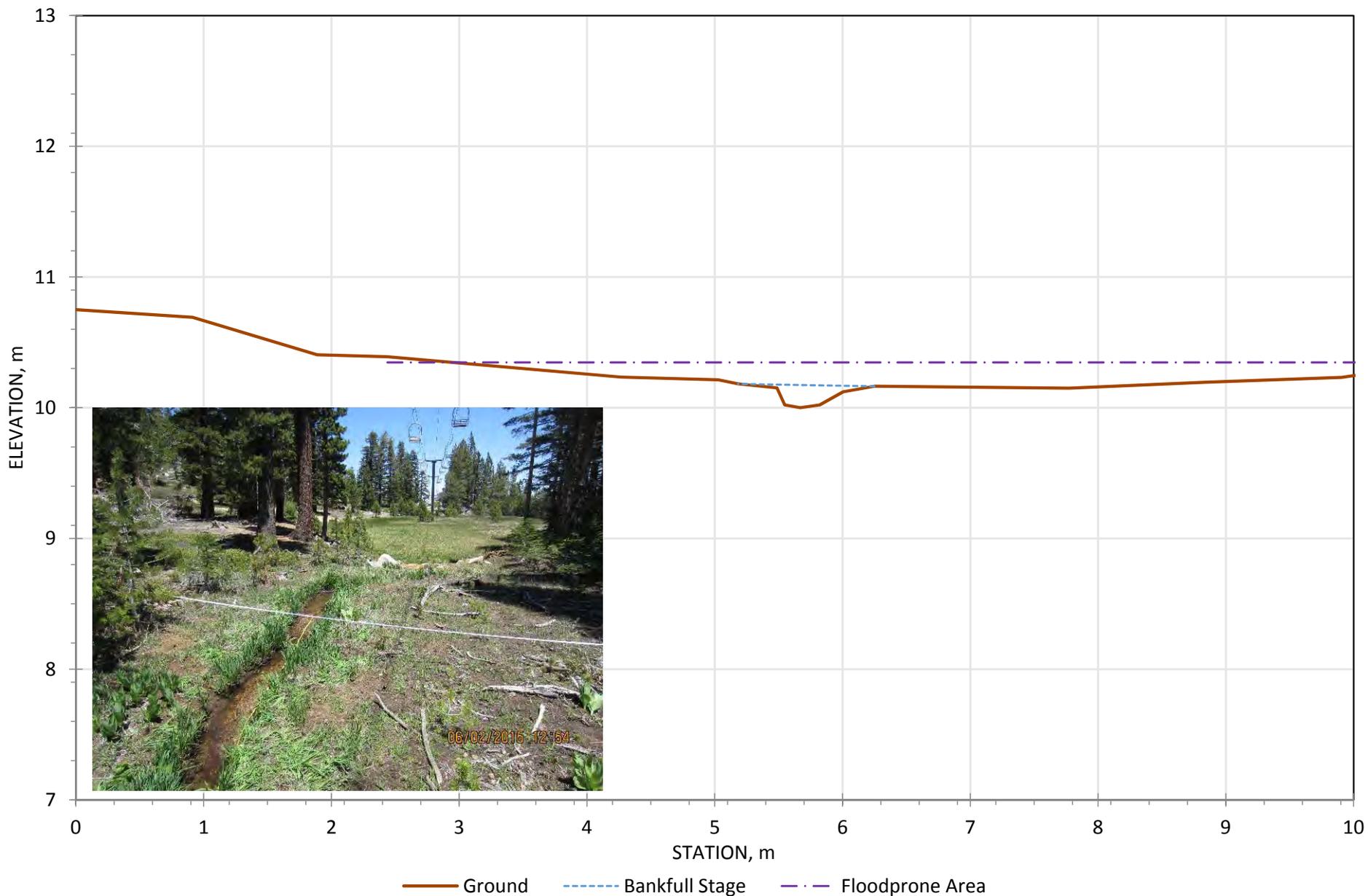
Cross-section number 1 (XS-1) DC-1, Upper Daggett, along Daggett Creek



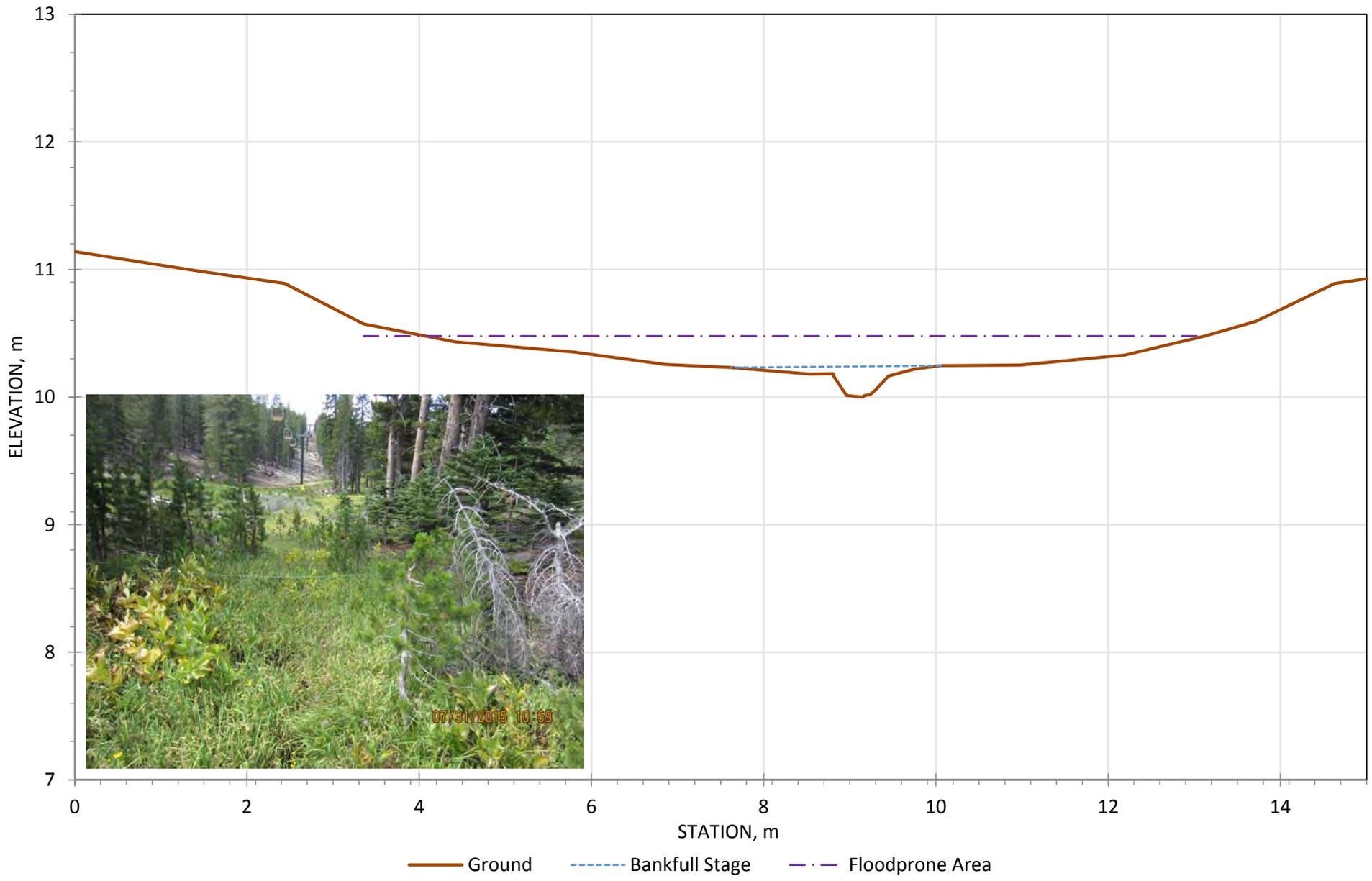
Cross-section number 2 (XS-2) DC-1, Upper Daggett, along Daggett Creek



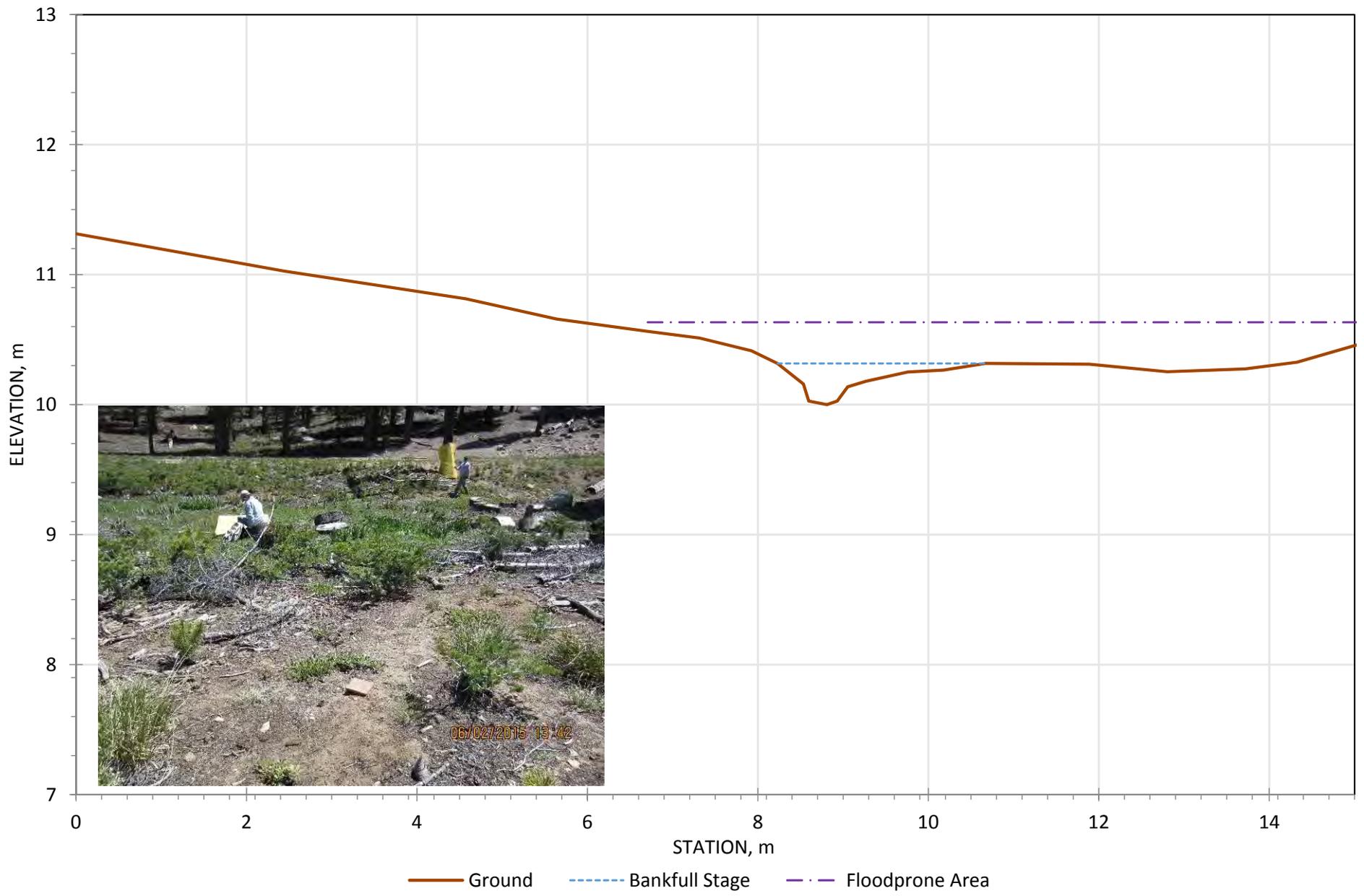
Cross-section number 3 (XS-3) DC-1, Upper Daggett, along Daggett Creek



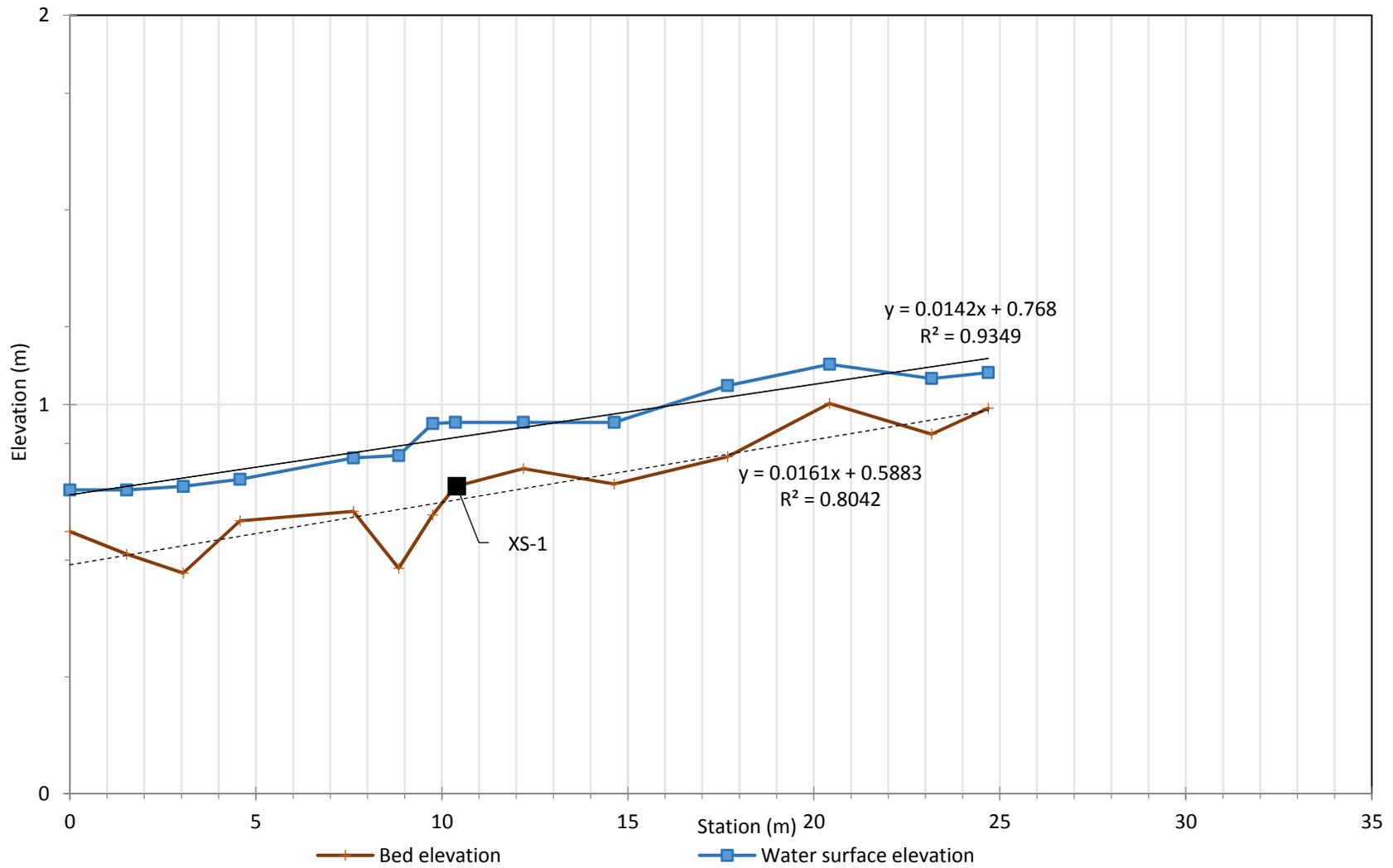
Cross-section number 1 (XS-1) DC-2, Lower Daggett, along Daggett Creek



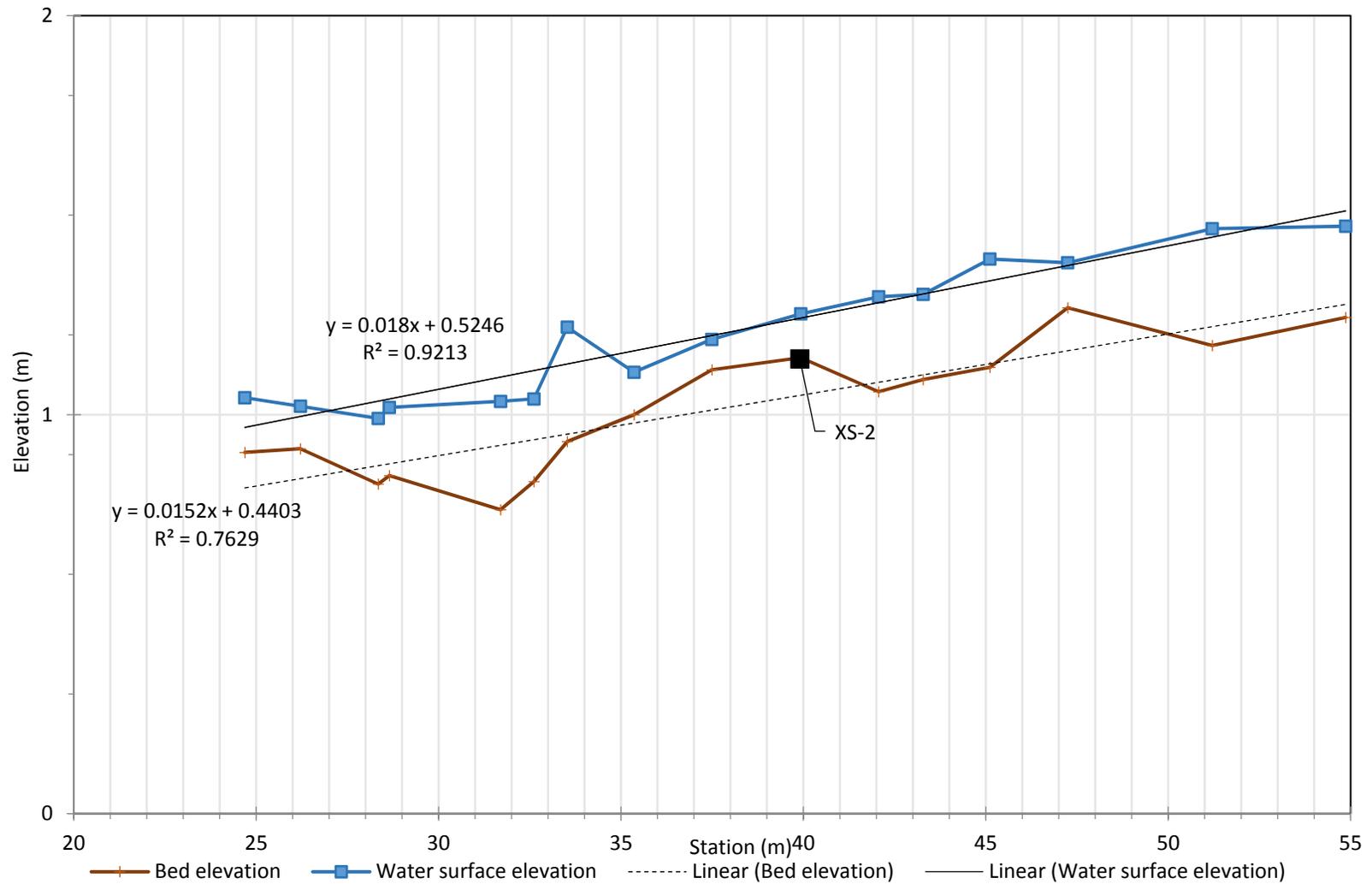
Cross-section number 2 (XS-2) DC-2, Lower Daggett, along Daggett Creek



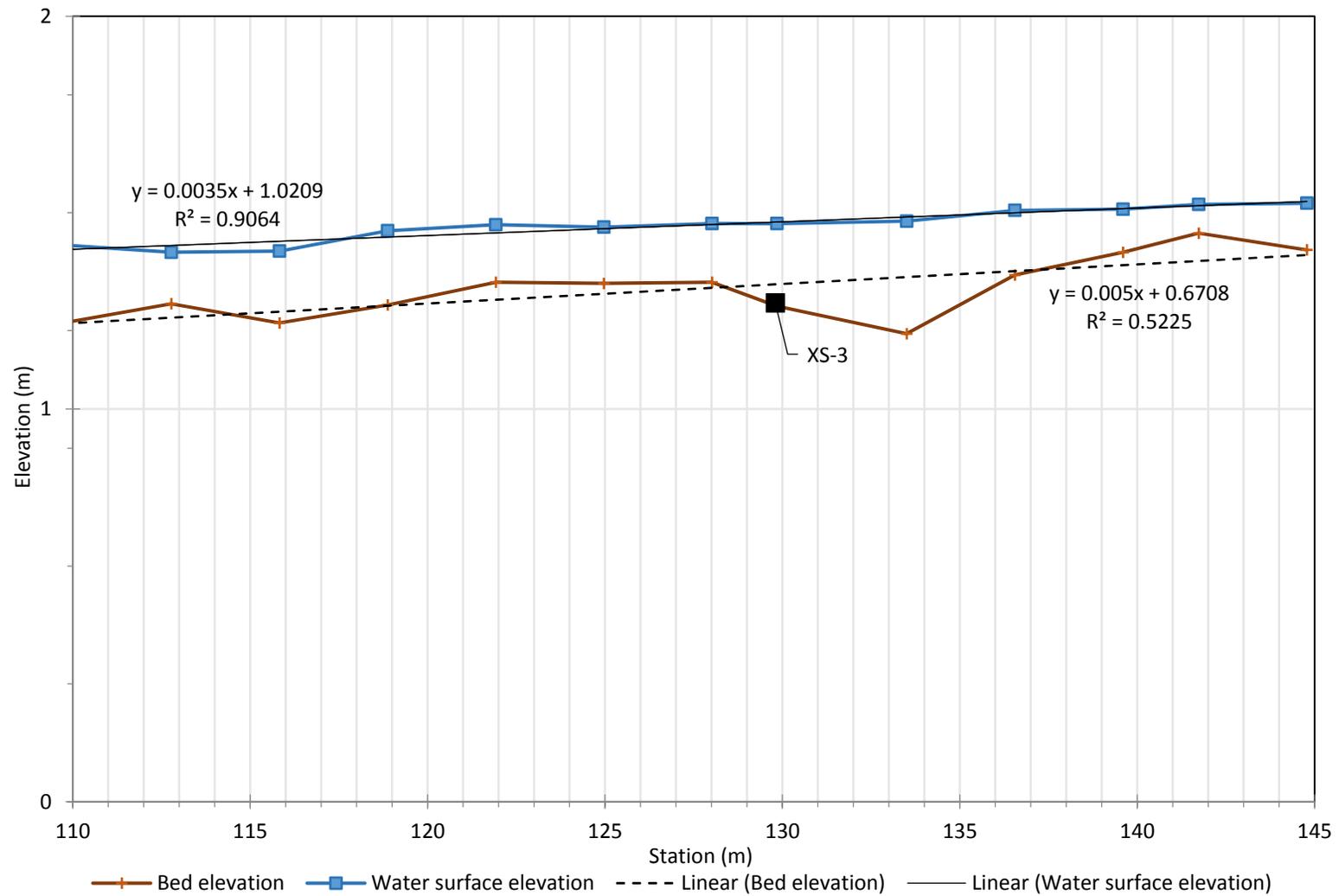
Cross-section number 3 (XS-3) DC-2, Lower Daggett, along Daggett Creek



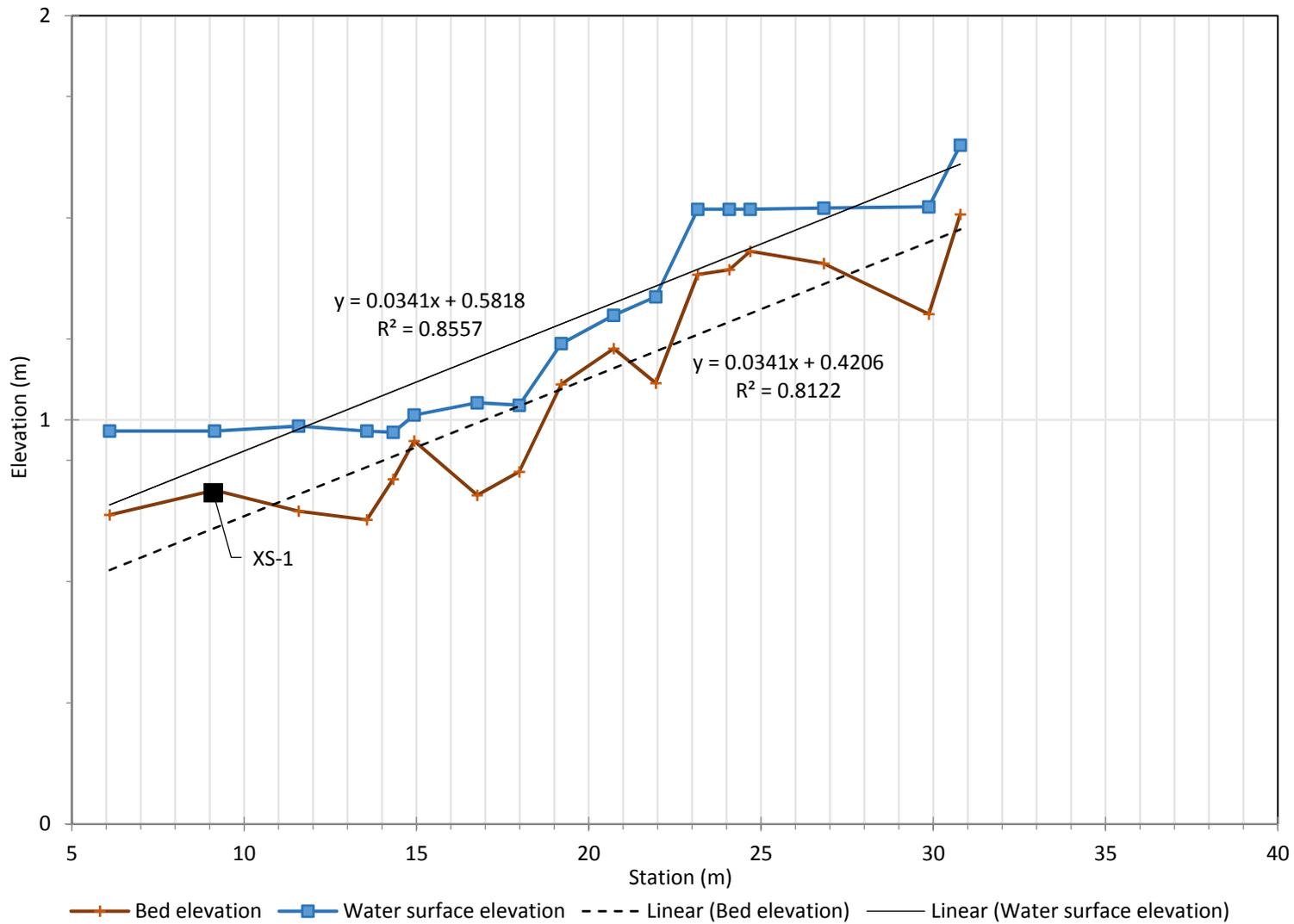
Bed and Water Surface Profiles for XS-1, HVC-1, Sky Meadows, along Heavenly Valley Creek



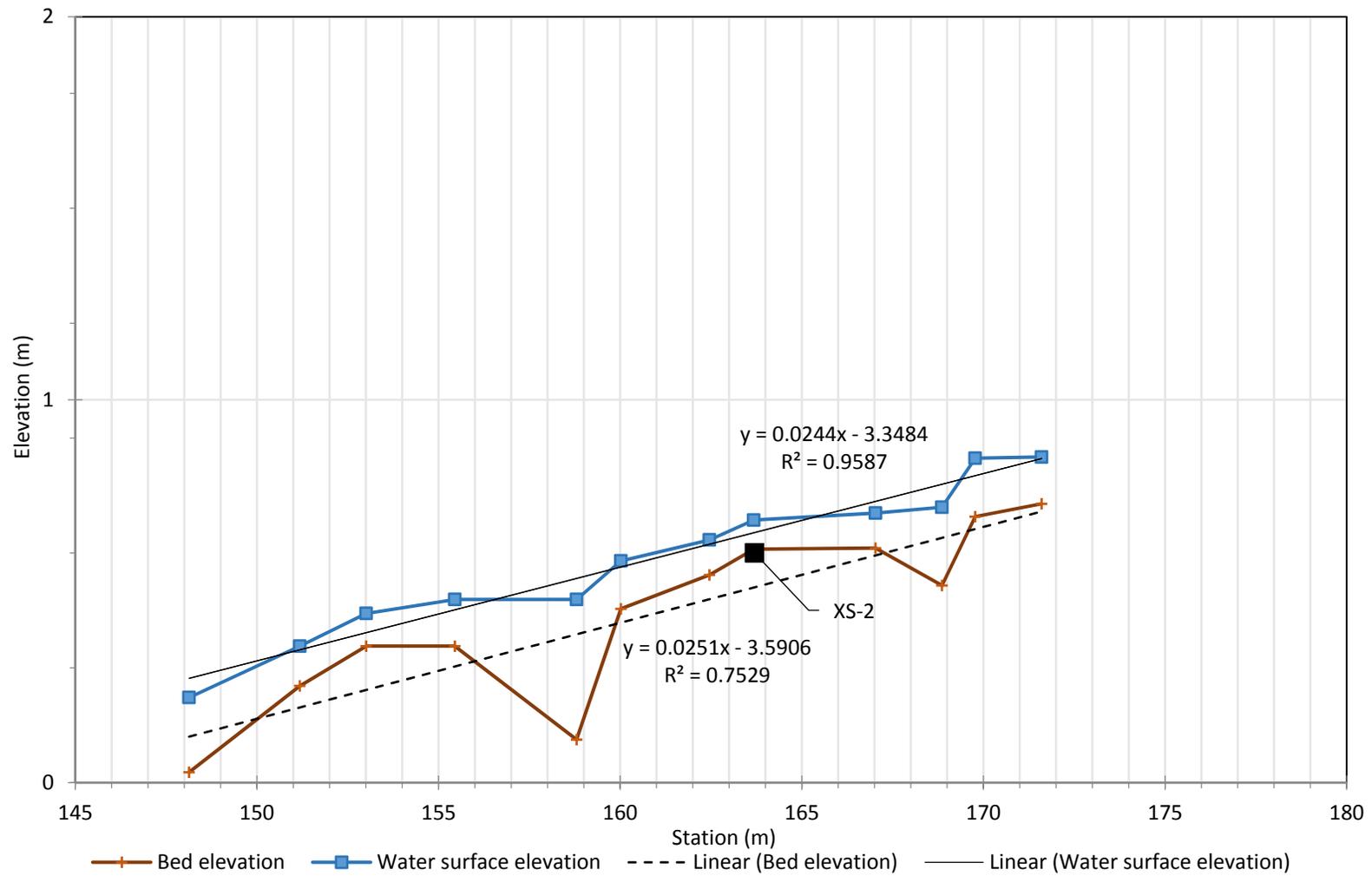
Bed and Water Surface Profiles for XS-2, HVC-1, Sky Meadows, along Heavenly Valley Creek



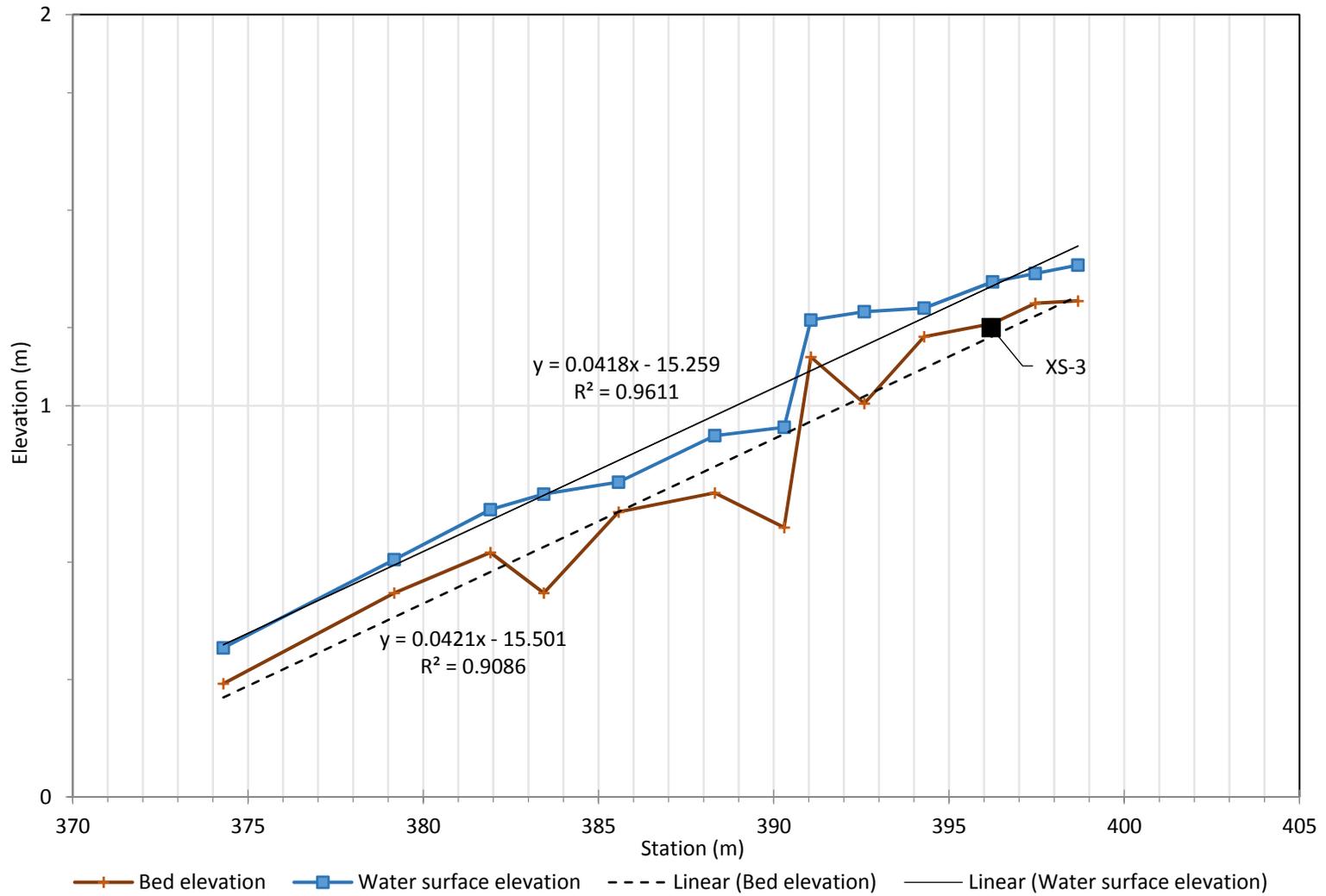
Bed and Water Surface Profiles for XS-3, HVC-1, Sky Meadows, along Heavenly Valley Creek



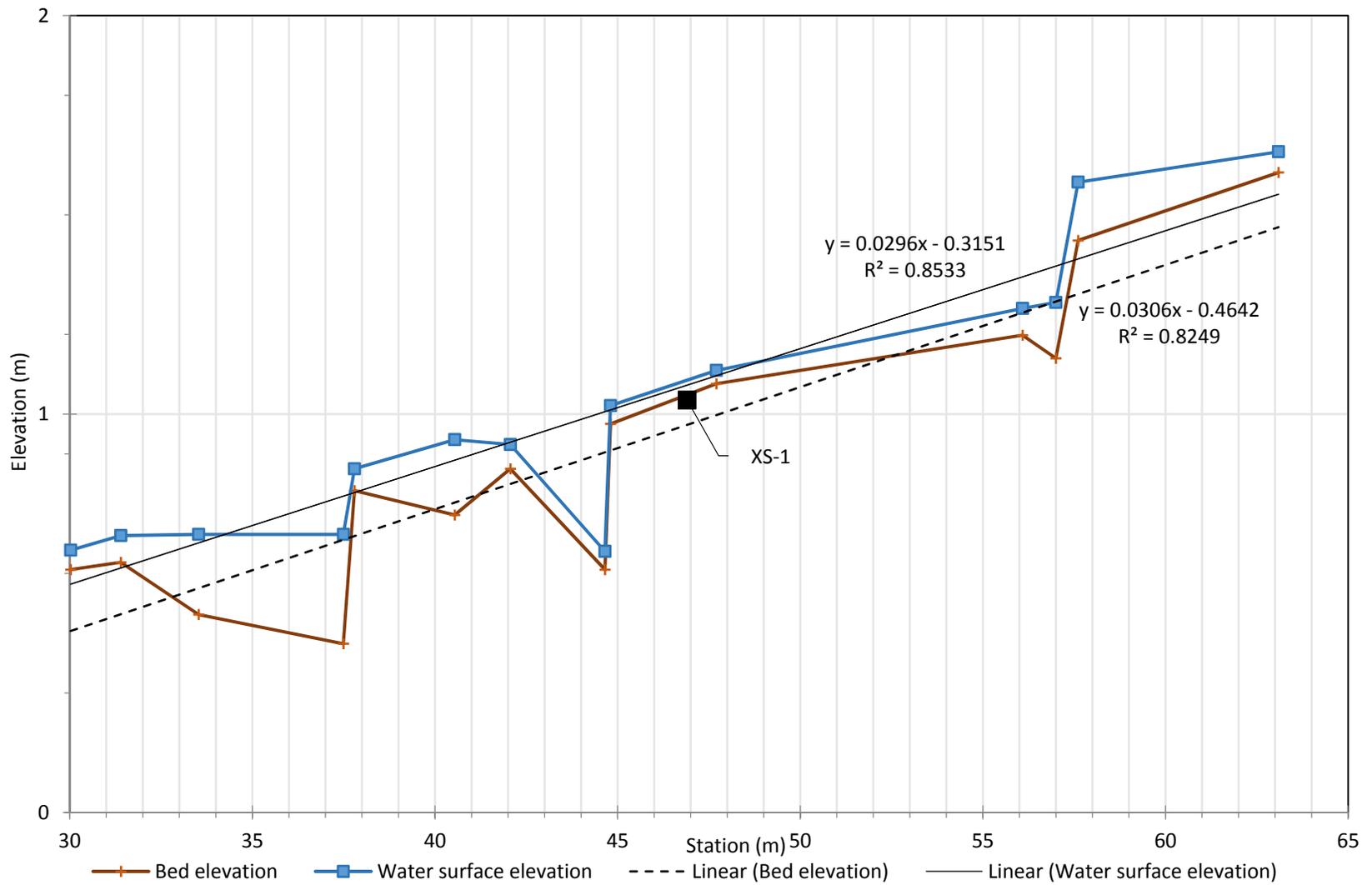
Bed and Water Surface Profiles for XS-1, HVC-2, Below Patsy's, along Heavenly Valley Creek



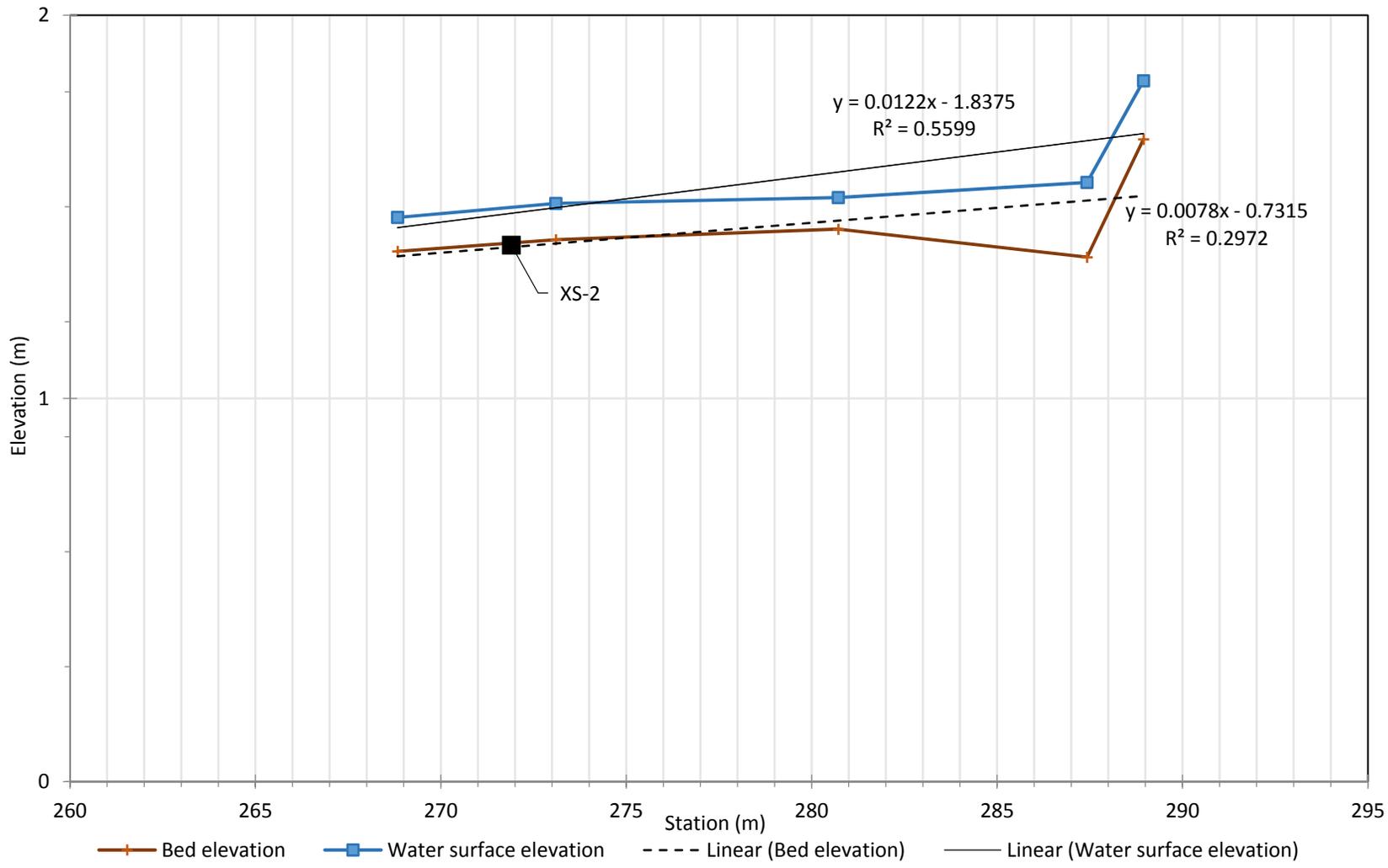
Bed and Water Surface Profiles for XS-2, HVC-2, Below Patsy's, along Heavenly Valley Creek



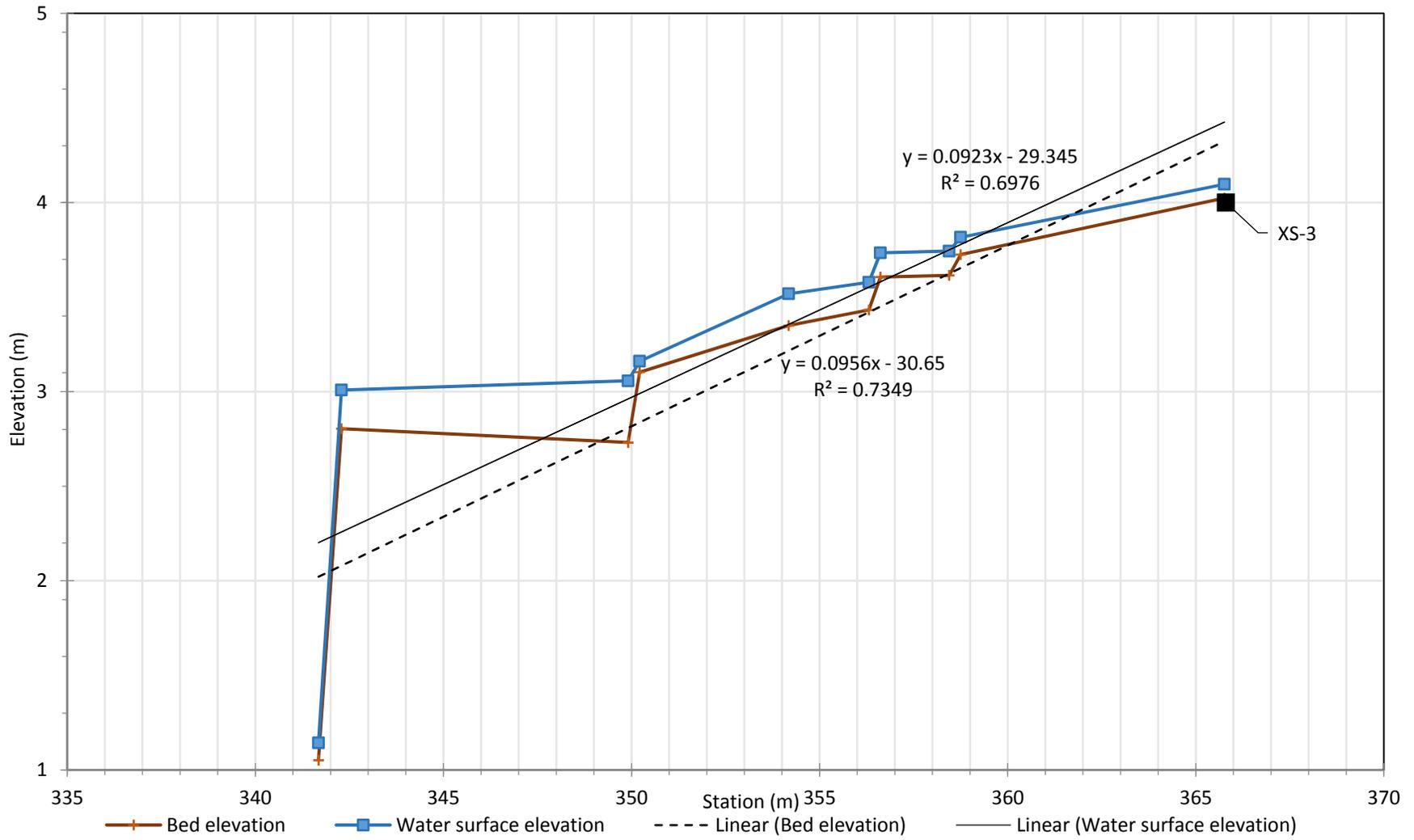
Bed and Water Surface Profiles for XS-3, HVC-2, Below Patsy's, along Heavenly Valley Creek



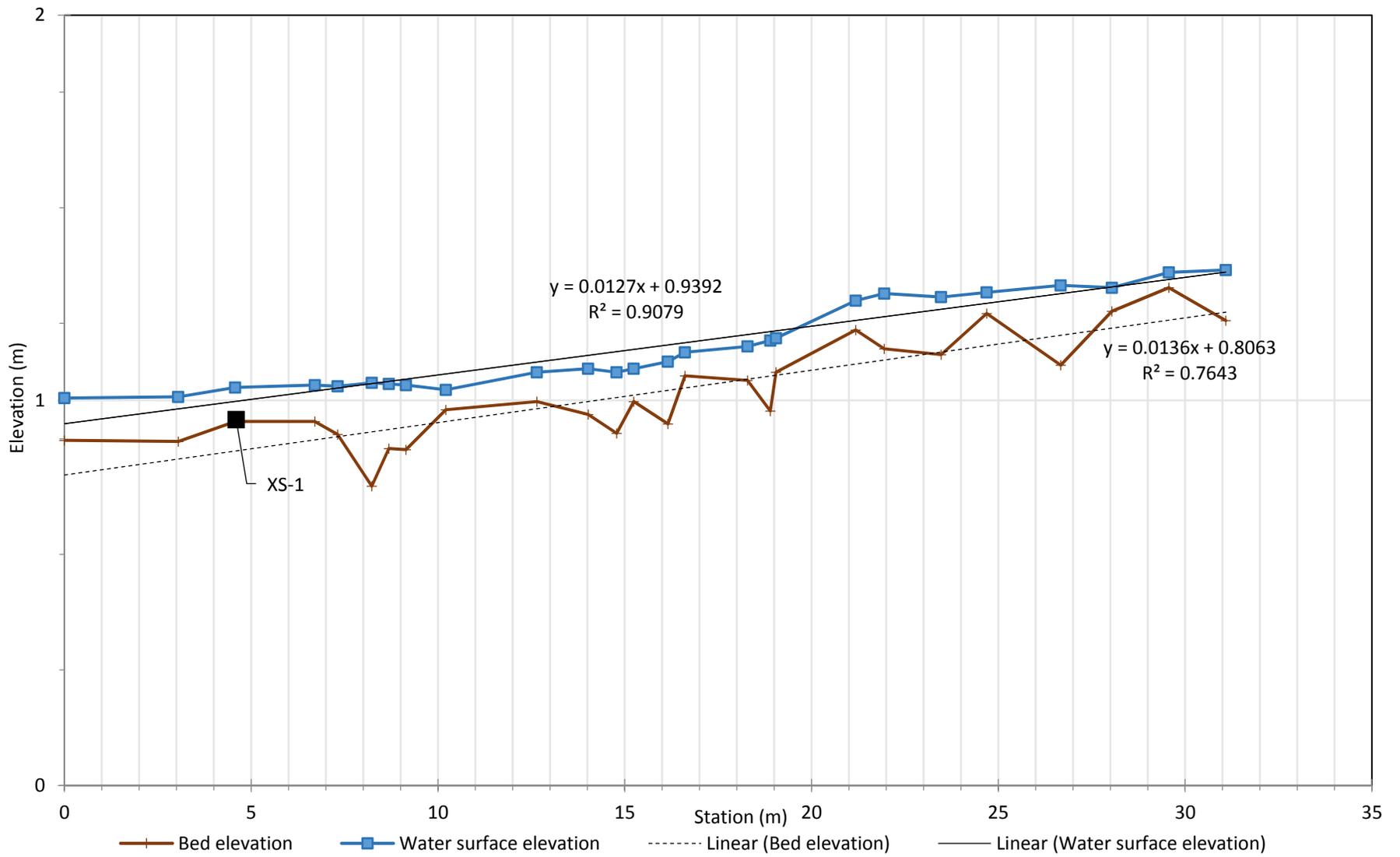
Bed and Water Surface Profiles for XS-1, HVC-3, Property Line, along Heavenly Valley Creek



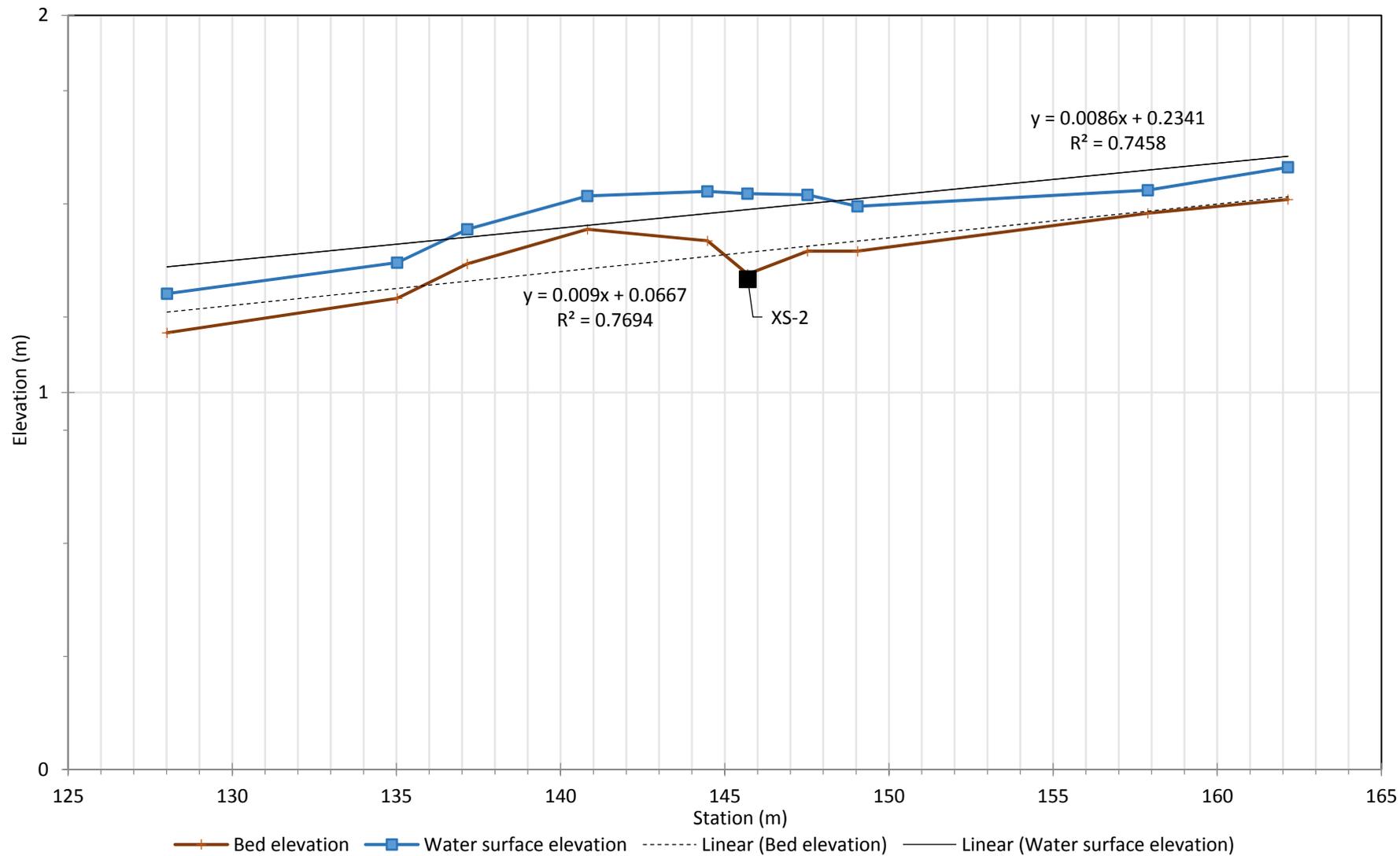
Bed and Water Surface Profiles for XS-2, HVC-3, Property Line, along Heavenly Valley Creek



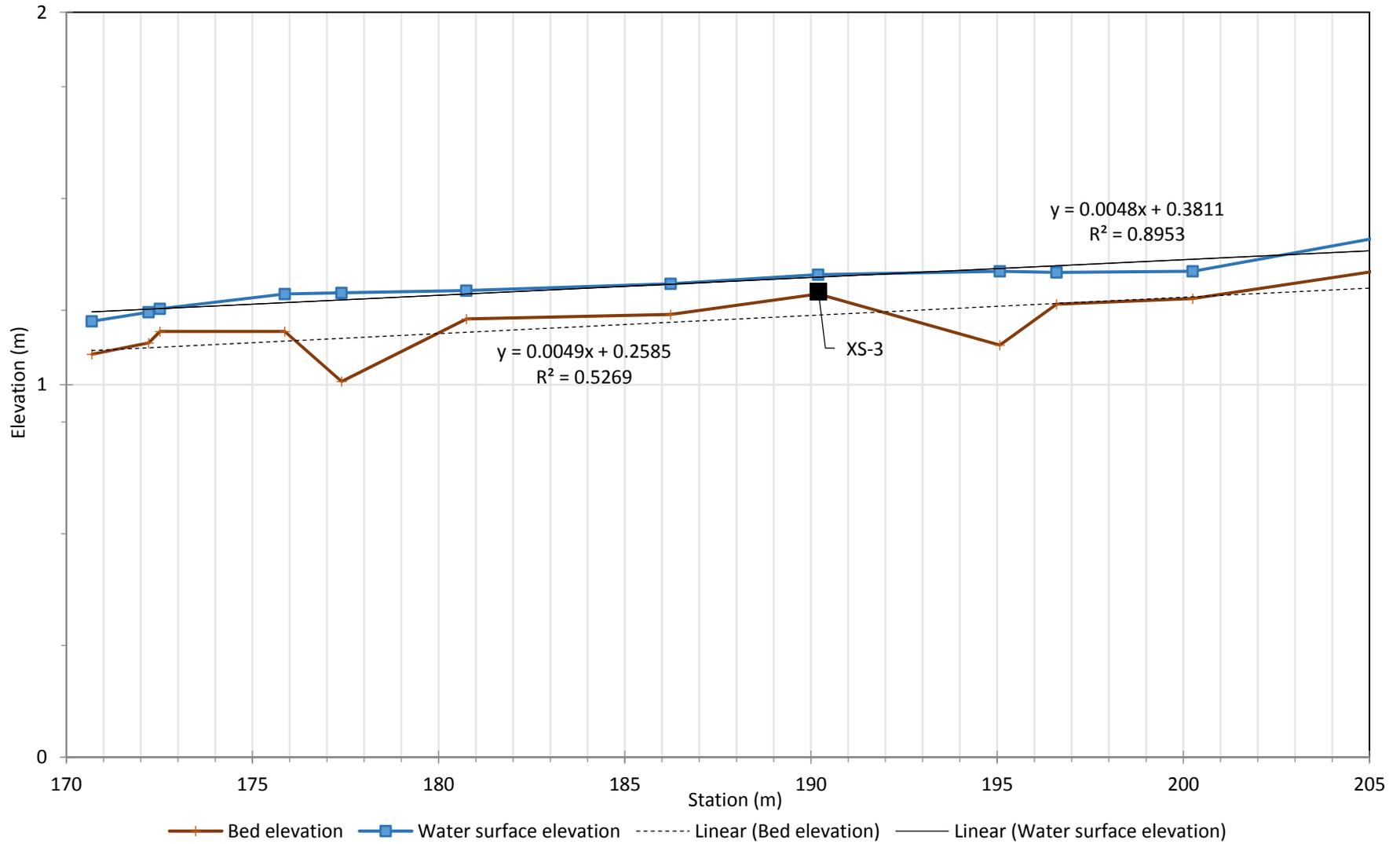
Bed and Water Surface Profiles for XS-3, HVC-3, Property Line, along Heavenly Valley Creek



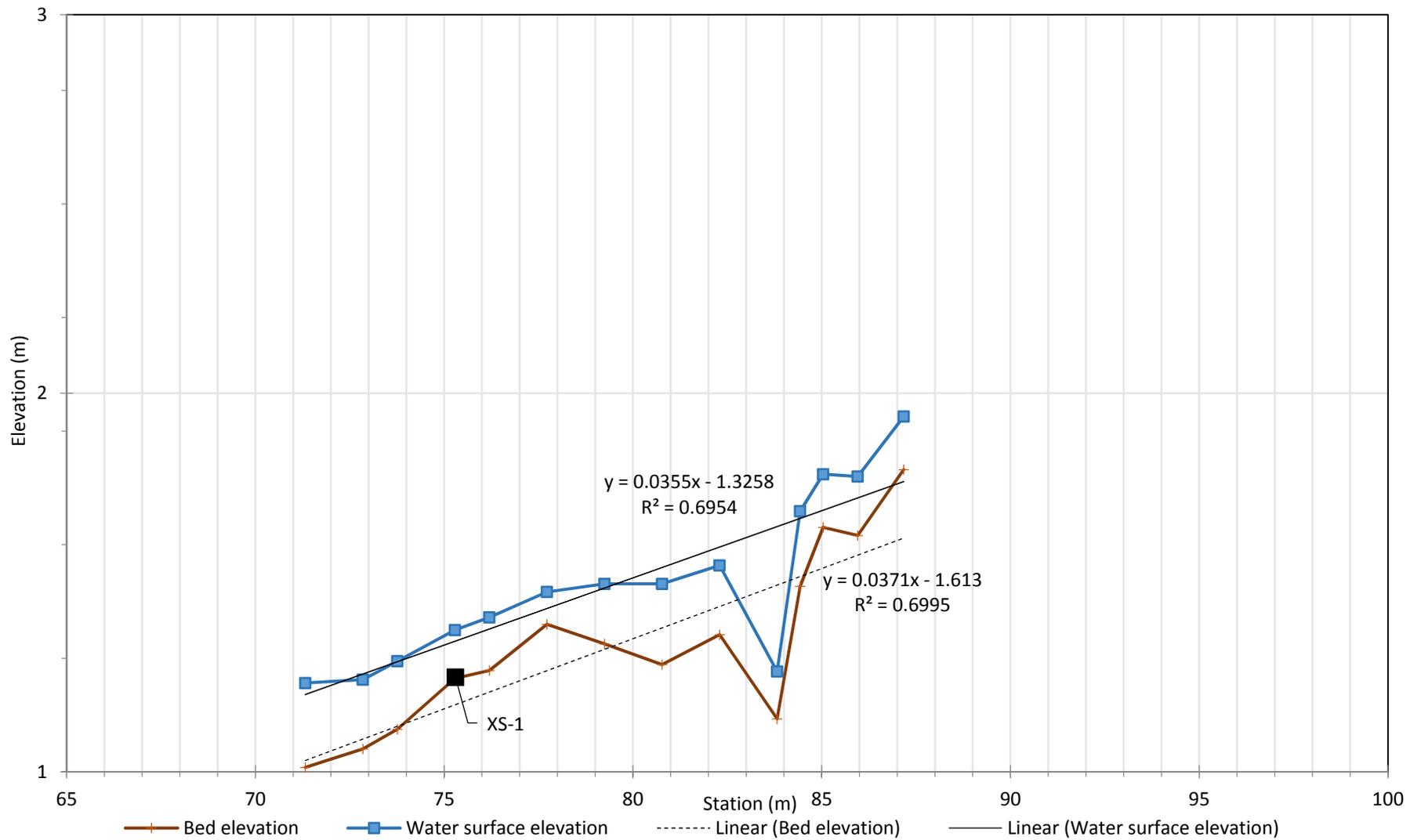
Bed and Water Surface Profiles for XS-1, HDVC-1, Upper Hidden, along Hidden Valley Creek



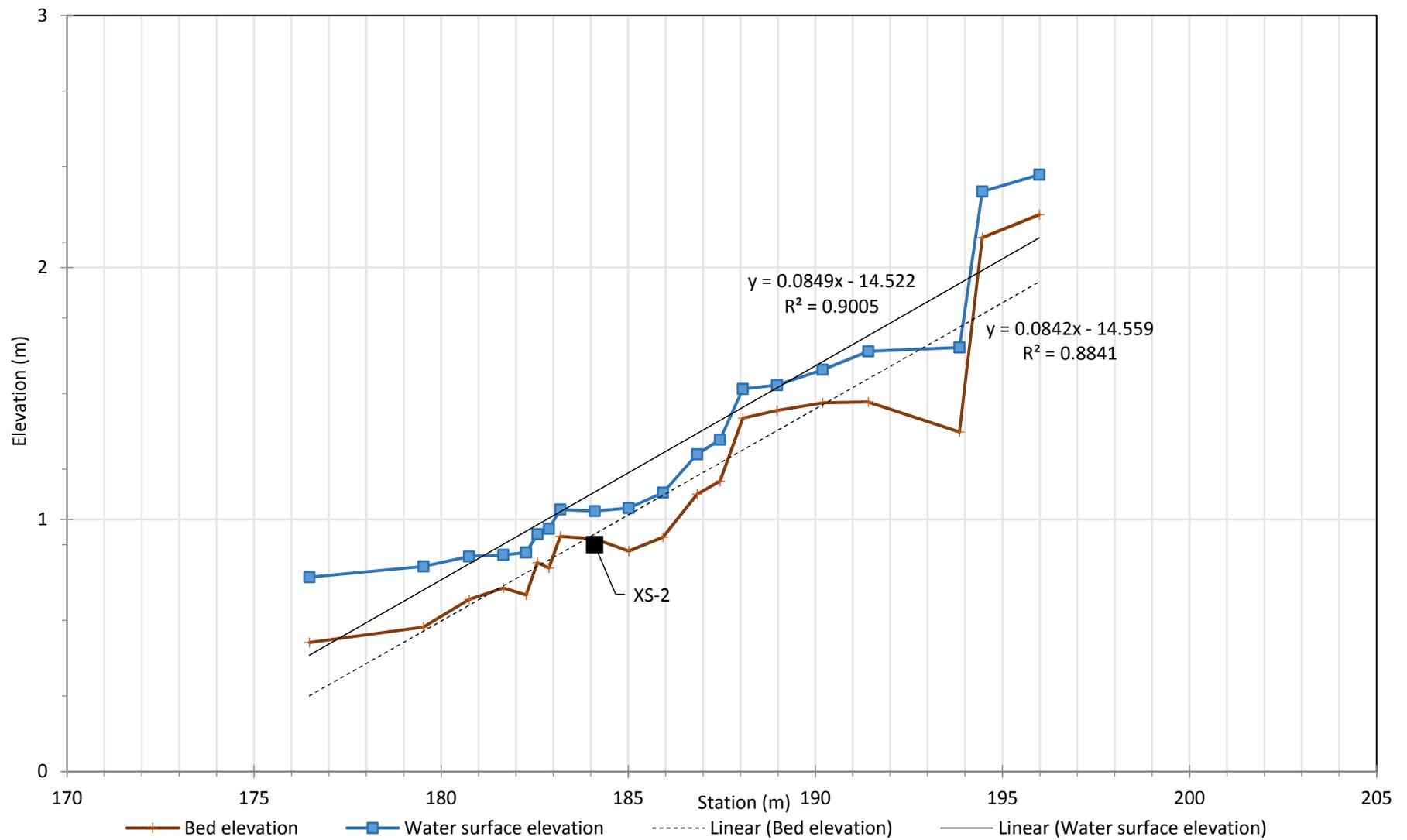
Bed and Water Surface Profiles for XS-2, HDVC-1, Upper Hidden, along Hidden Valley Creek



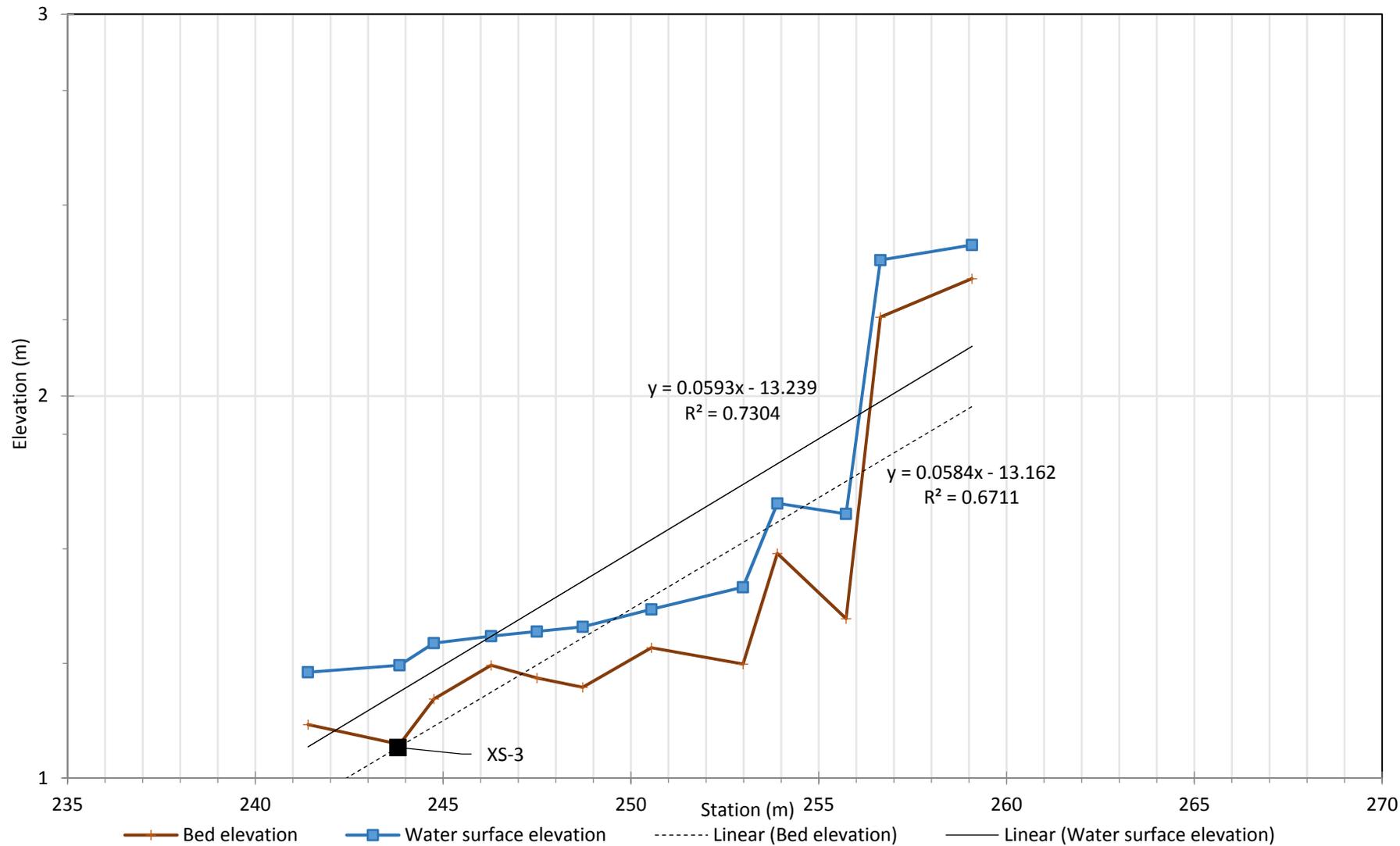
Bed and Water Surface Profiles for XS-3, HDVC-1, Upper Hidden, along Hidden Valley Creek



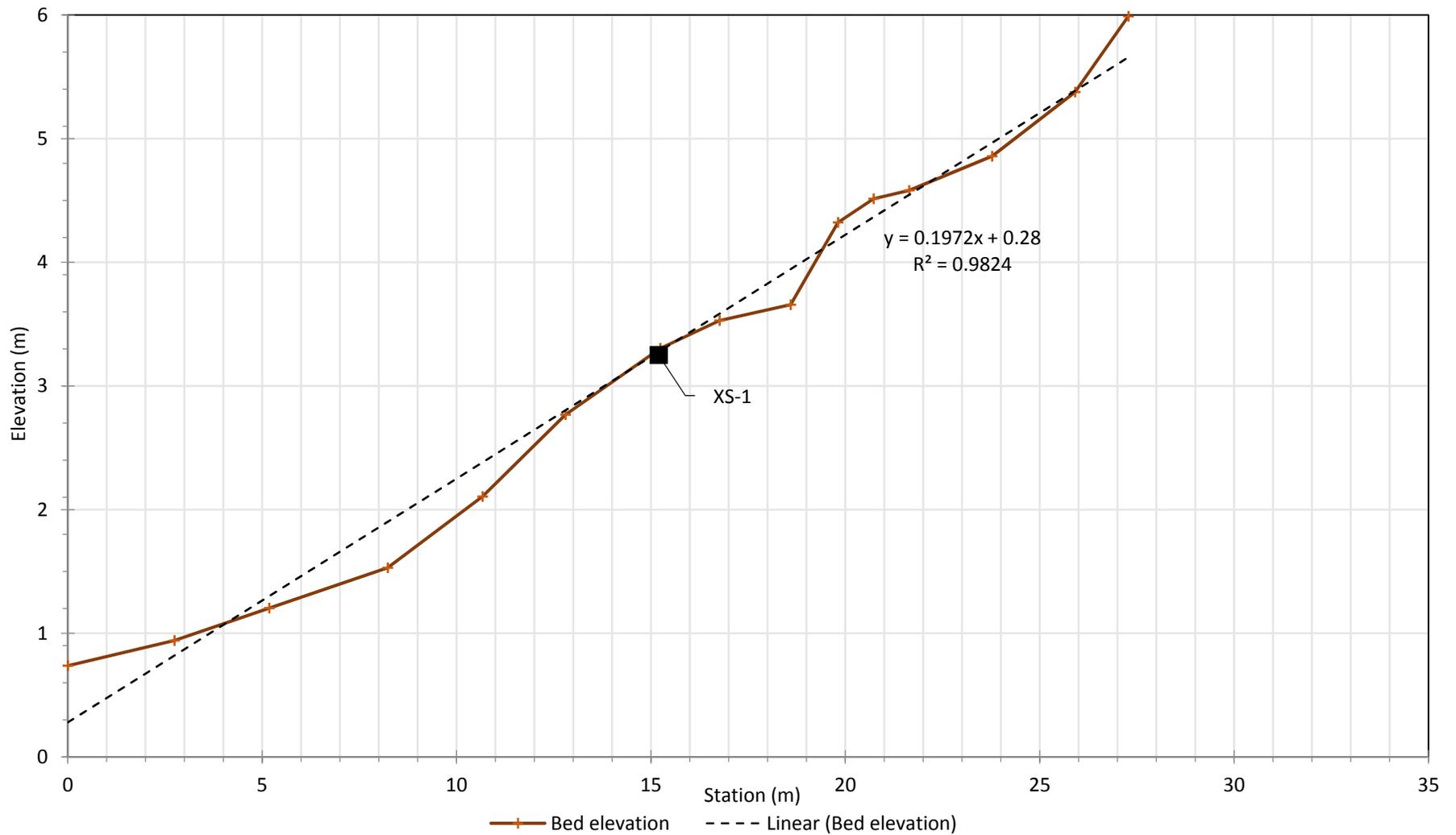
Bed and Water Surface Profiles for XS-1, HDVC-2, Lower Hidden, along Hidden Valley Creek



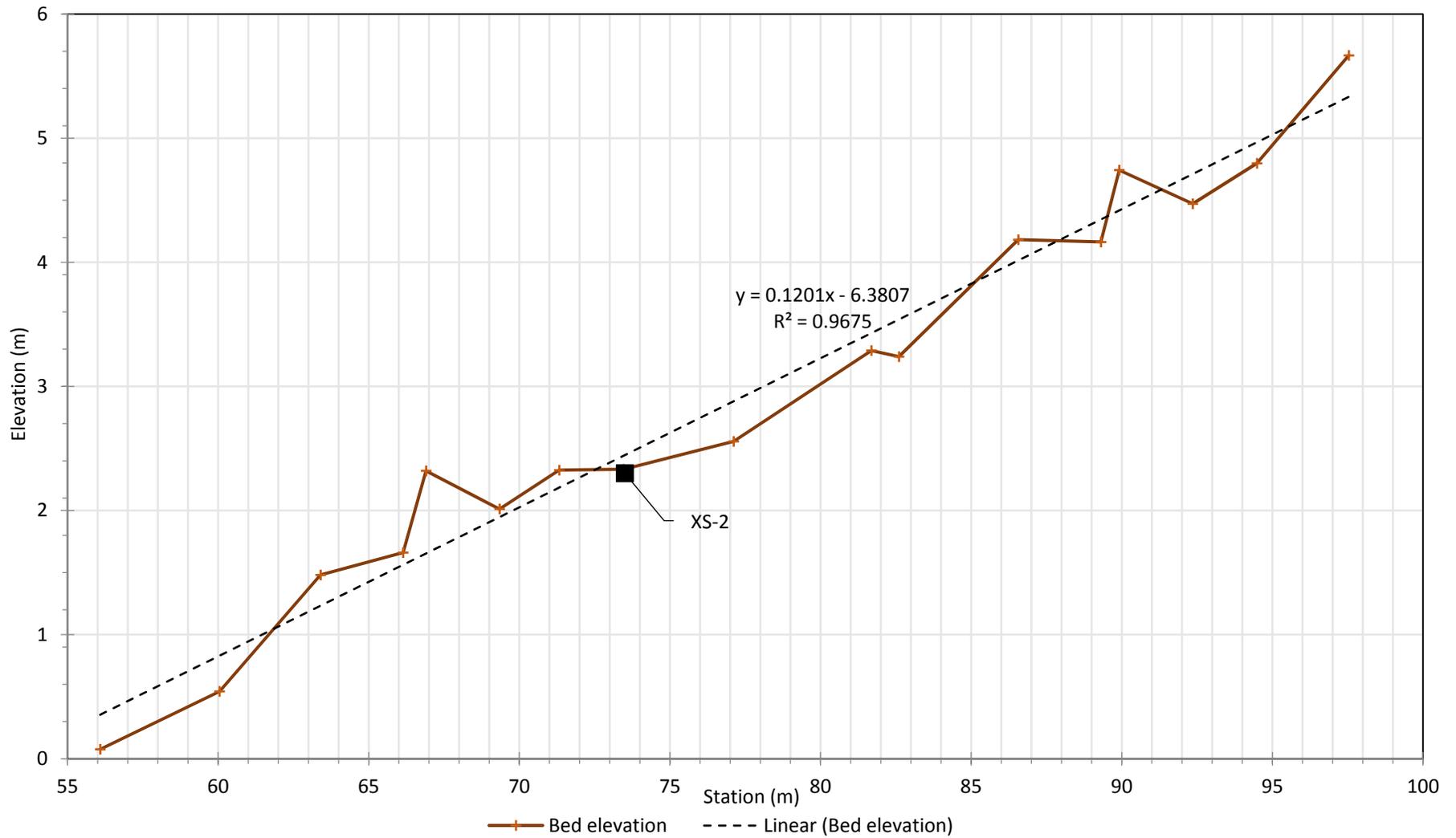
Bed and Water Surface Profiles for XS-2, HDVC-2, Lower Hidden, along Hidden Valley Creek



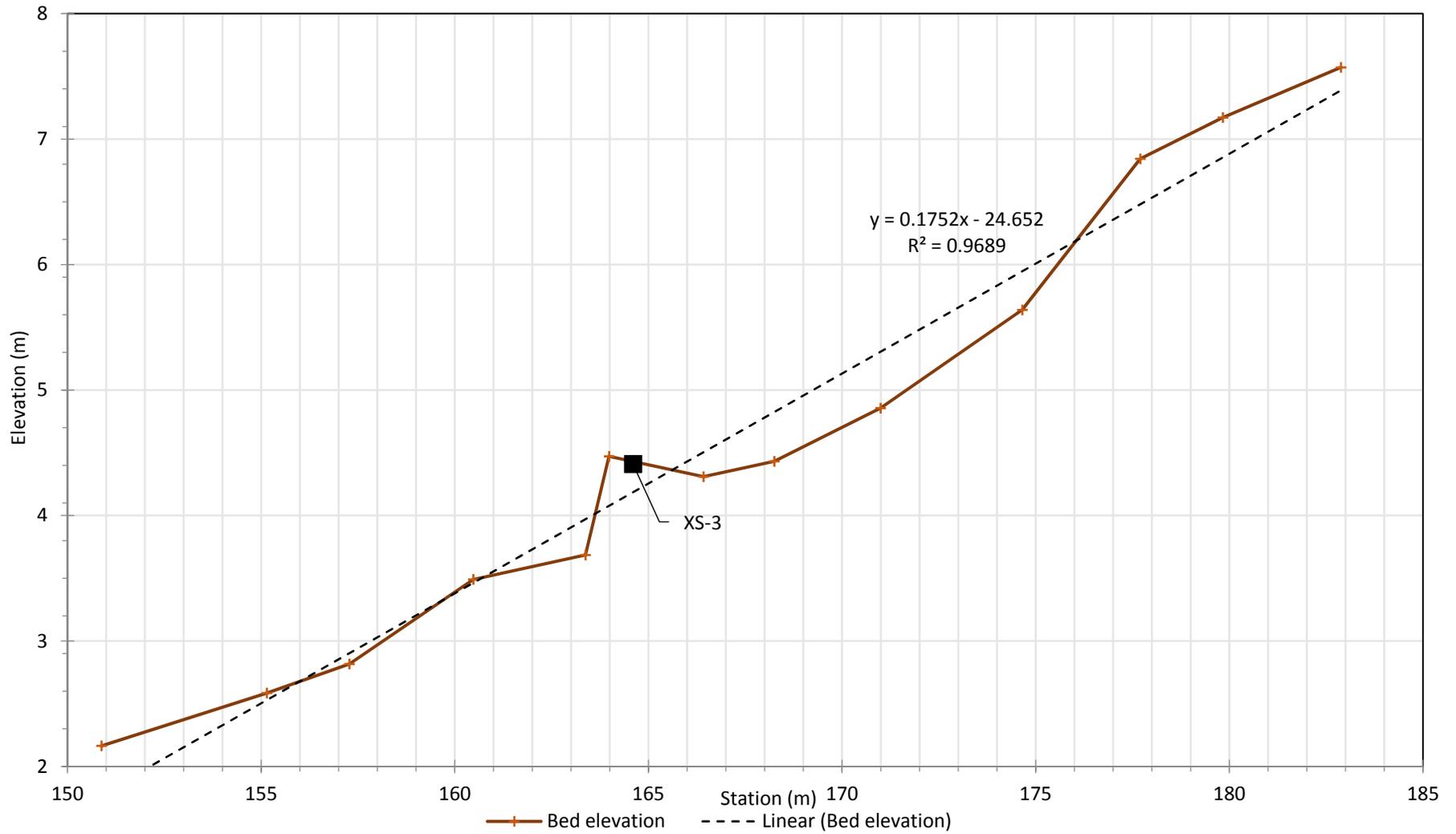
Bed and Water Surface Profiles for XS-3, HDVC-2, Lower Hidden, along Hidden Valley Creek



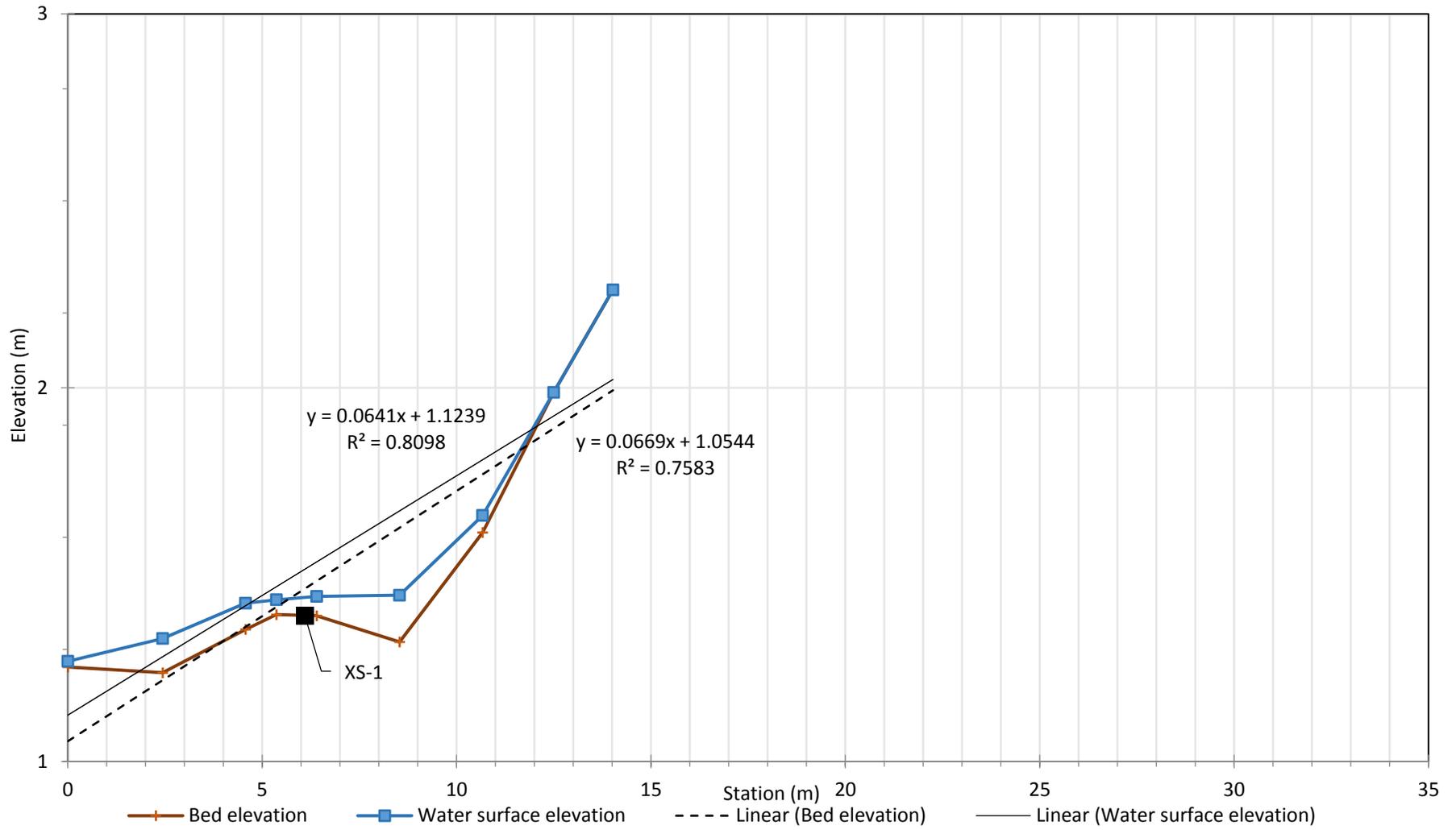
Bed and Water Surface Profile for XS-1, EC-1, Upper Edgewood, along Edgewood Creek



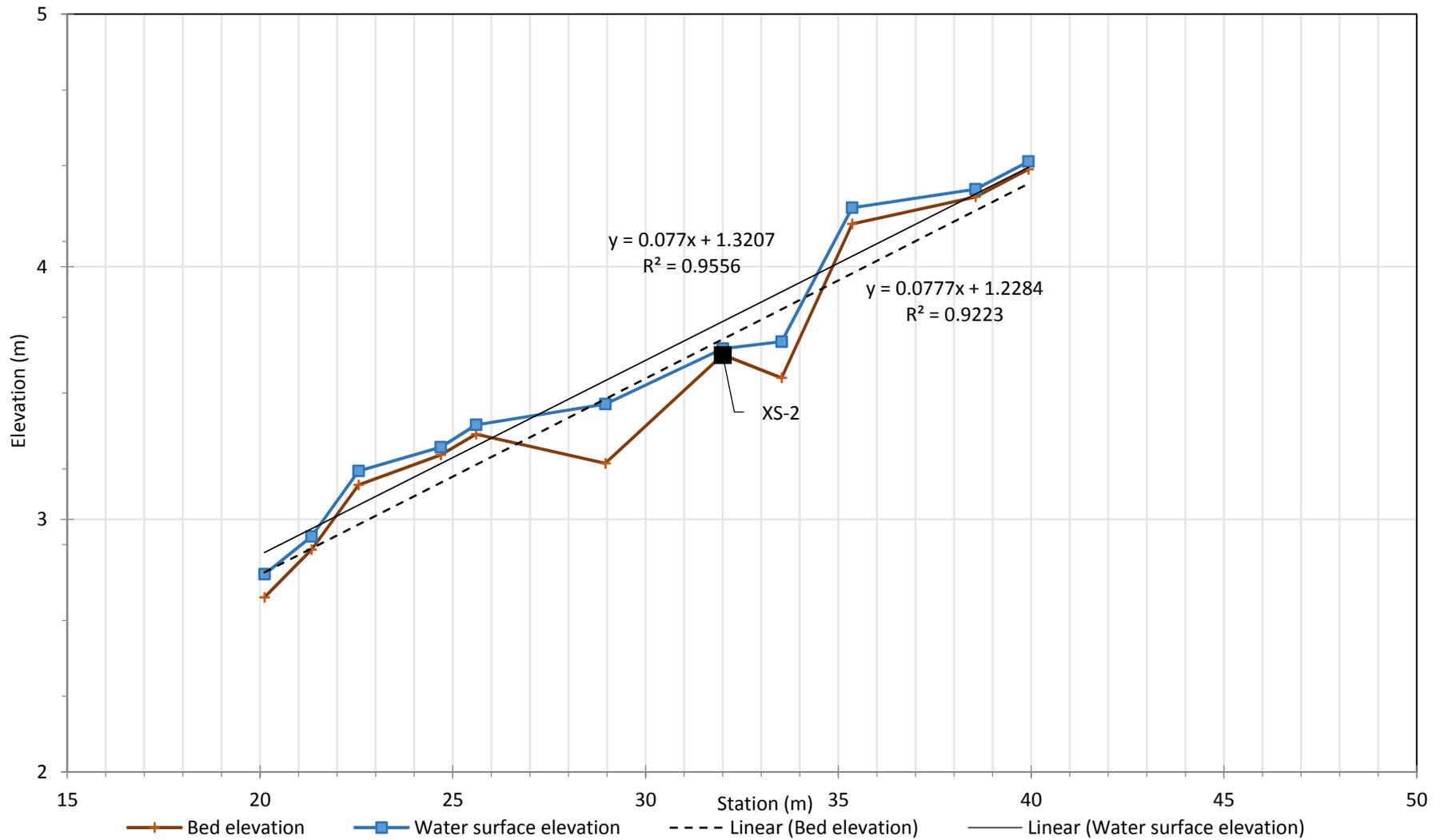
Bed and Water Surface Profile for XS-2, EC-1, Upper Edgewood, along Edgewood Creek



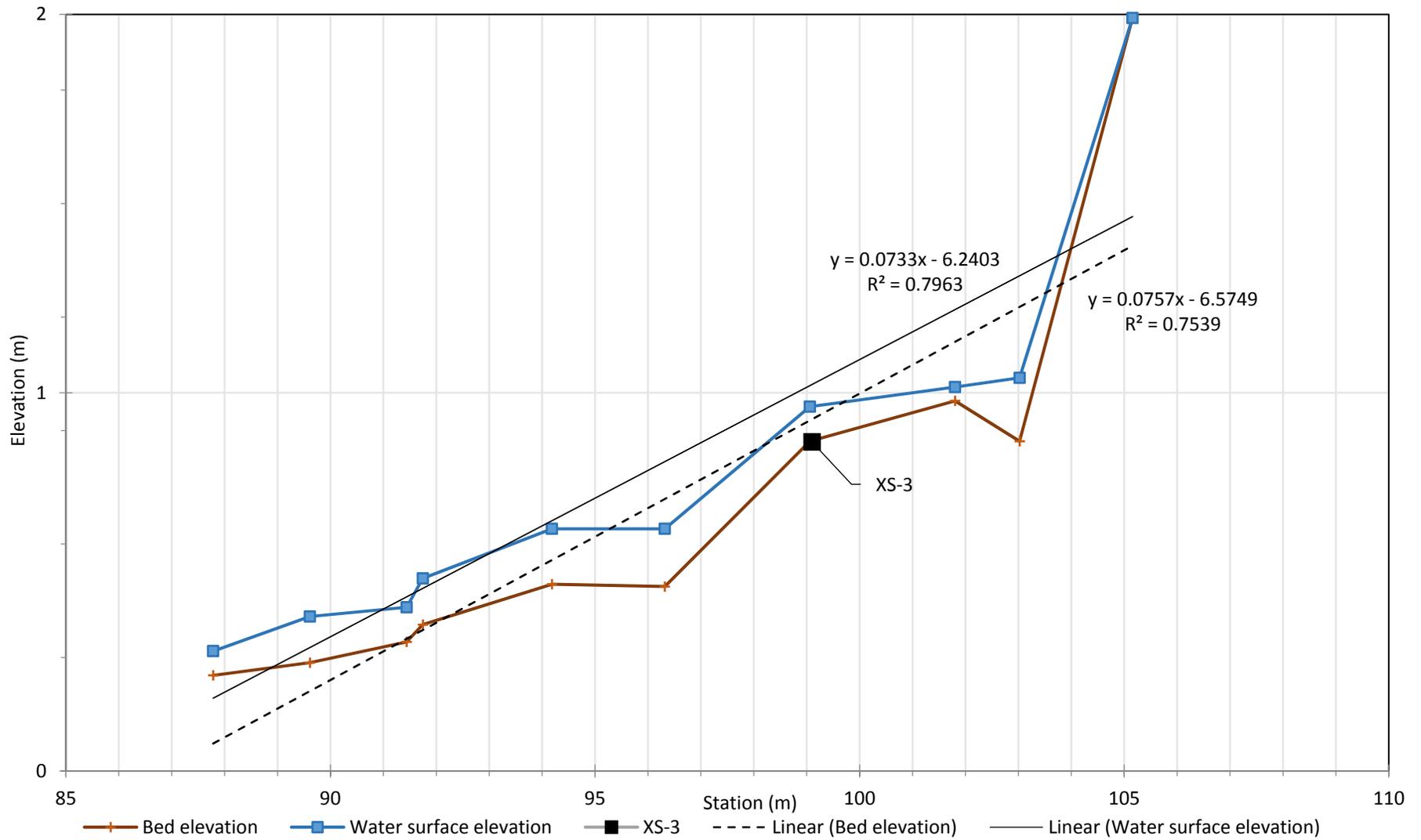
Bed and Water Surface Profile for XS-3, EC-1, Upper Edgewood, along Edgewood Creek



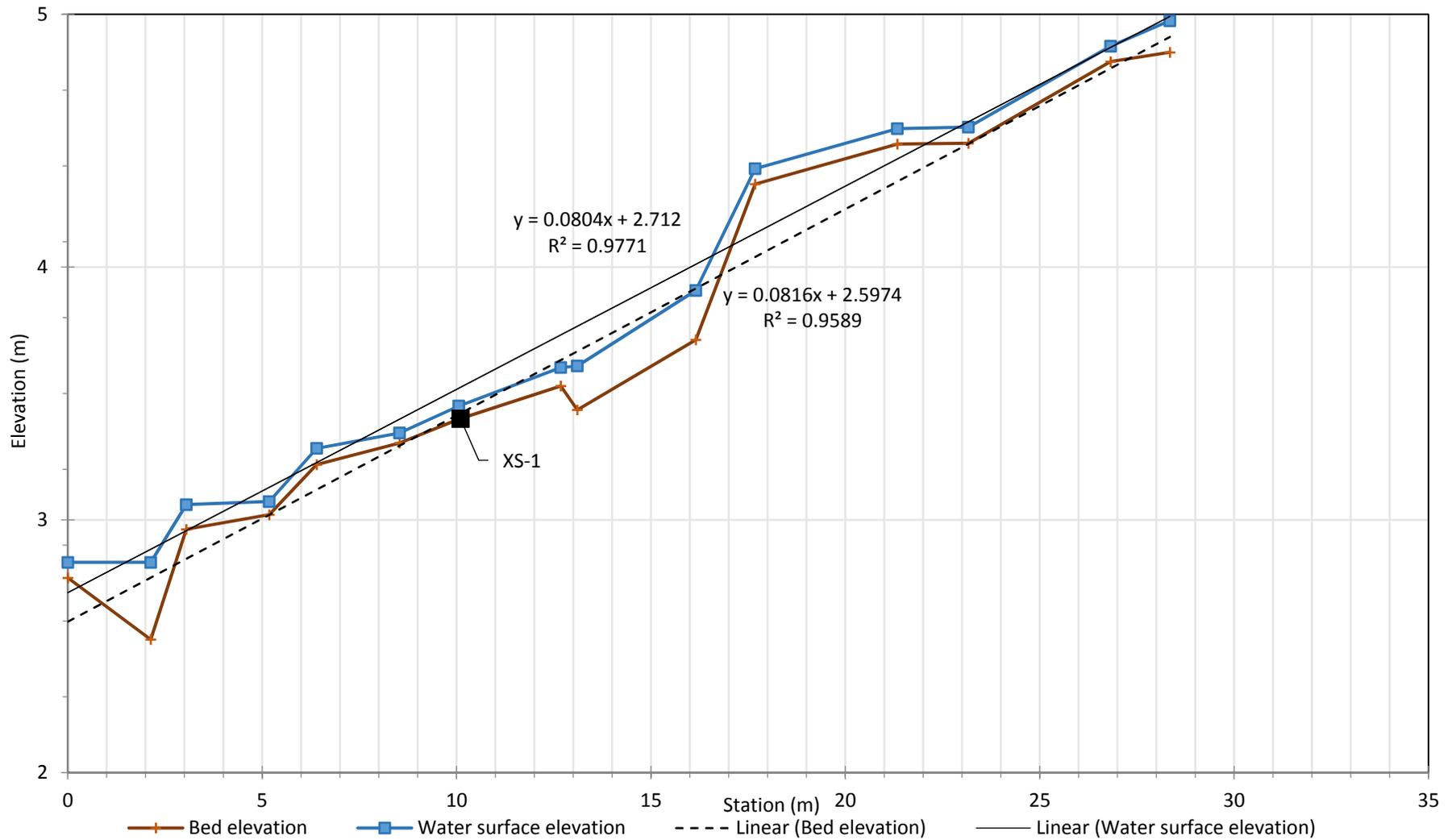
Bed and Water Surface Profiles for XS-1, EC-2, Lower Edgewood, along Edgewood Creek



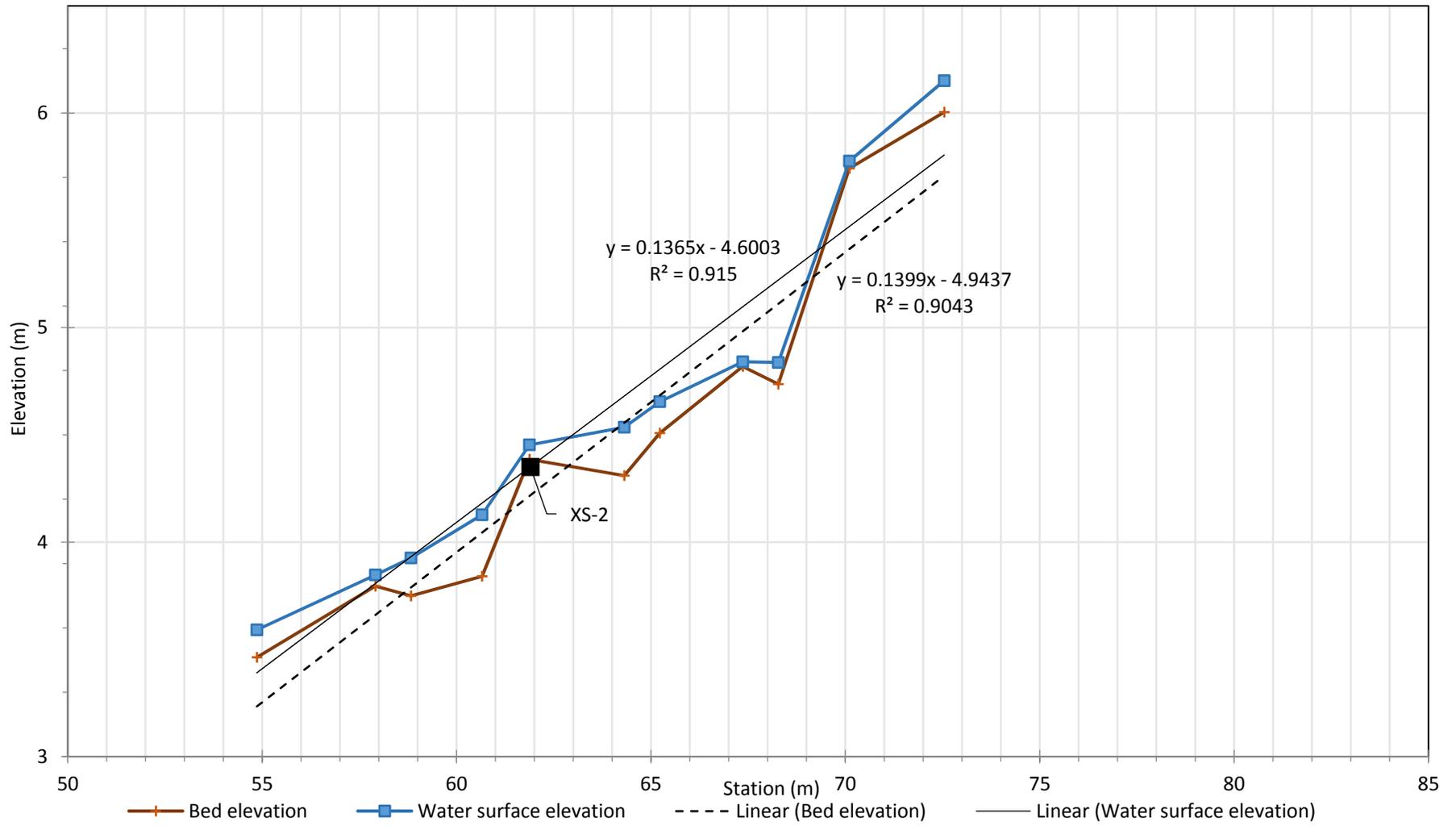
Bed and Water Surface Profiles for XS-2, EC-2, Lower Edgewood, along Edgewood Creek



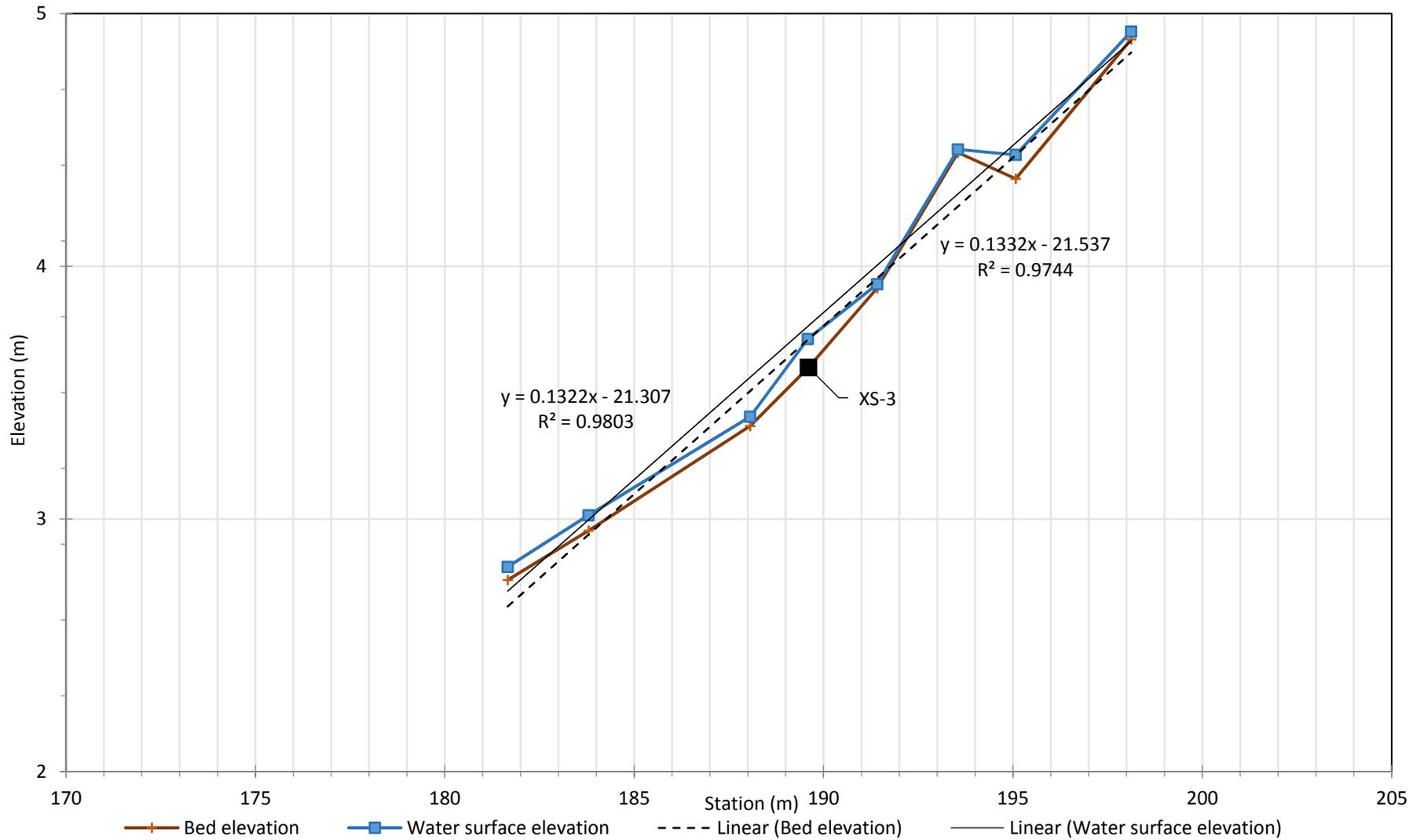
Bed and Water Surface Profiles for XS-3, EC-2, Lower Edgewood, along Edgewood Creek



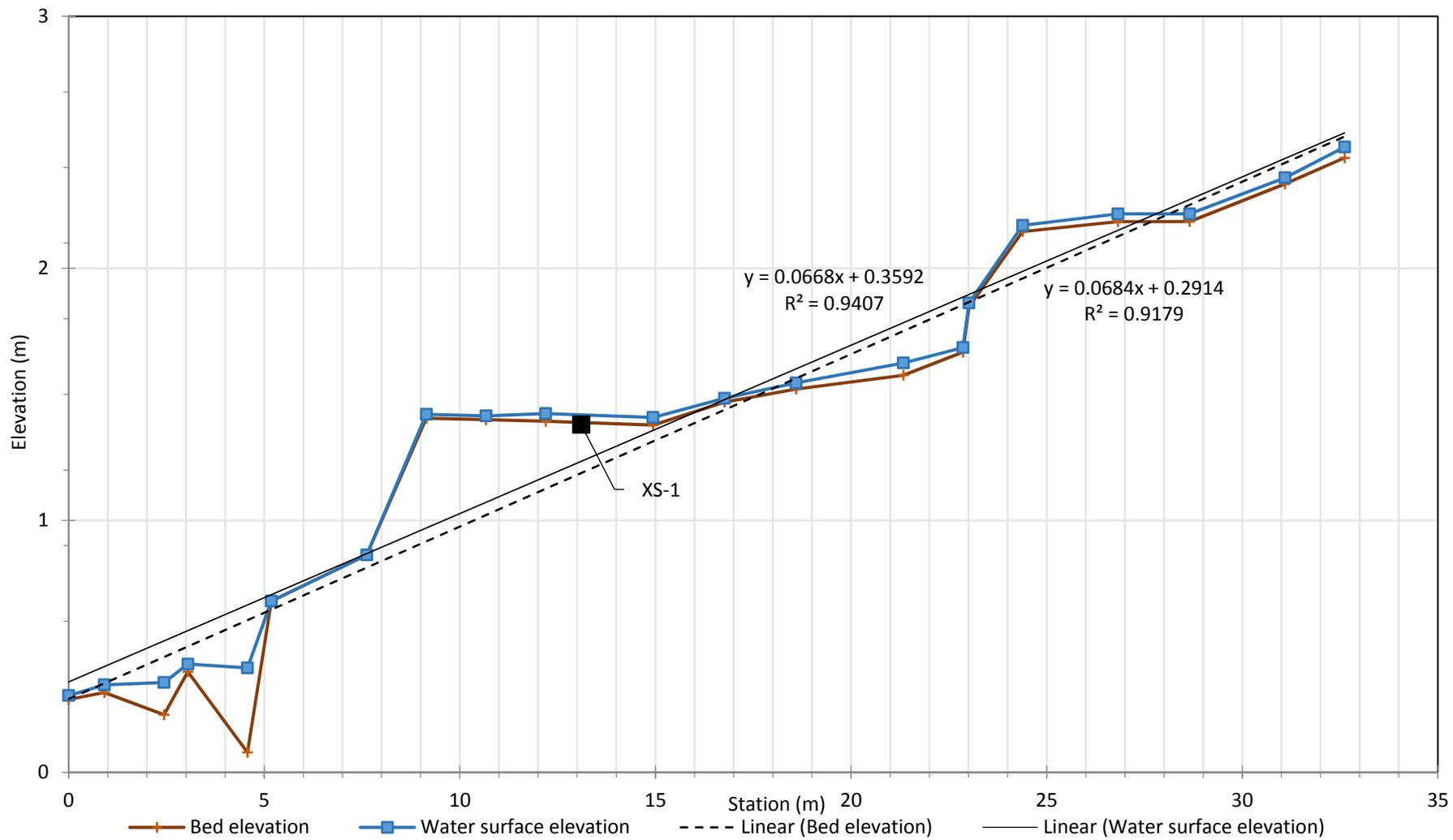
Bed and Water Surface Profiles for XS-1, DC-1, Upper Daggett, along Daggett Creek



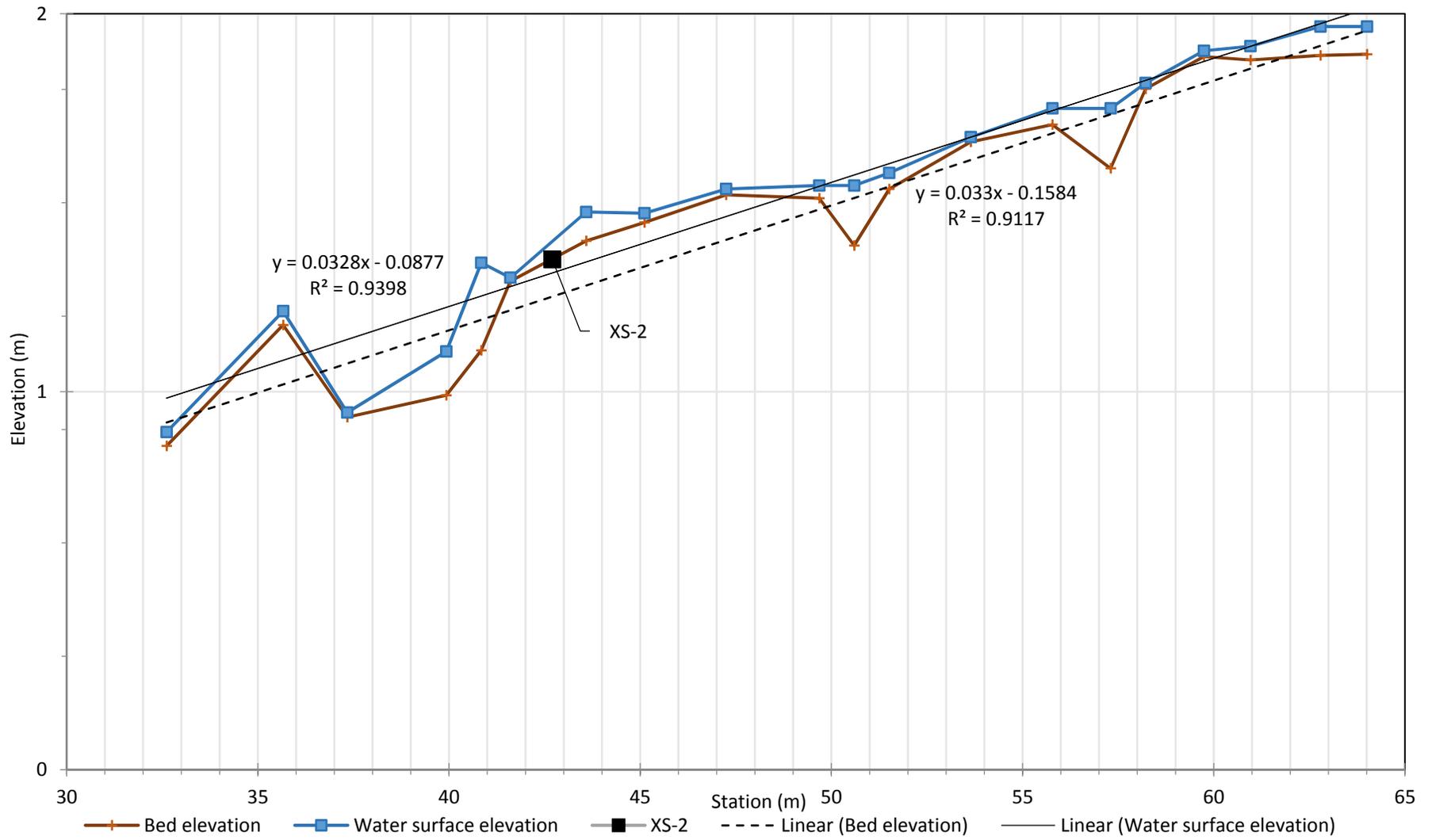
Bed and Water Surface Profiles for XS-2, DC-1, Upper Daggett, along Daggett Creek



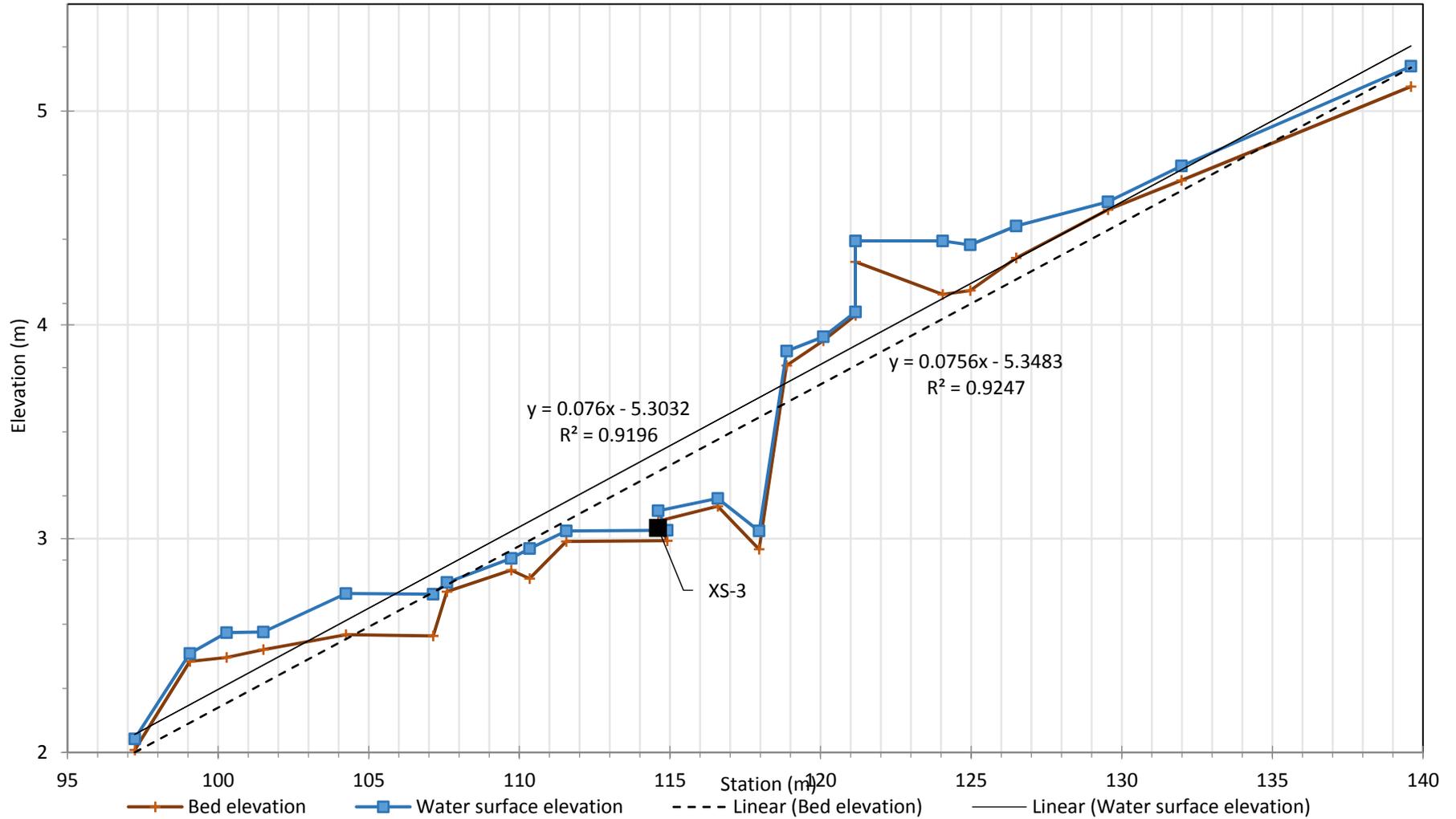
Bed and Water Surface Profiles for XS-3, DC-1, Upper Daggett, along Daggett Creek



Bed and Water Surface Profiles for XS-1, DC-2, Lower Daggett, along Daggett Creek



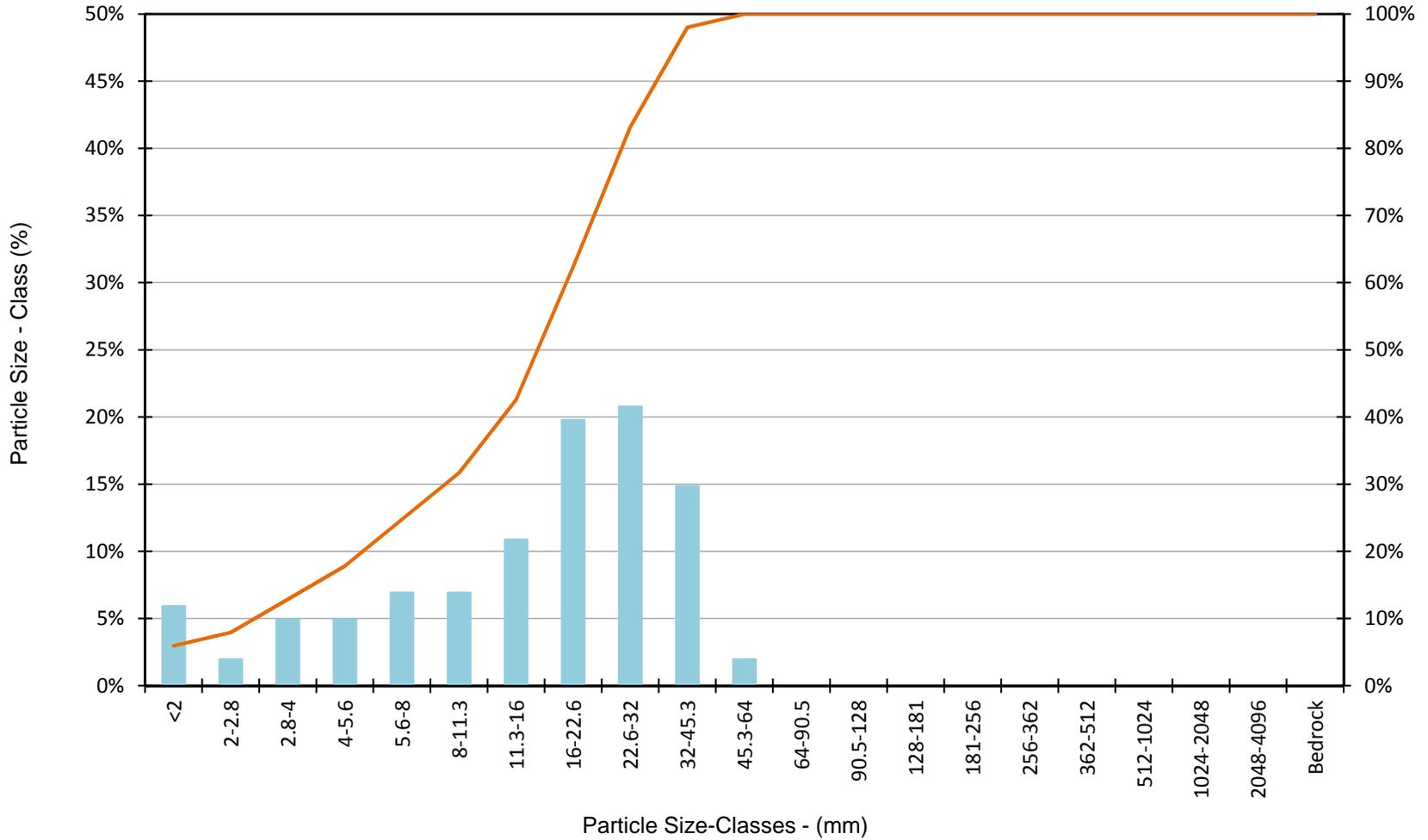
Bed and Water Surface Profiles for XS-2, DC-2, Lower Daggett, along Daggett Creek



Bed and Water Surface Profiles for XS-3, DC-2, Lower Daggett, along Daggett Creek

Sky Meadows, Heavenly Valley Creek (Station 38)

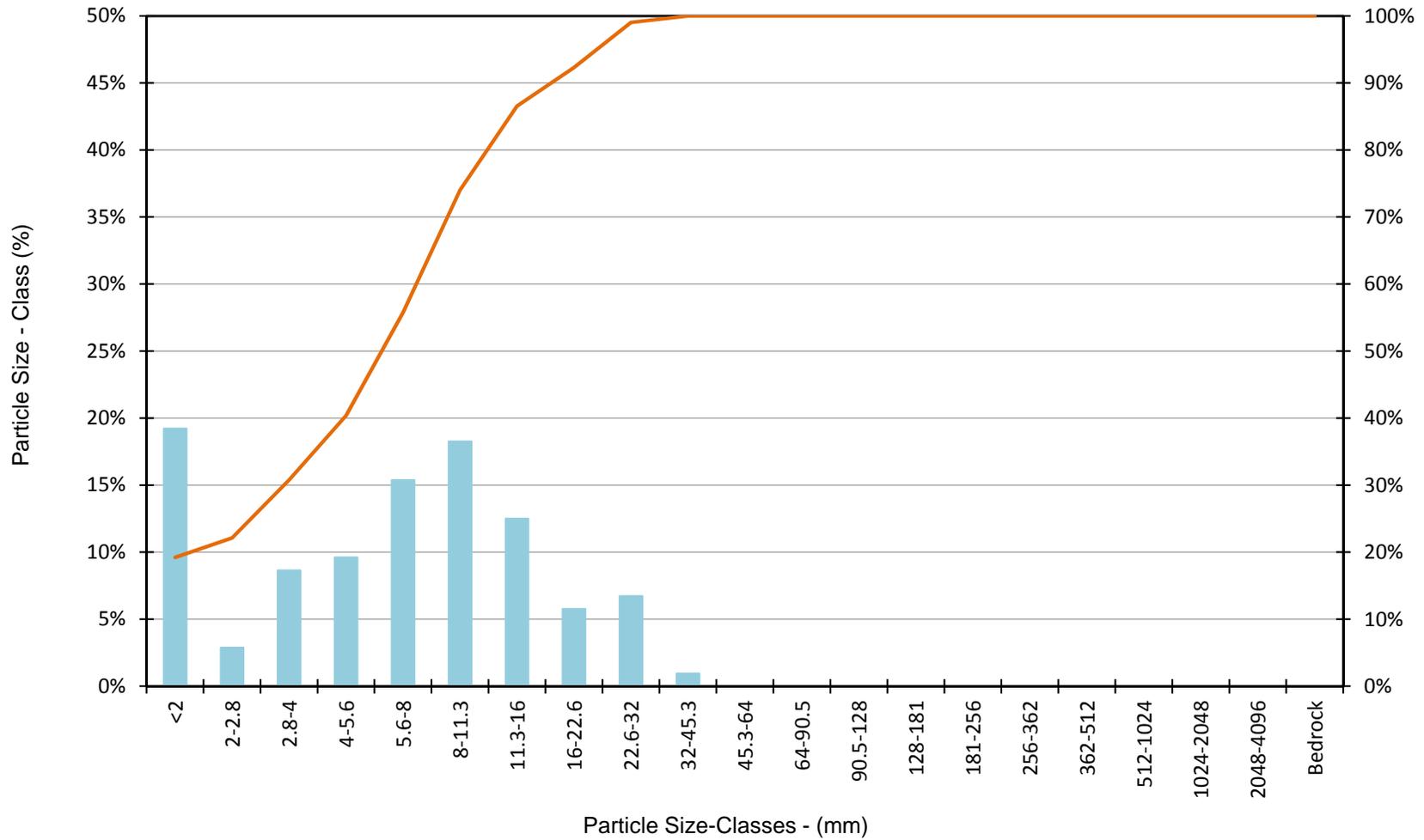
Pebble Count



Bed Particle Size Distribution, Station 38, Sky Meadows at Heavenly Valley Creek

Sky Meadows, Heavenly Valley Creek (Station 100)

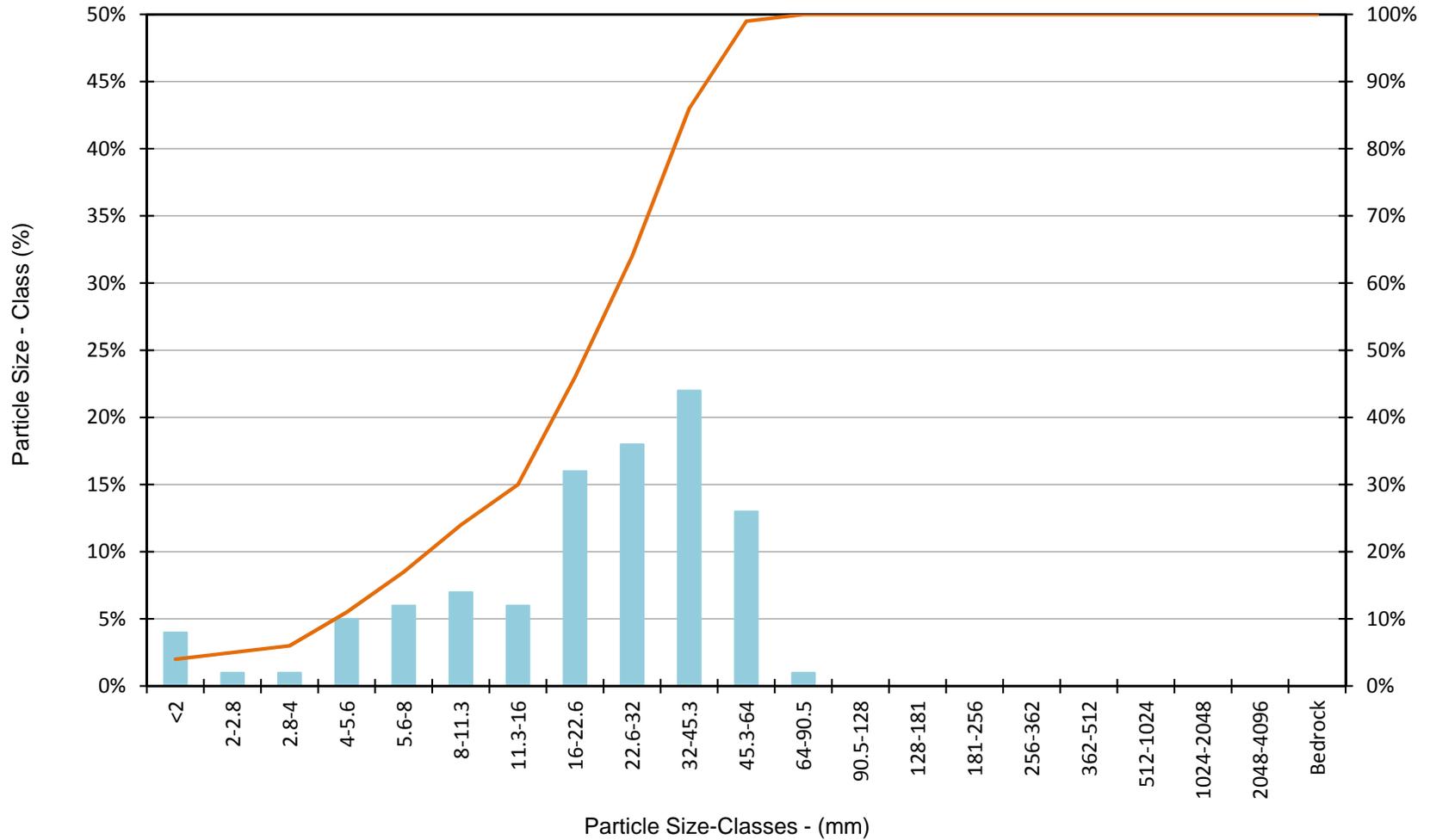
Pebble Count



Bed Particle Size Distribution, Station 100, Sky Meadows at Heavenly Valley Creek

Sky Meadows, Heavenly Valley Creek (Station 112)

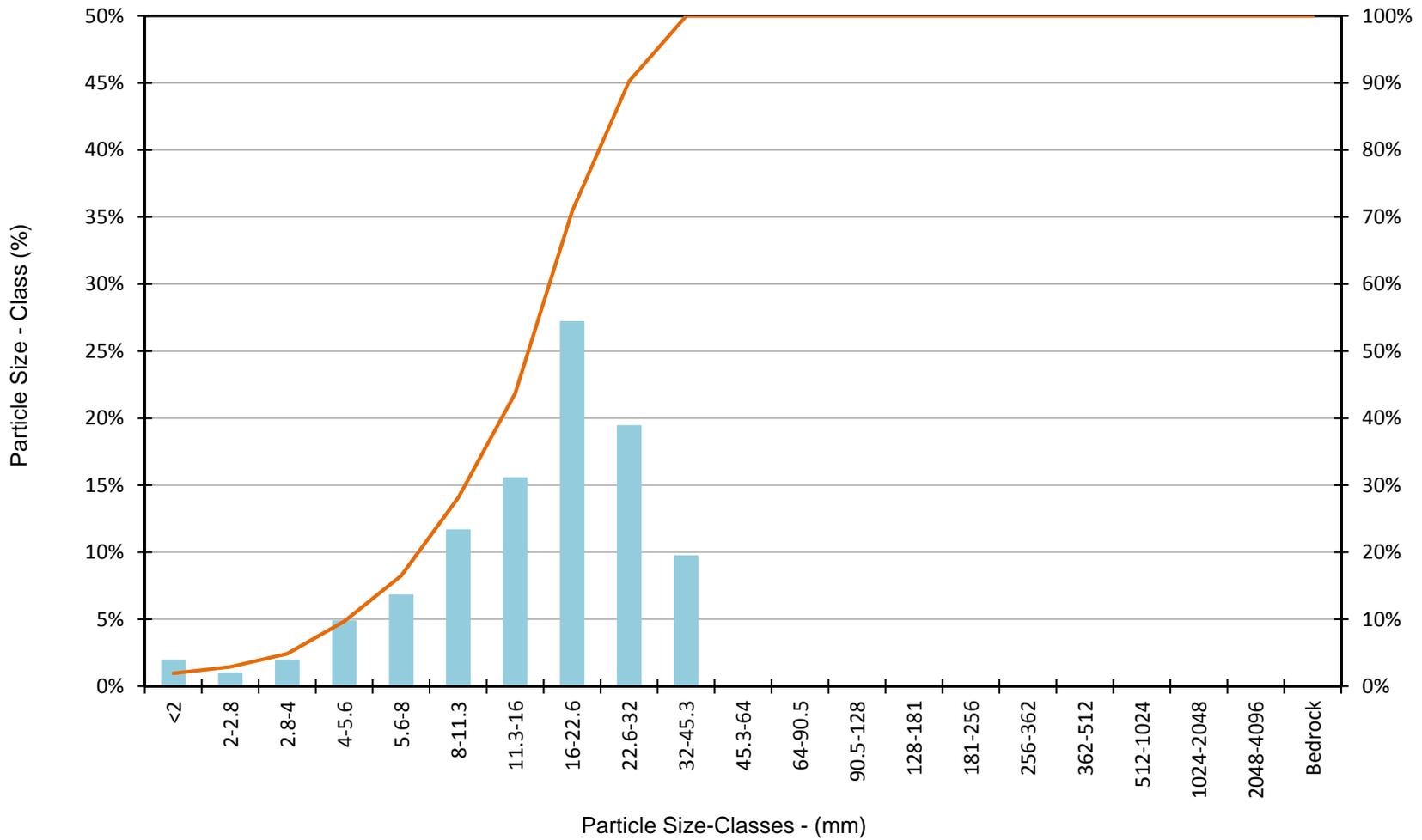
Pebble Count



Bed Particle Size Distribution, Station 112, Sky Meadows at Heavenly Valley Creek

Sky Meadows, Heavenly Valley Creek (Station 290)

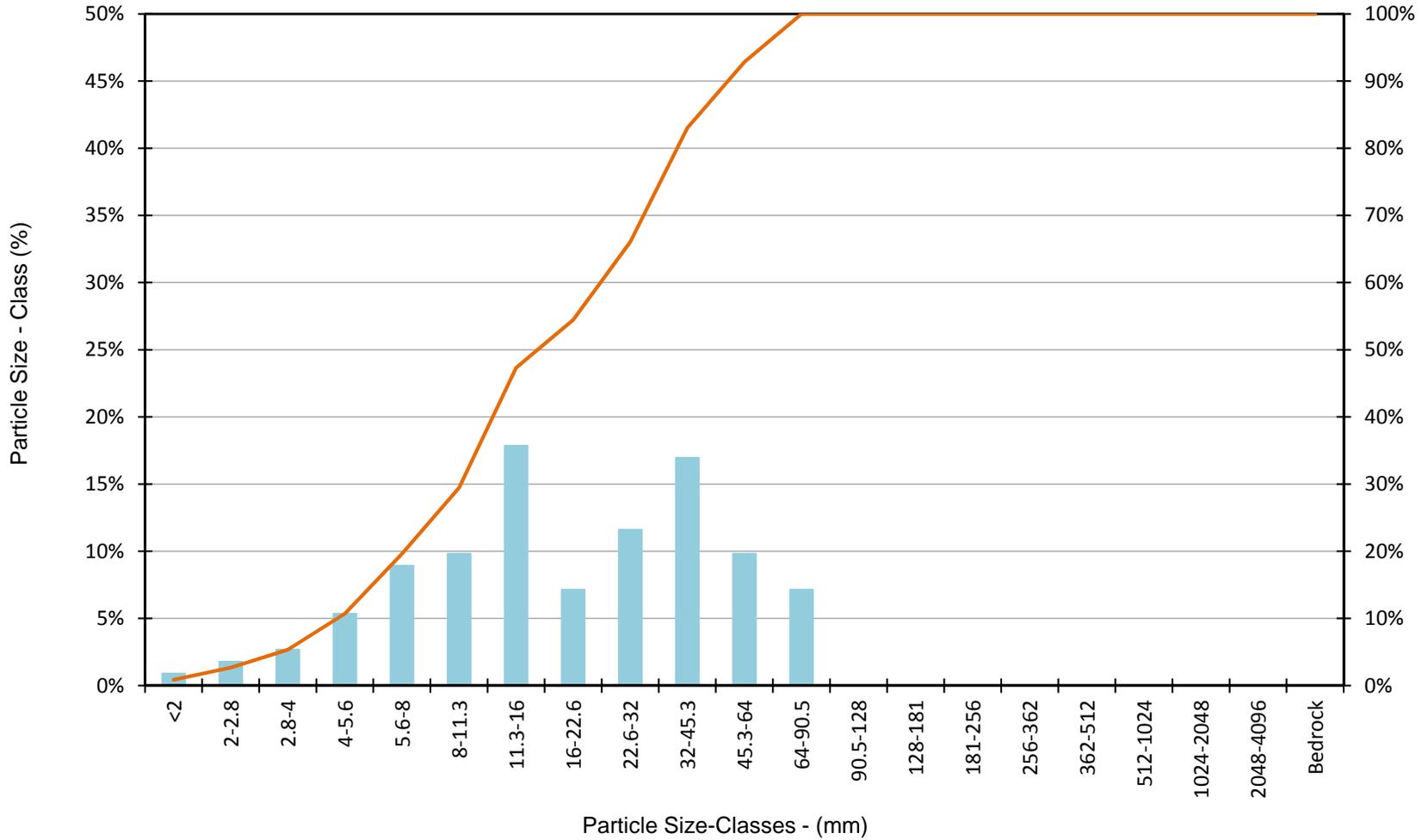
Pebble Count



Bed Particle Size Distribution, Station 290, Sky Meadows at Heavenly Valley Creek

Below Patsy's, Heavenly Valley Creek (Station 185)

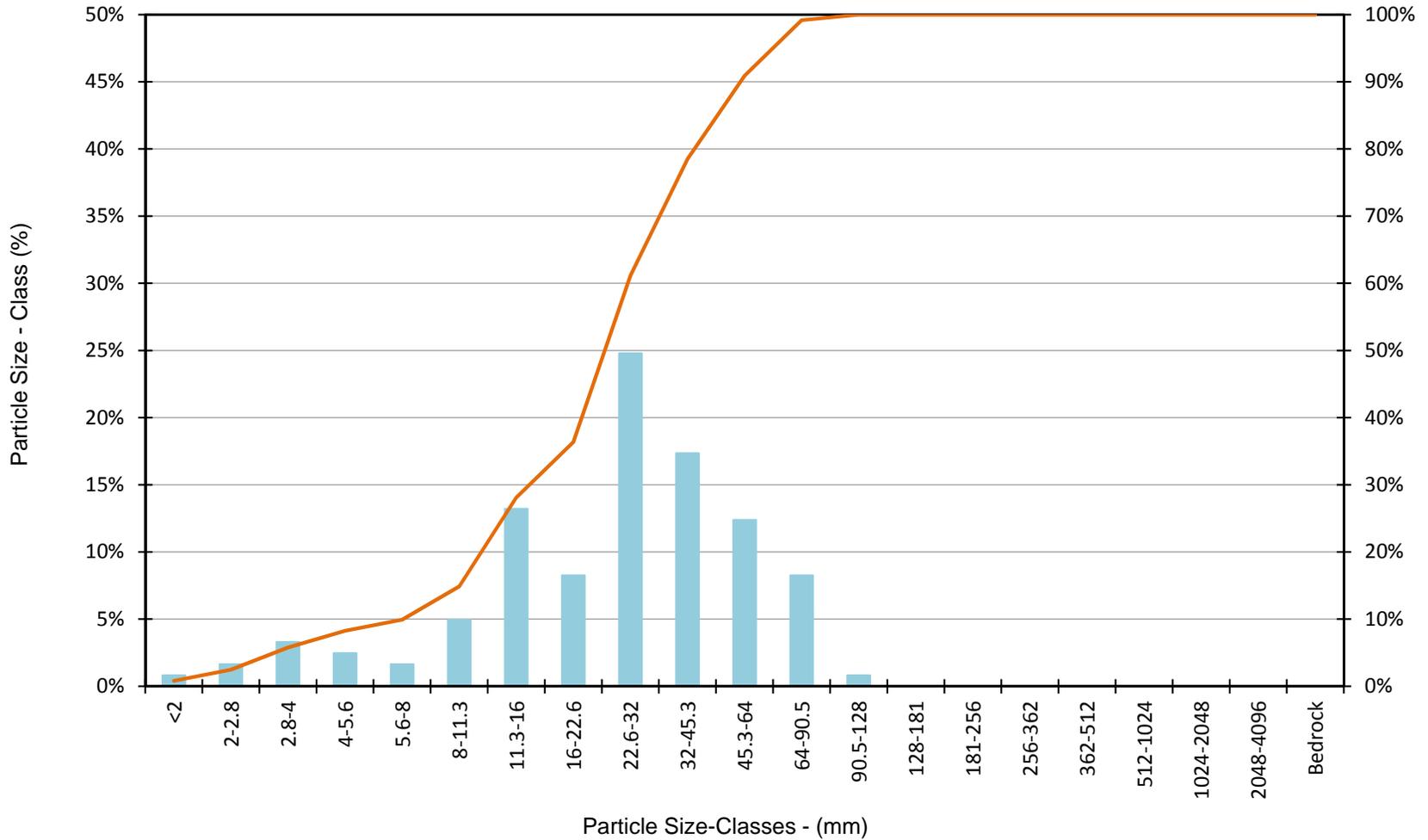
Pebble Count



Bed Particle Size Distribution, Station 185, Below Patsy's at Heavenly Valley Creek

Below Patsy's, Heavenly Valley Creek (Station 535)

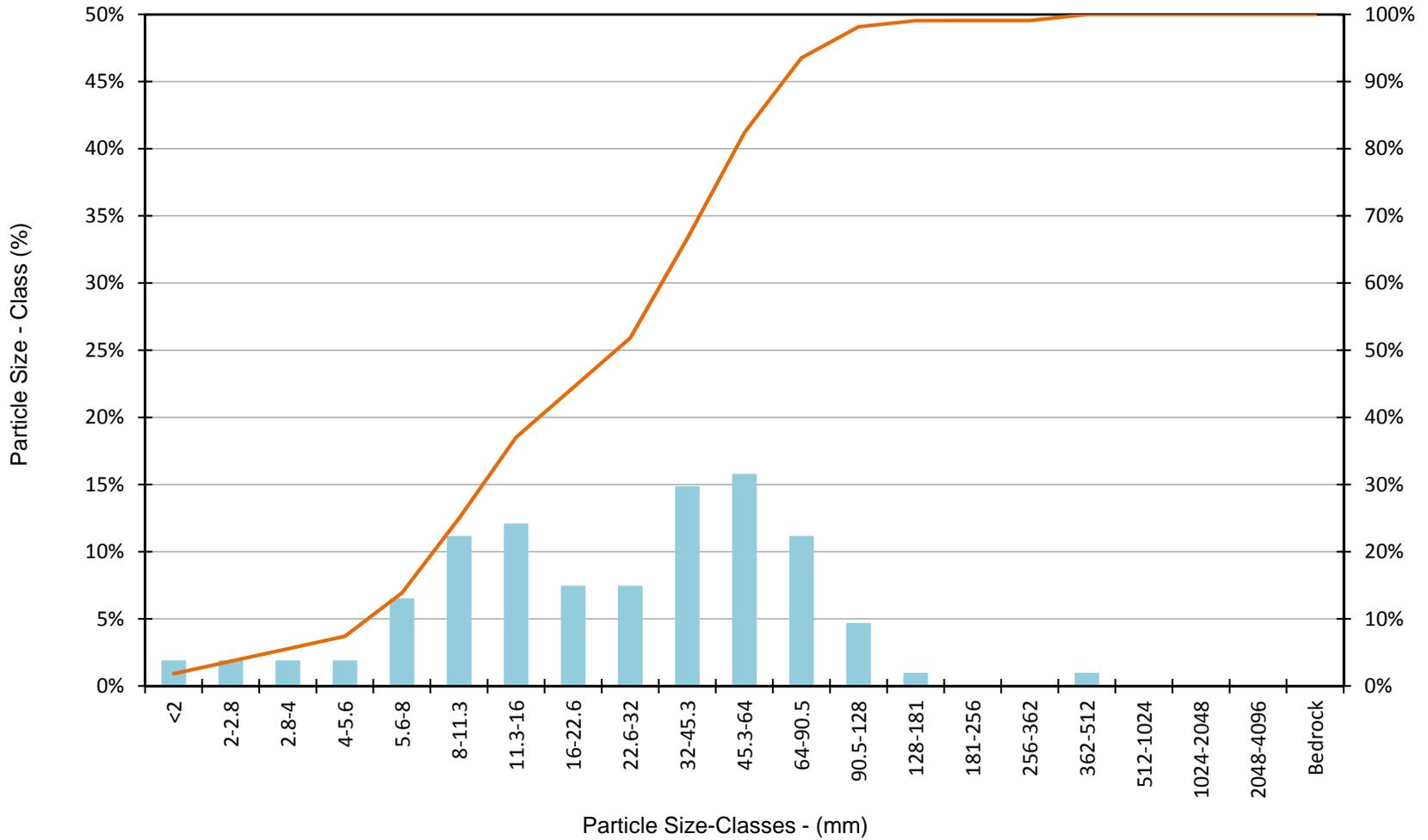
Pebble Count



Bed Particle Size Distribution, Station 535, Below Patsy's at Heavenly Valley Creek

Below Patsy's, Heavenly Valley Creek (Station 860)

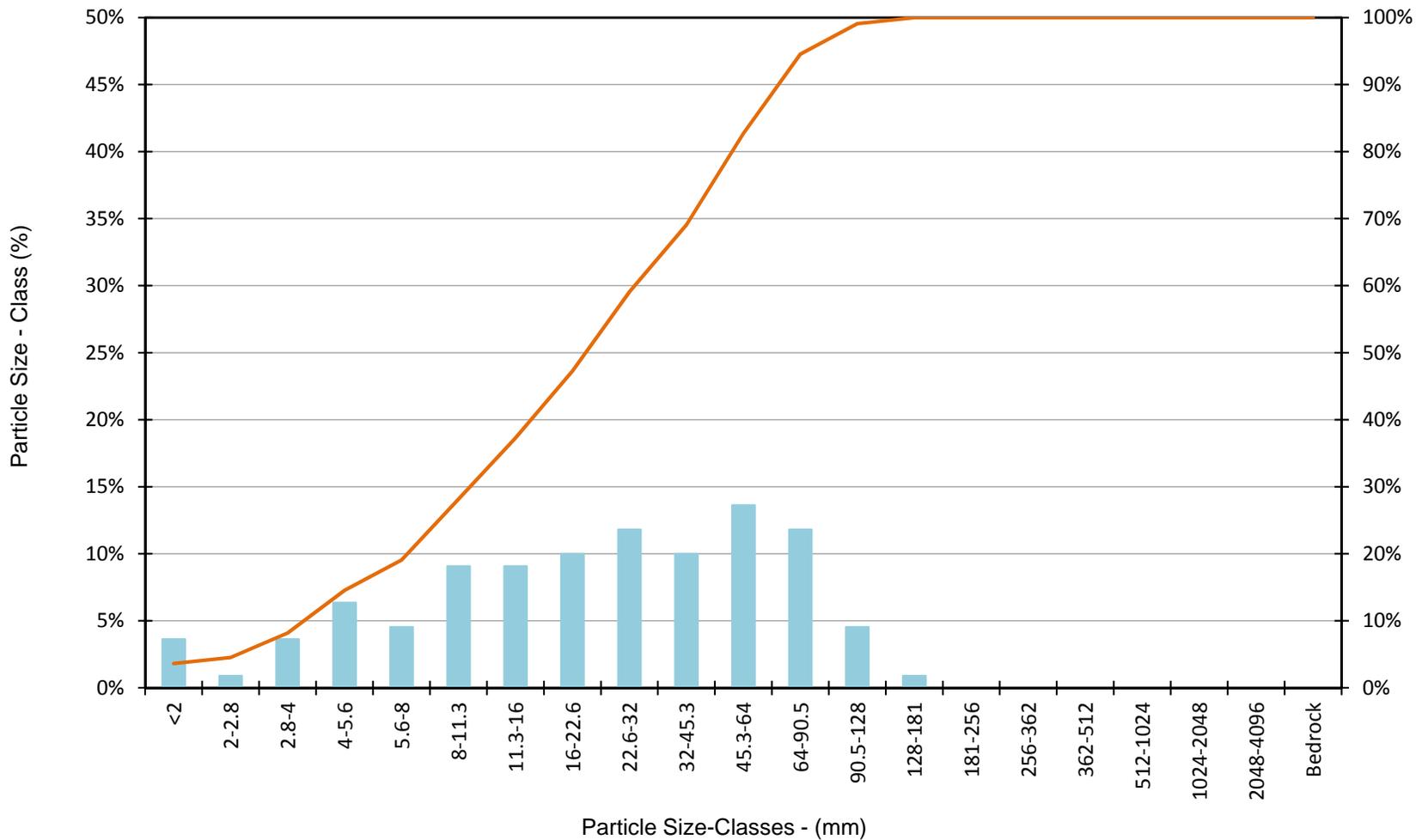
Pebble Count



Bed Particle Size Distribution, Station 860, Below Patsy's at Heavenly Valley Creek

Below Patsy's, Heavenly Valley Creek (Station 1090)

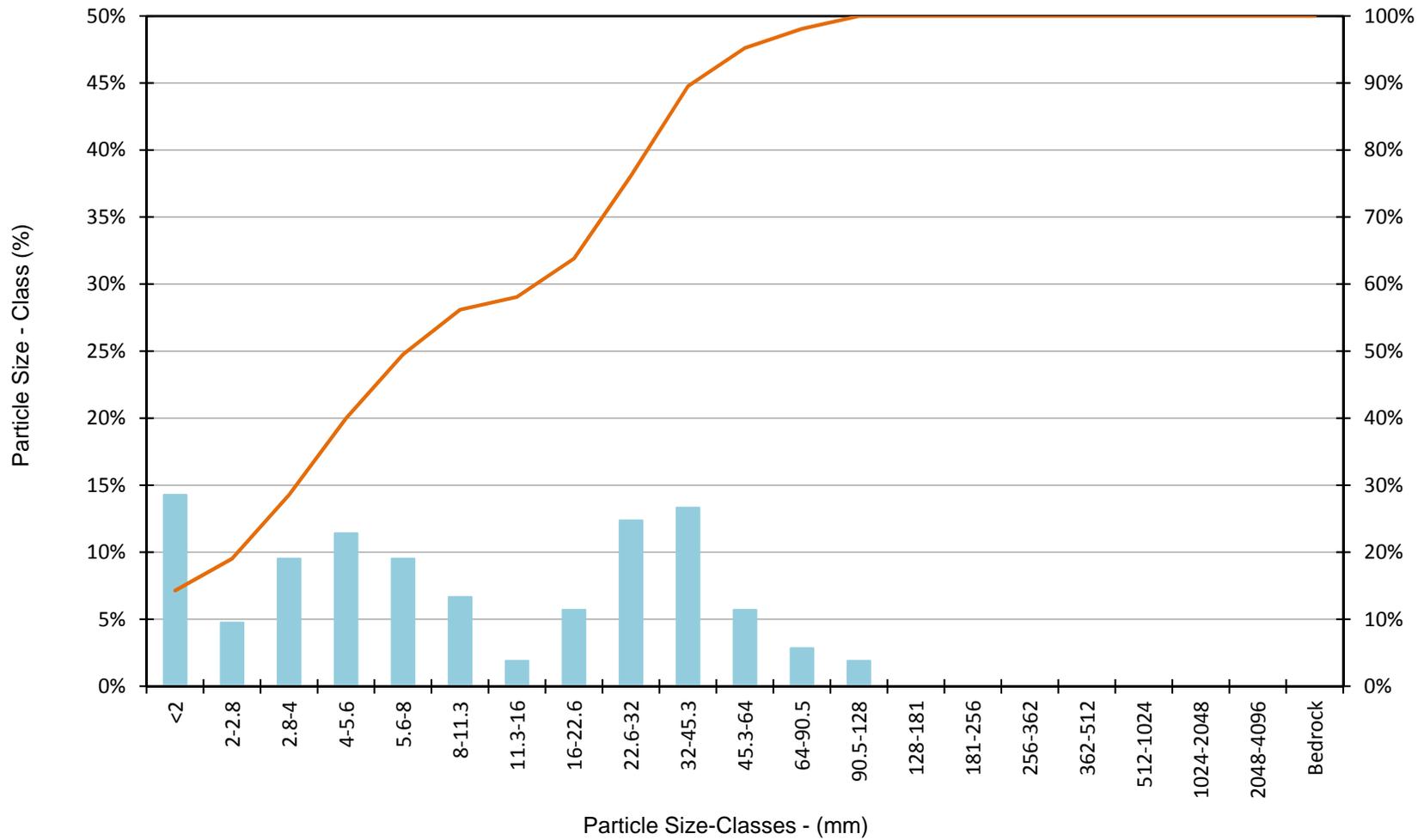
Pebble Count



Bed Particle Size Distribution, Station 1090, Below Patsy's at Heavenly Valley Creek

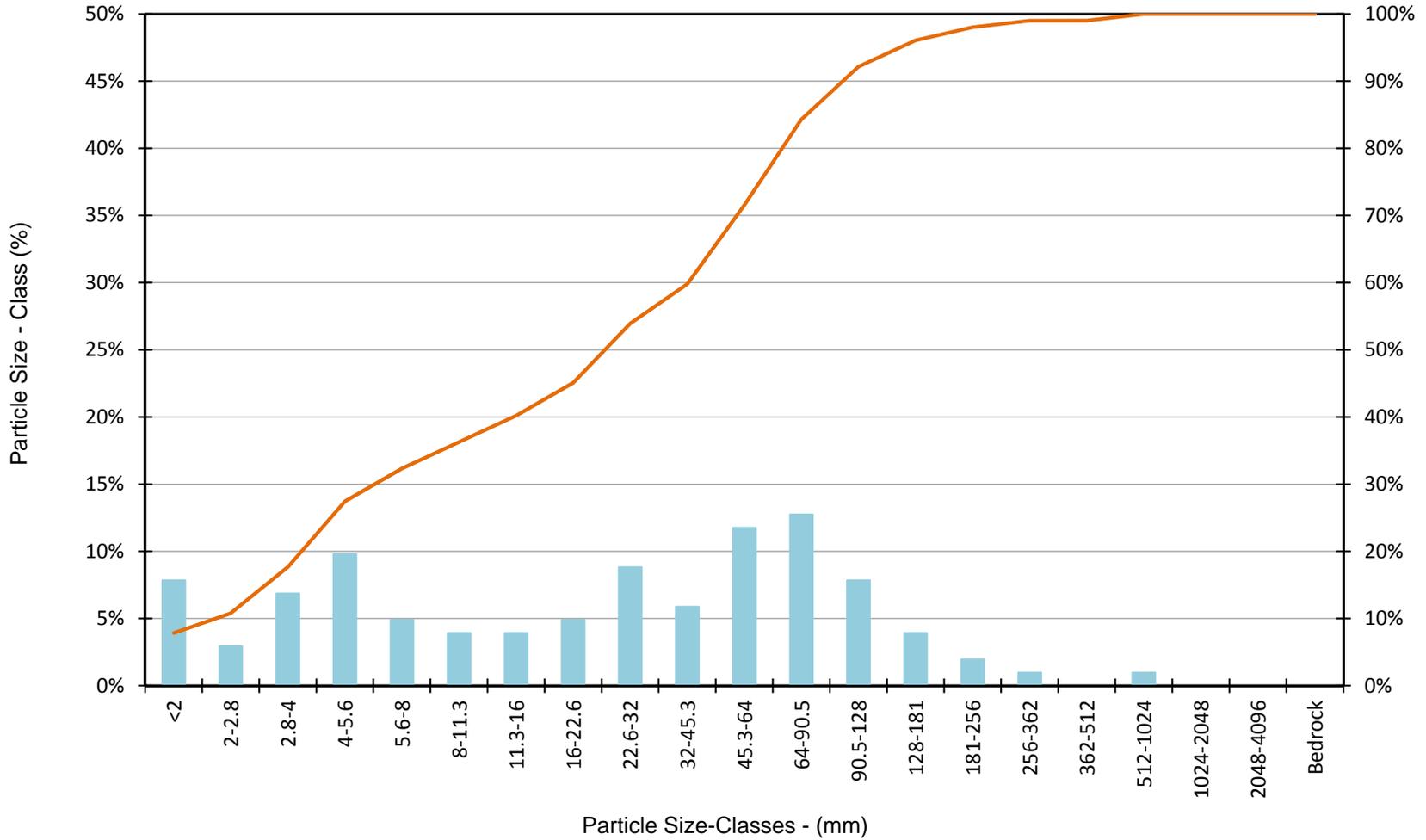
Property Line, Heavenly Valley Creek (Station 152)

Pebble Count



Bed Particle Size Distribution, Station 152, Property Line at Heavenly Valley Creek

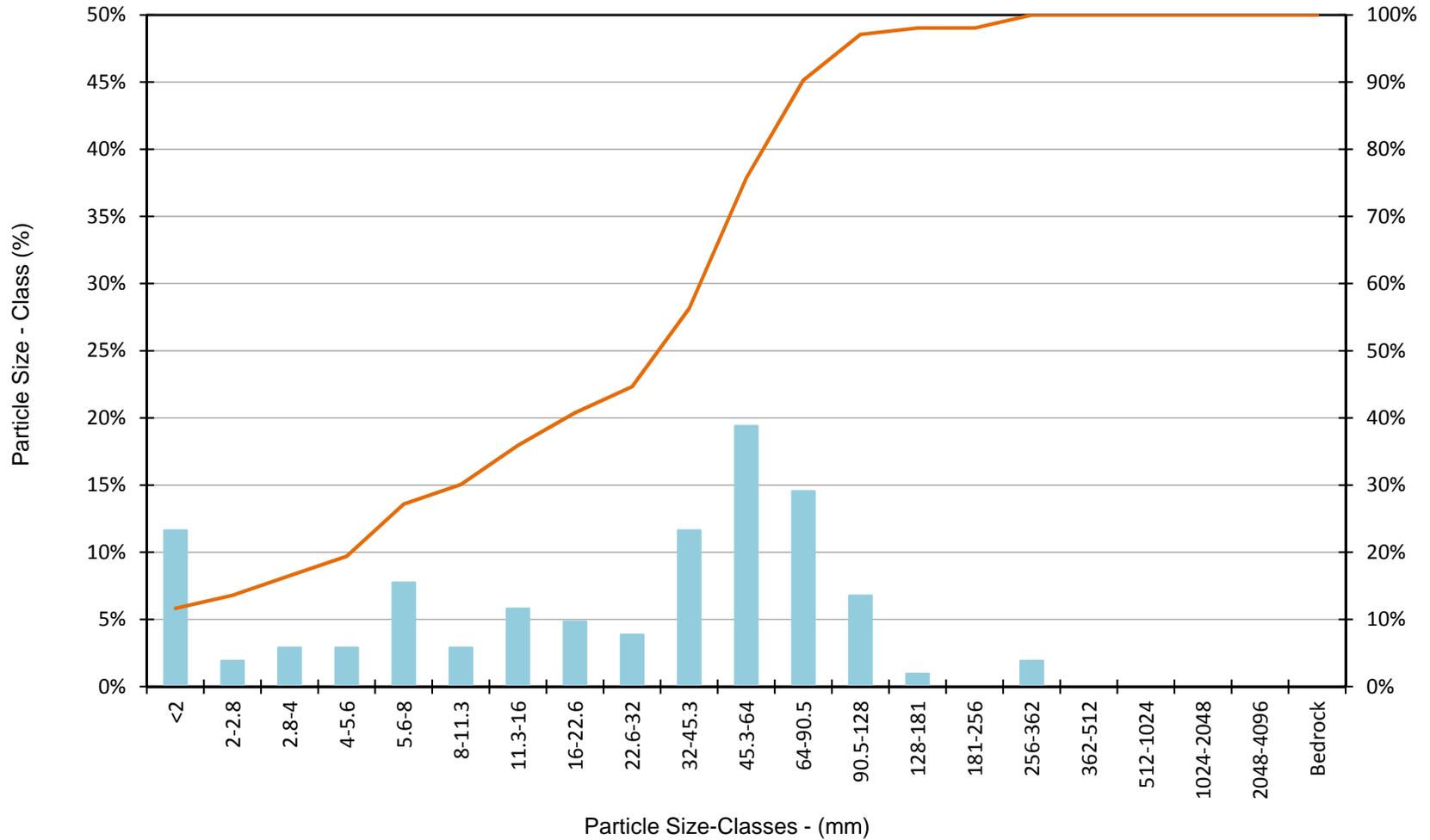
Property Line, Heavenly Valley Creek (Station 365) Pebble Count



Bed Particle Size Distribution, Station 365, Property Line at Heavenly Valley Creek

Property Line, Heavenly Valley Creek (Station 716)

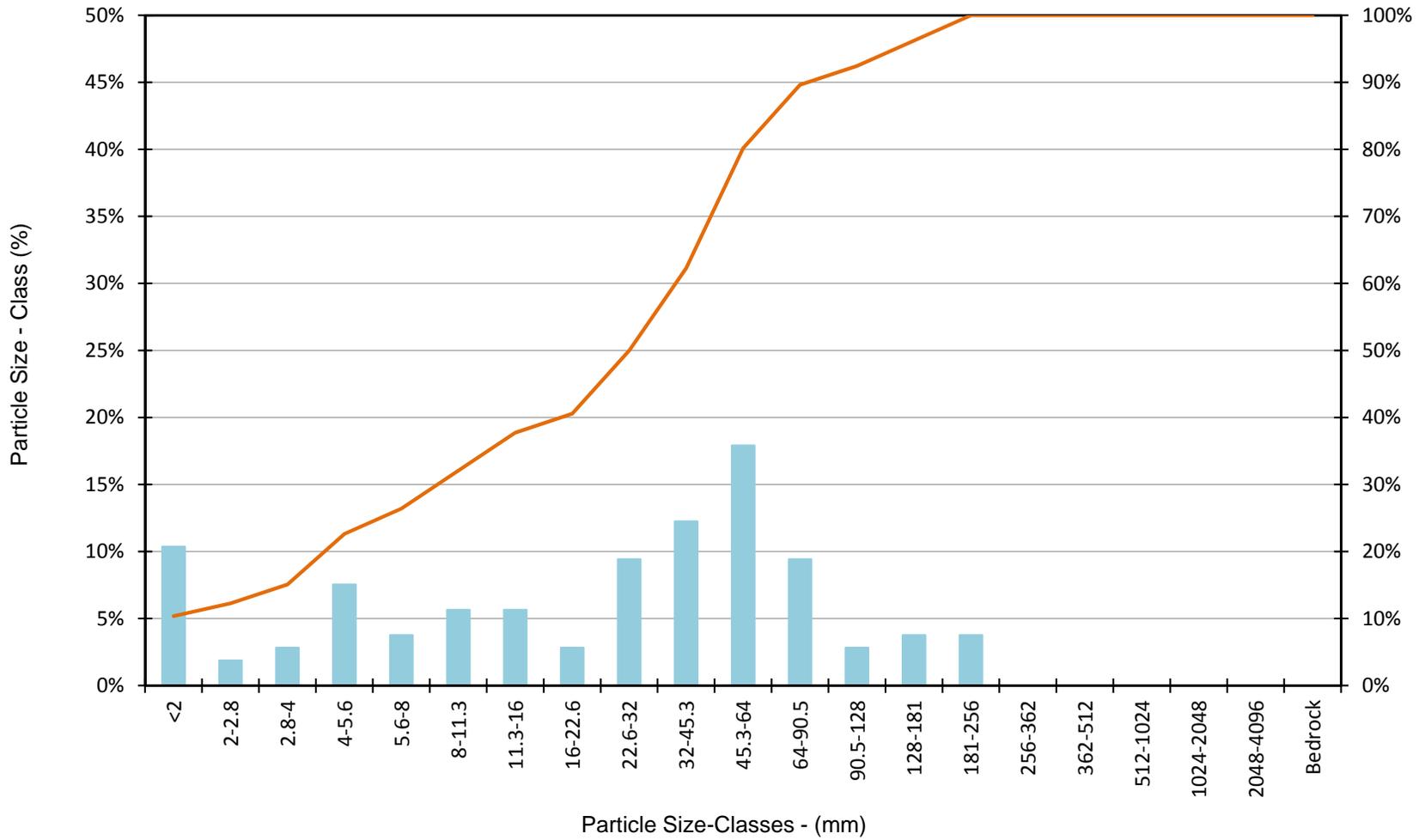
Pebble Count



Bed Particle Size Distribution, Station 716, Property Line at Heavenly Valley Creek

Property Line, Heavenly Valley Creek (Station 1170)

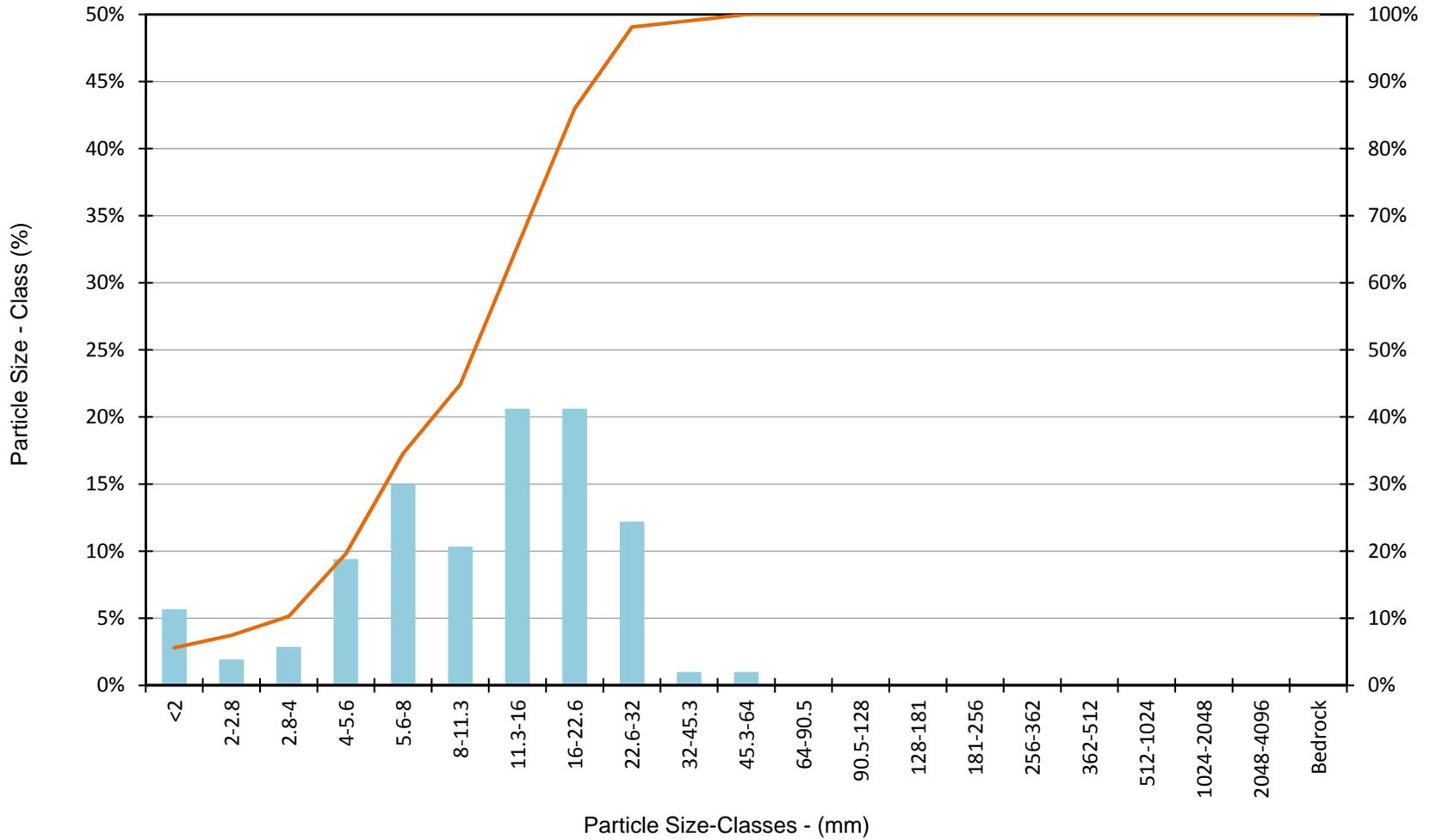
Pebble Count



Bed Particle Size Distribution, Station 1170, Property Line at Heavenly Valley Creek

Upper Hidden Valley Creek (Station 33)

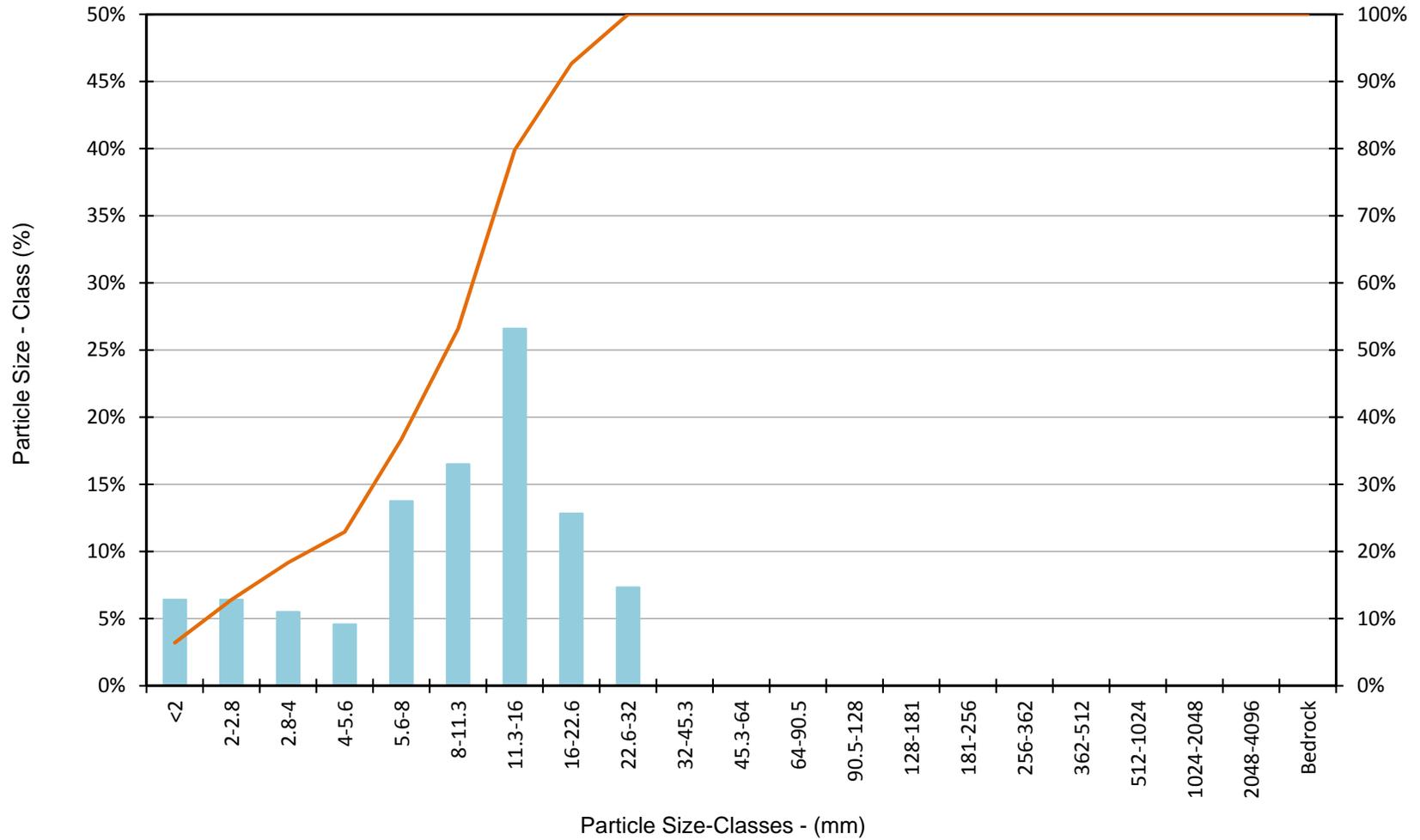
Pebble Count



Bed Particle Size Distribution, Station 33, Upper Hidden Valley Creek

Upper Hidden Valley Creek (Station 203)

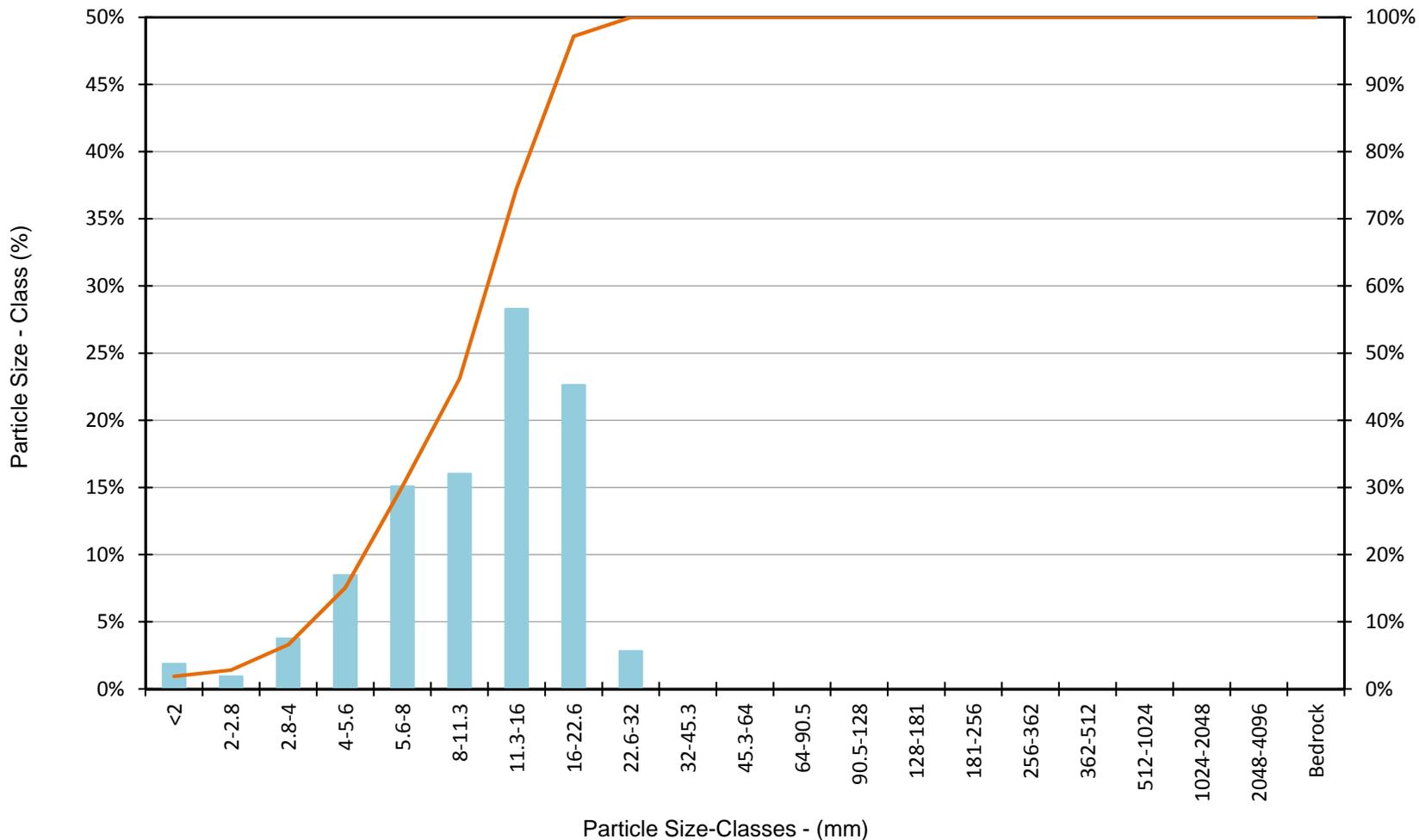
Pebble Count



Bed Particle Size Distribution, Station 203, Upper Hidden Valley Creek

Upper Hidden Valley Creek (Station 366)

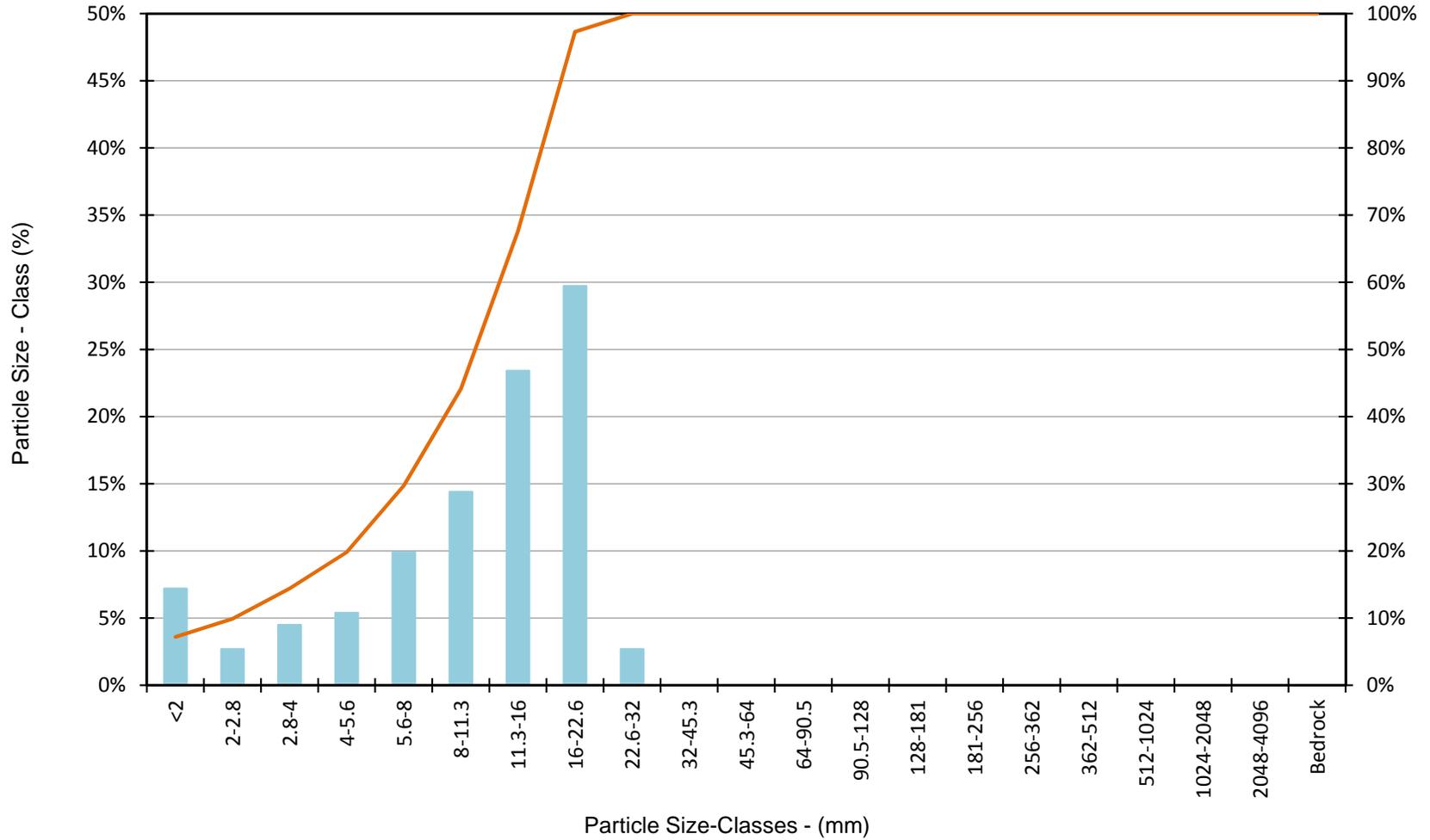
Pebble Count



Bed Particle Size Distribution, Station 366, Upper Hidden Valley Creek

Upper Hidden Valley Creek (Station 515)

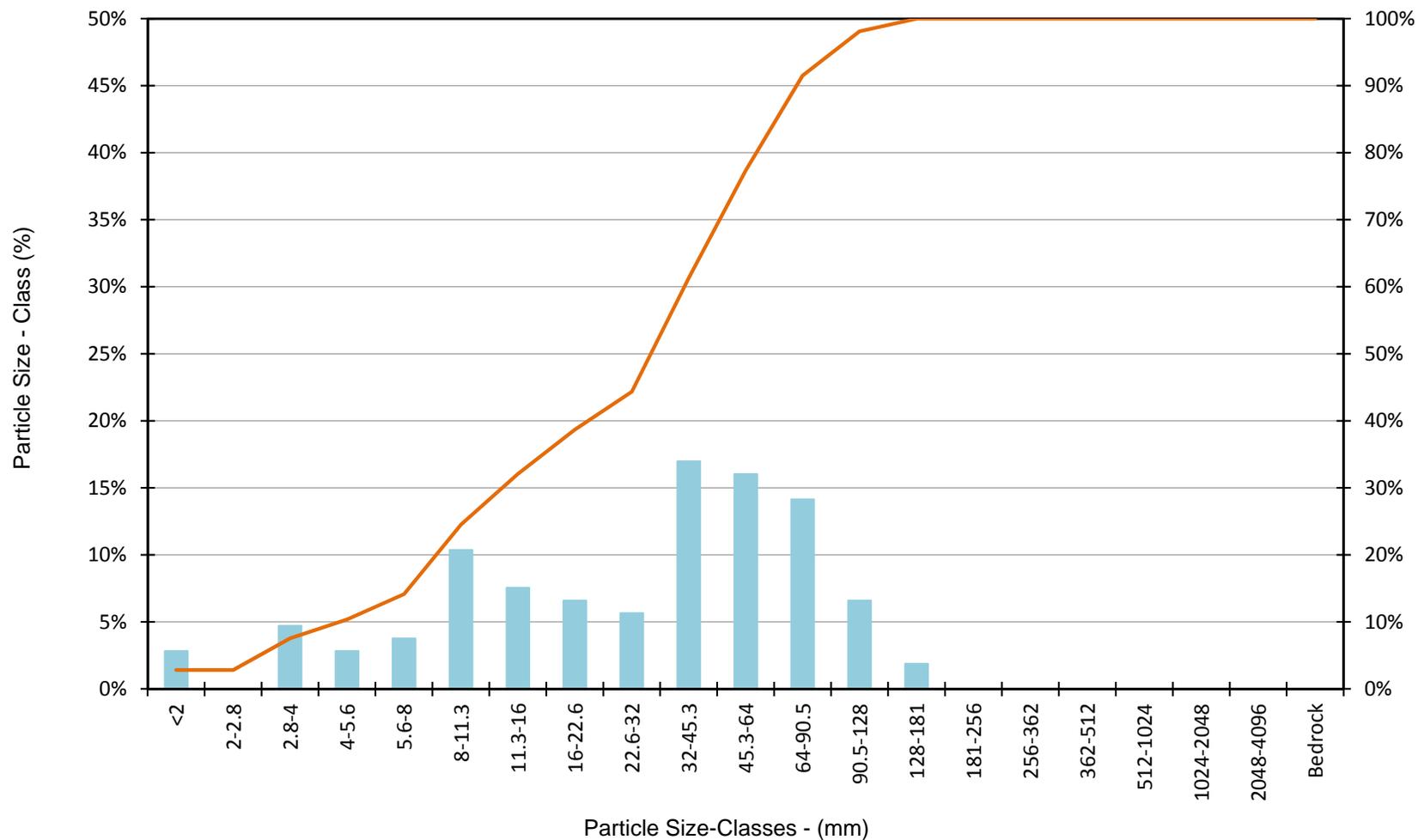
Pebble Count



Bed Particle Size Distribution, Station 515, Upper Hidden Valley Creek

Lower Hidden Valley Creek (Station 80)

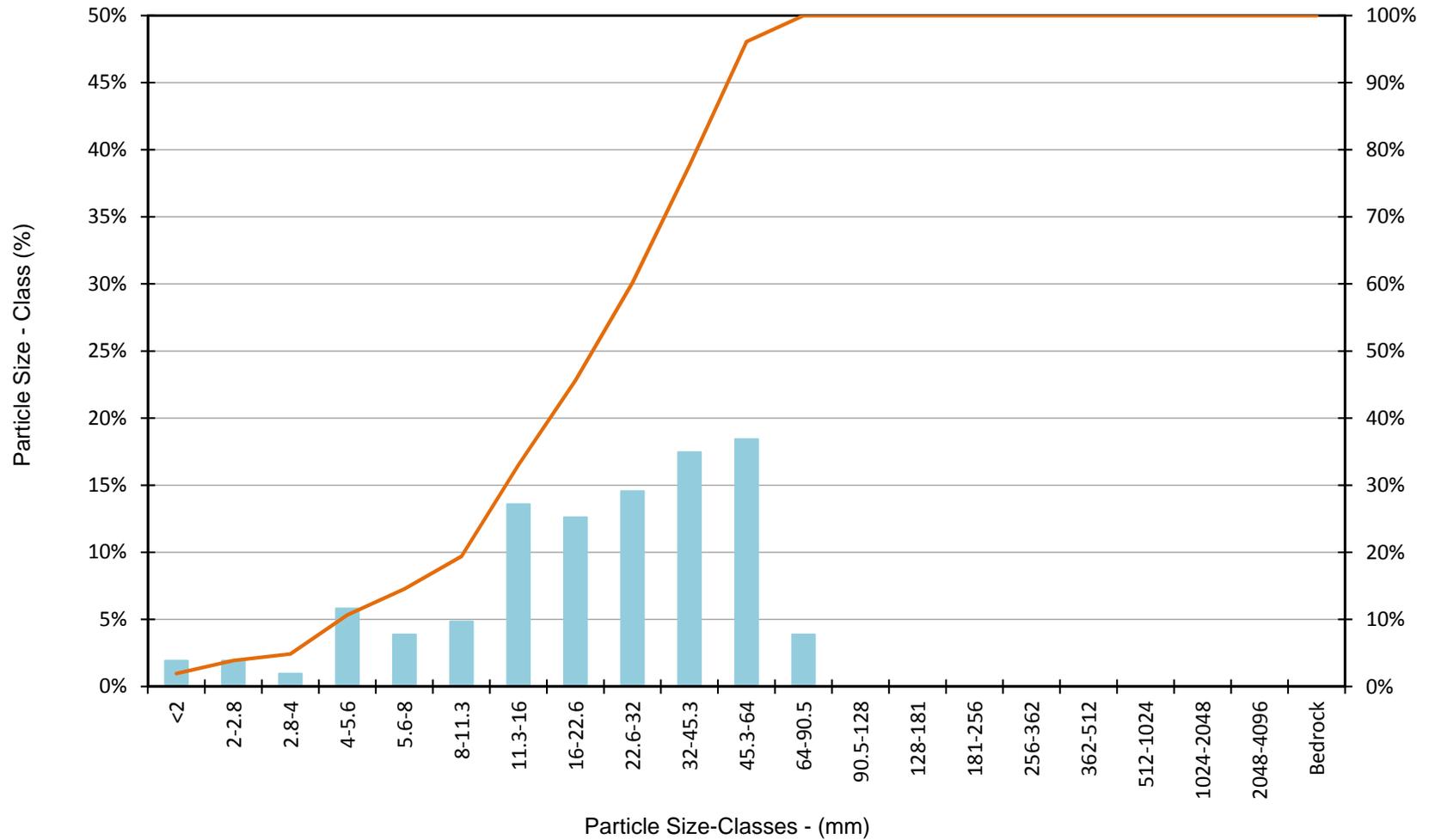
Pebble Count



Bed Particle Size Distribution, Station 80, Lower Hidden Valley Creek

Lower Hidden Valley Creek (Station 250)

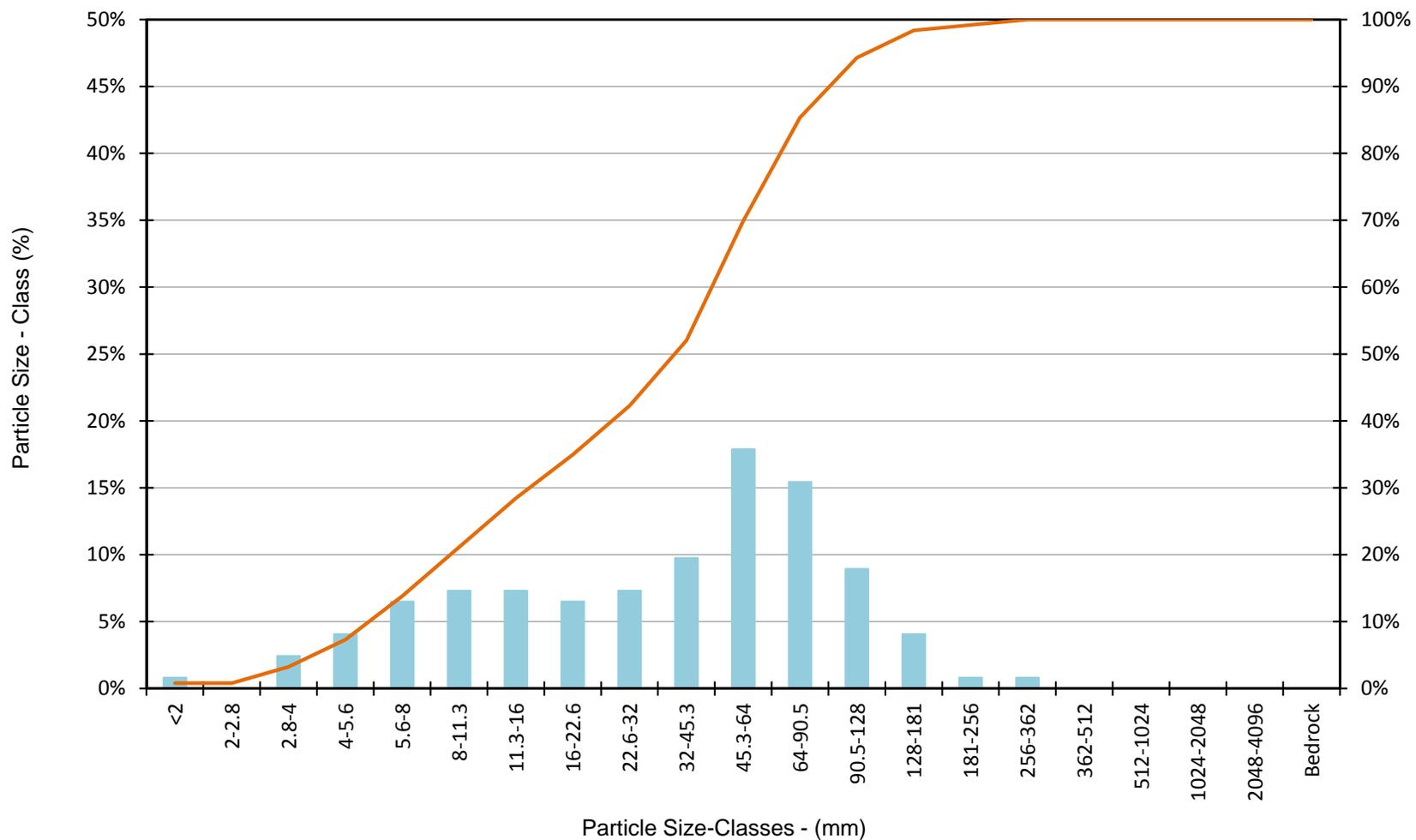
Pebble Count



Bed Particle Size Distribution, Station 250, Lower Hidden Valley Creek

Lower Hidden Valley Creek (Station 487)

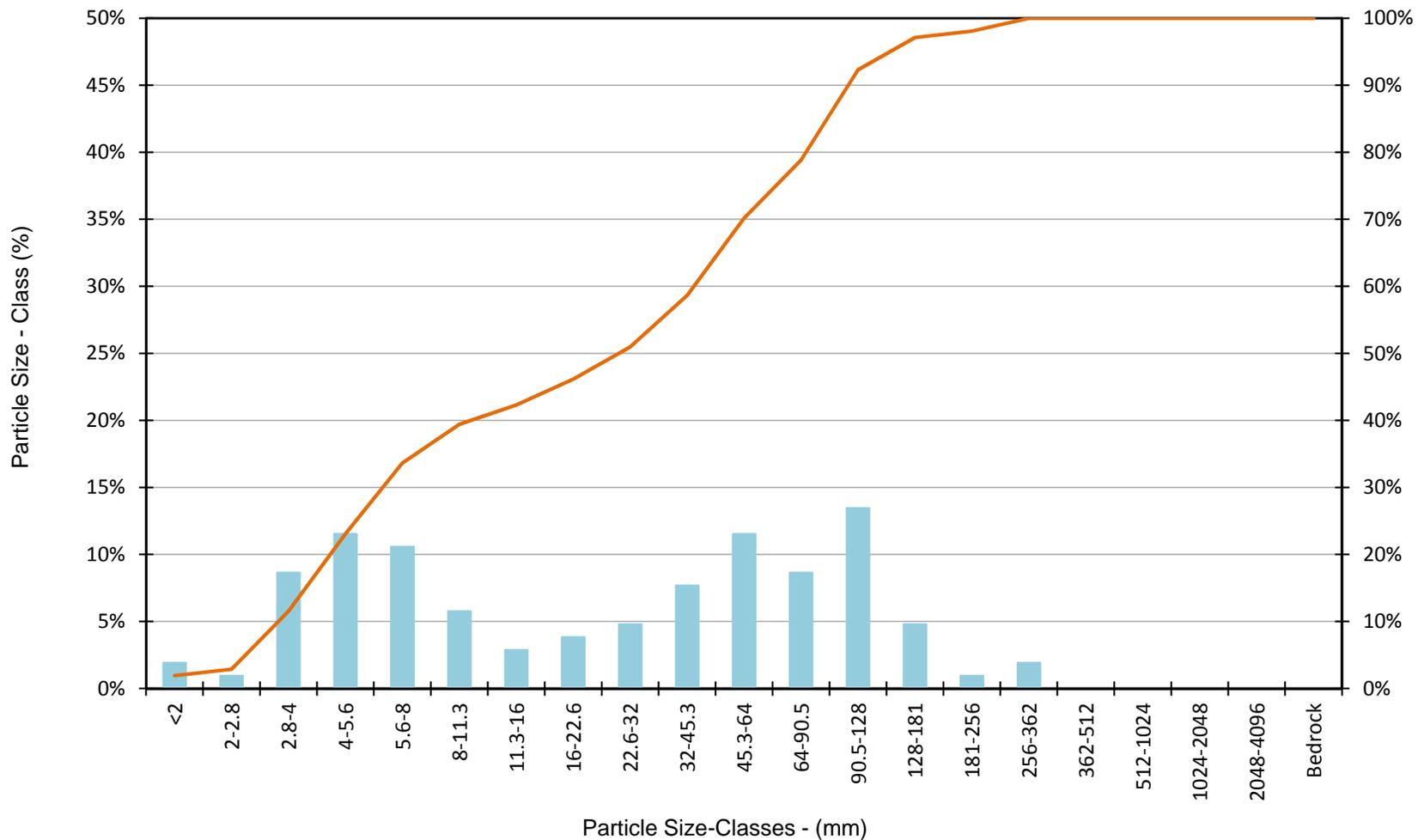
Pebble Count



Bed Particle Size Distribution, Station 487, Lower Hidden Valley Creek

Lower Hidden Valley Creek (Station 640)

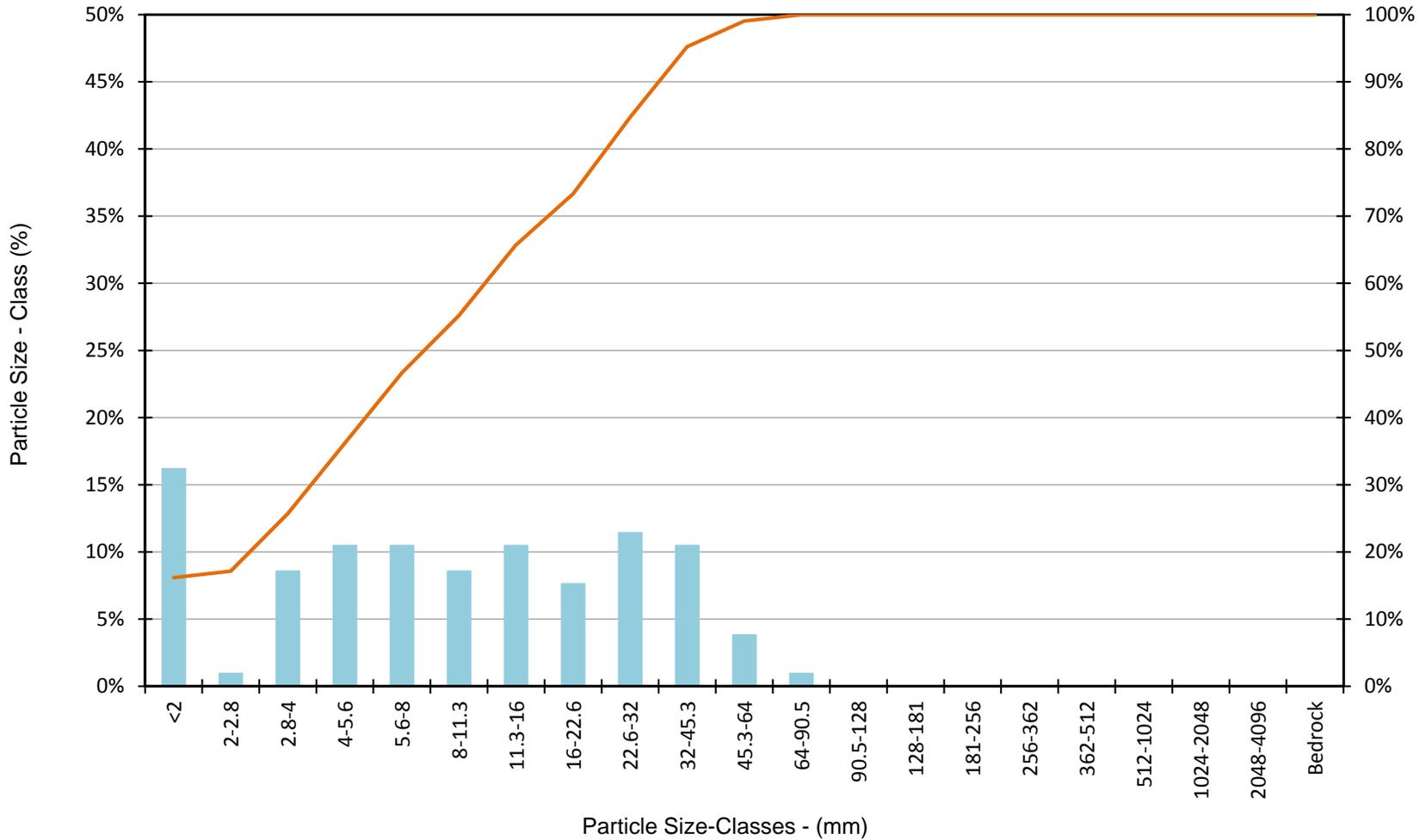
Pebble Count



Bed Particle Size Distribution, Station 640, Lower Hidden Valley Creek

Upper Edgewood, Edgewood Creek (Station 24)

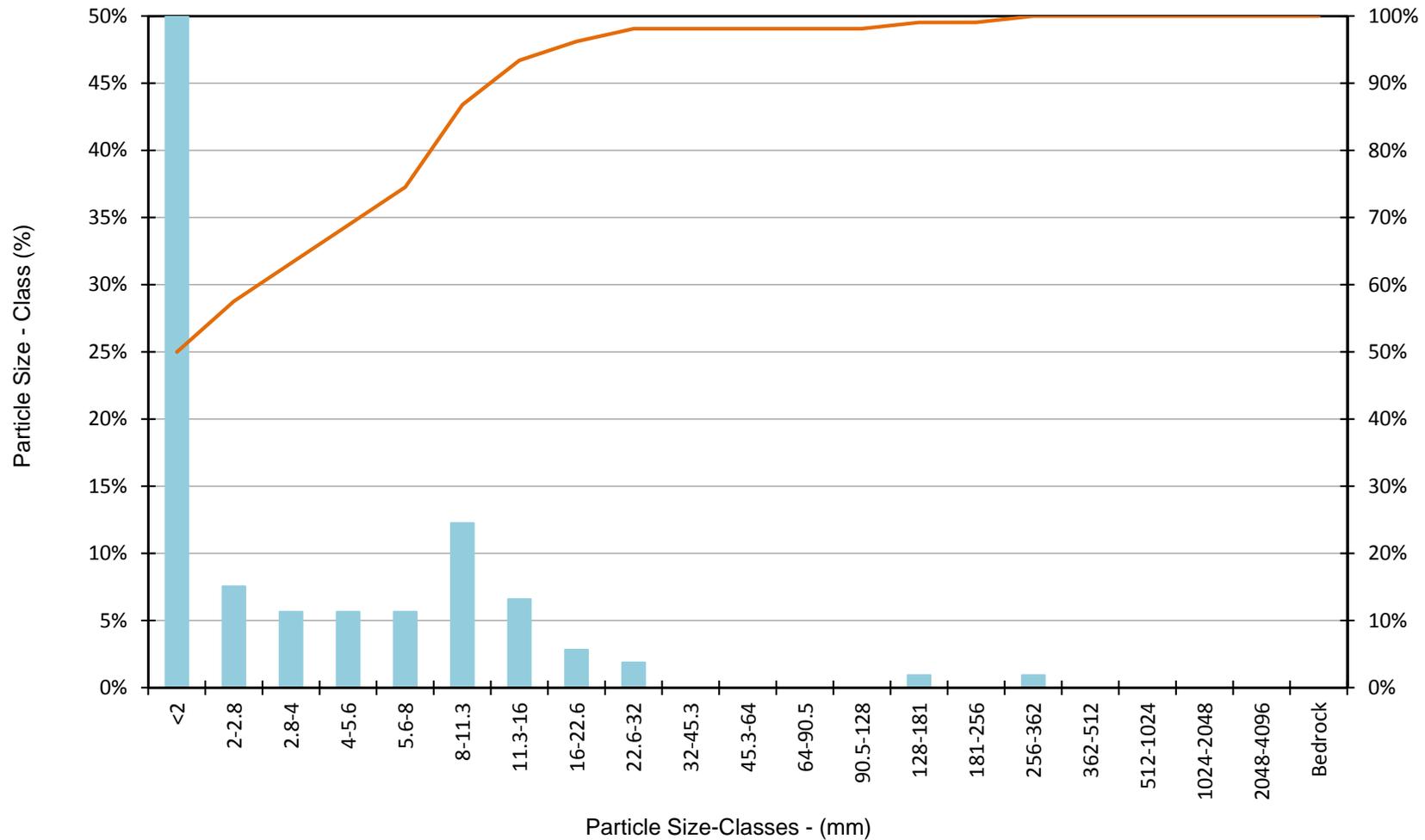
Pebble Count



Bed Particle Size Distribution, Station 24, Upper Edgewood at Edgewood Creek

Upper Edgewood, Edgewood Creek (Station 100)

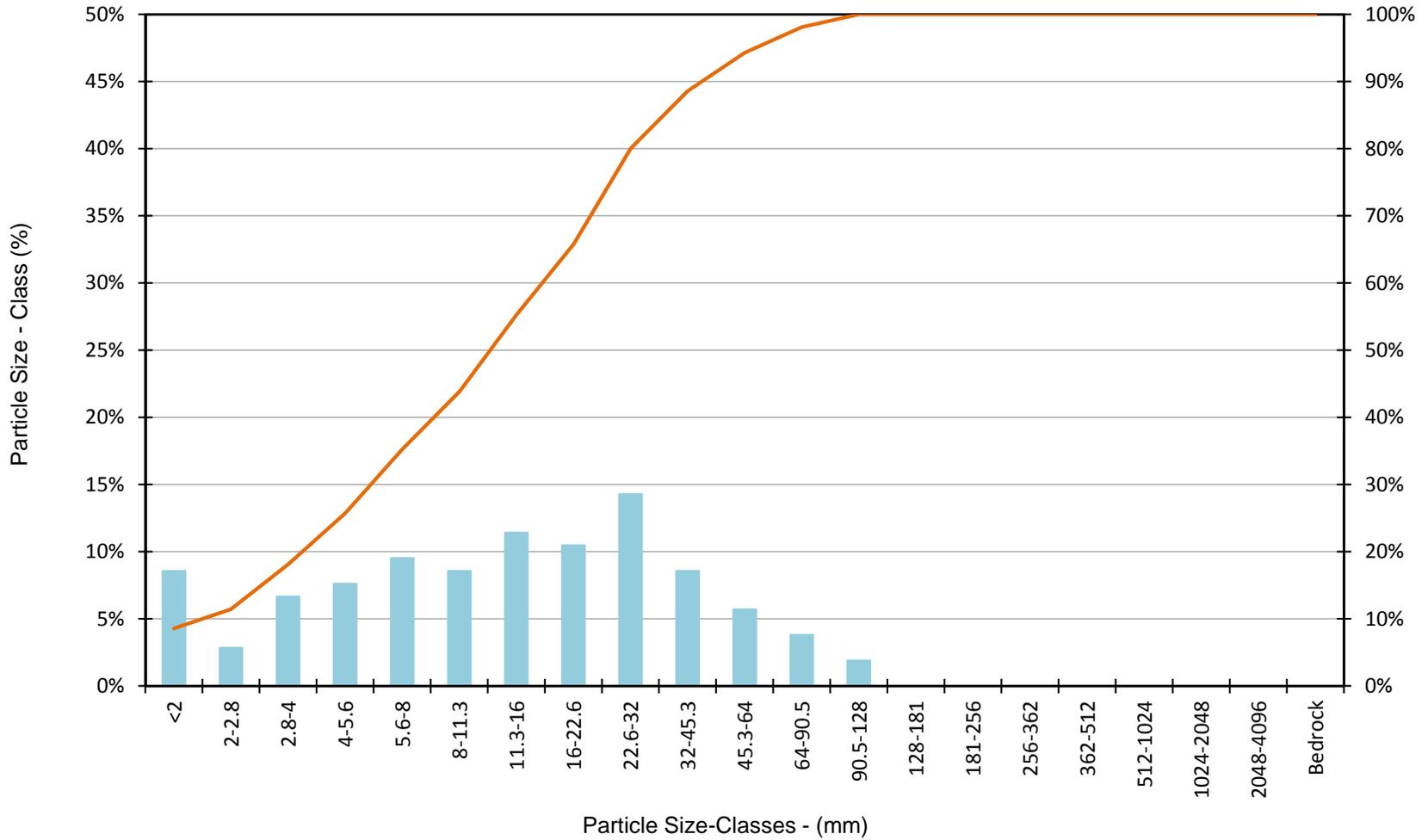
Pebble Count



Bed Particle Size Distribution, Station 100, Upper Edgewood at Edgewood Creek

Upper Edgewood, Edgewood Creek (Station 230)

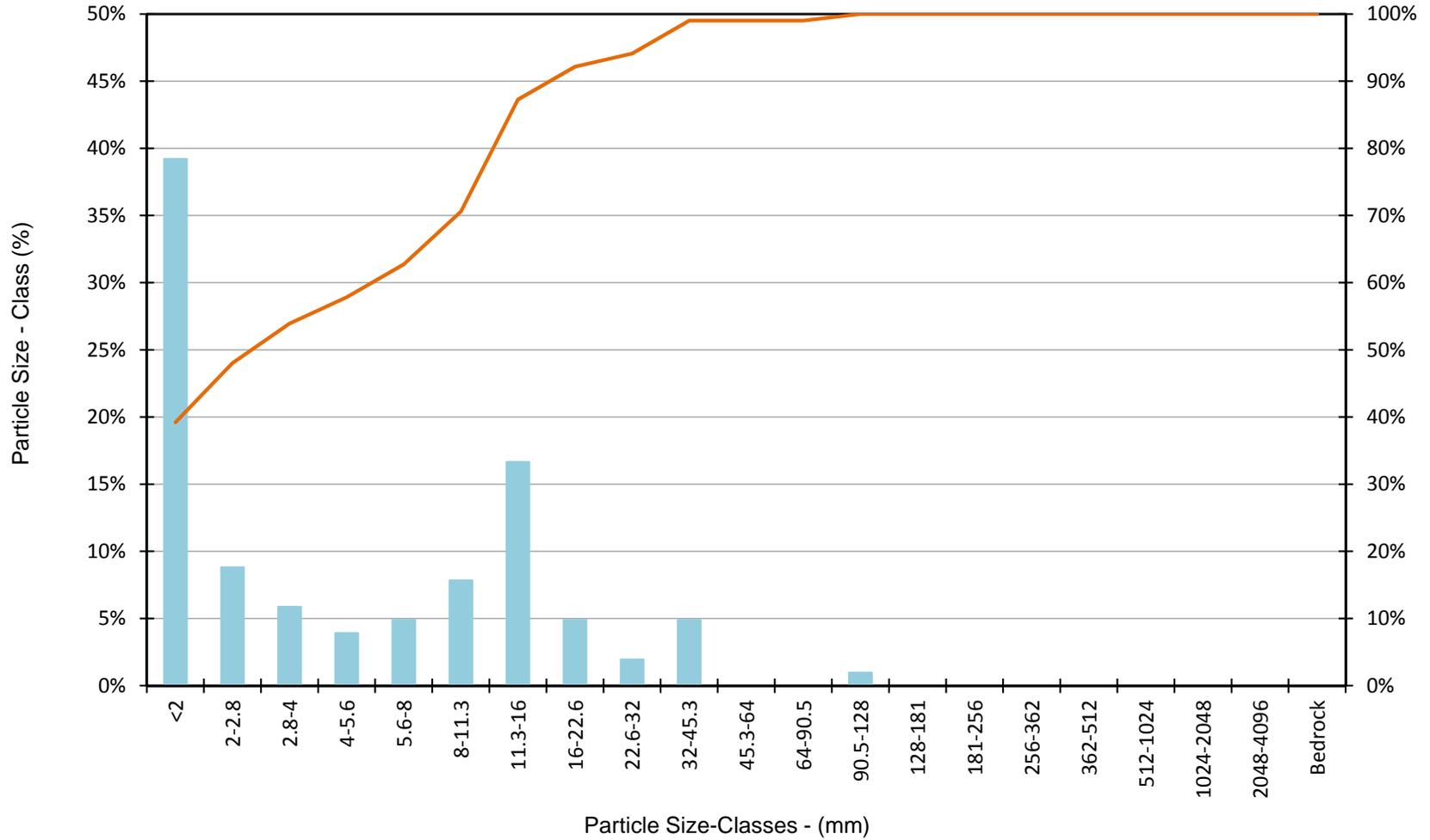
Pebble Count



Bed Particle Size Distribution, Station 230, Upper Edgewood at Edgewood Creek

Upper Edgewood, Edgewood Creek (Station 470)

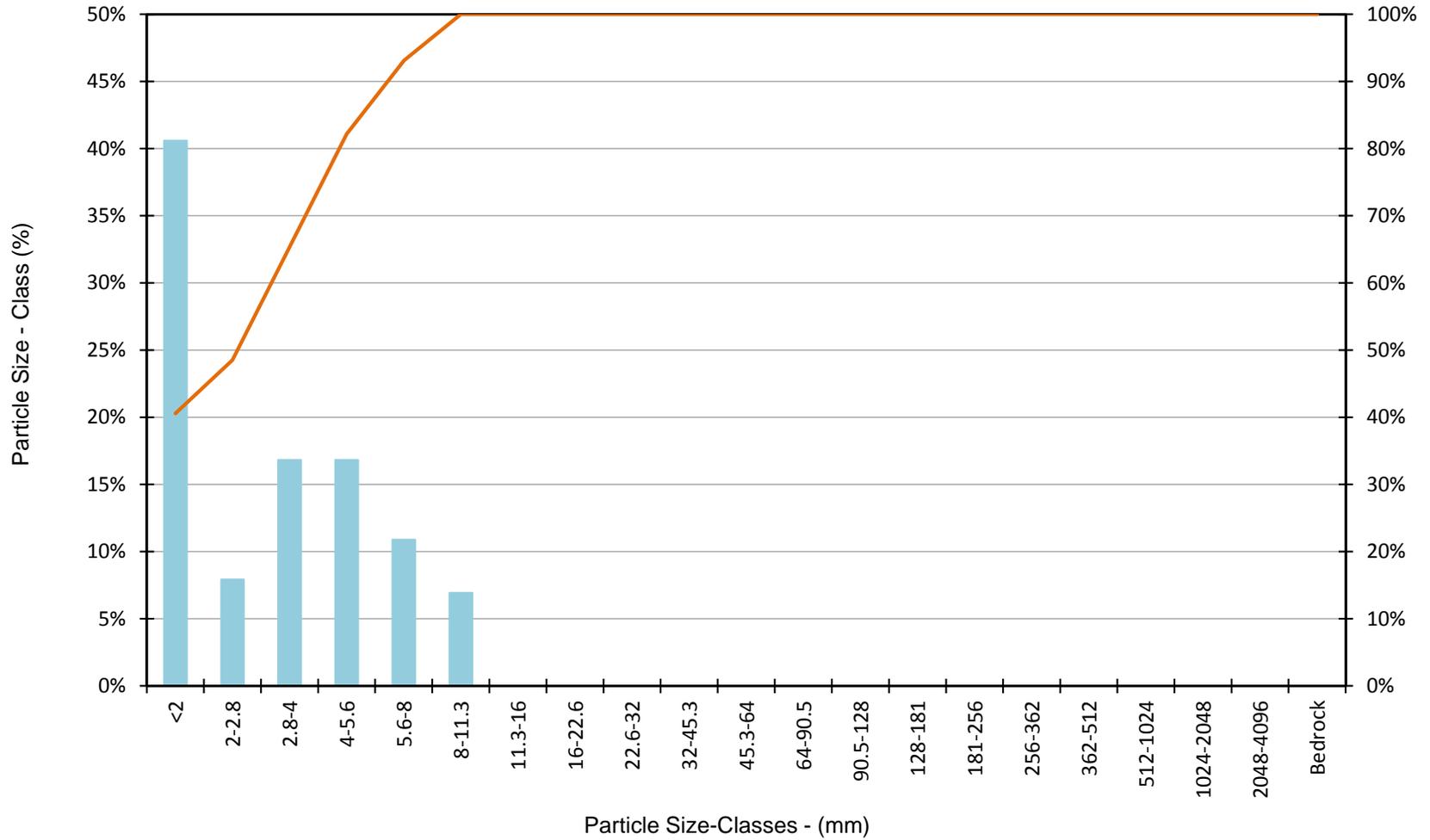
Pebble Count



Bed Particle Size Distribution, Station 470, Upper Edgewood at Edgewood Creek

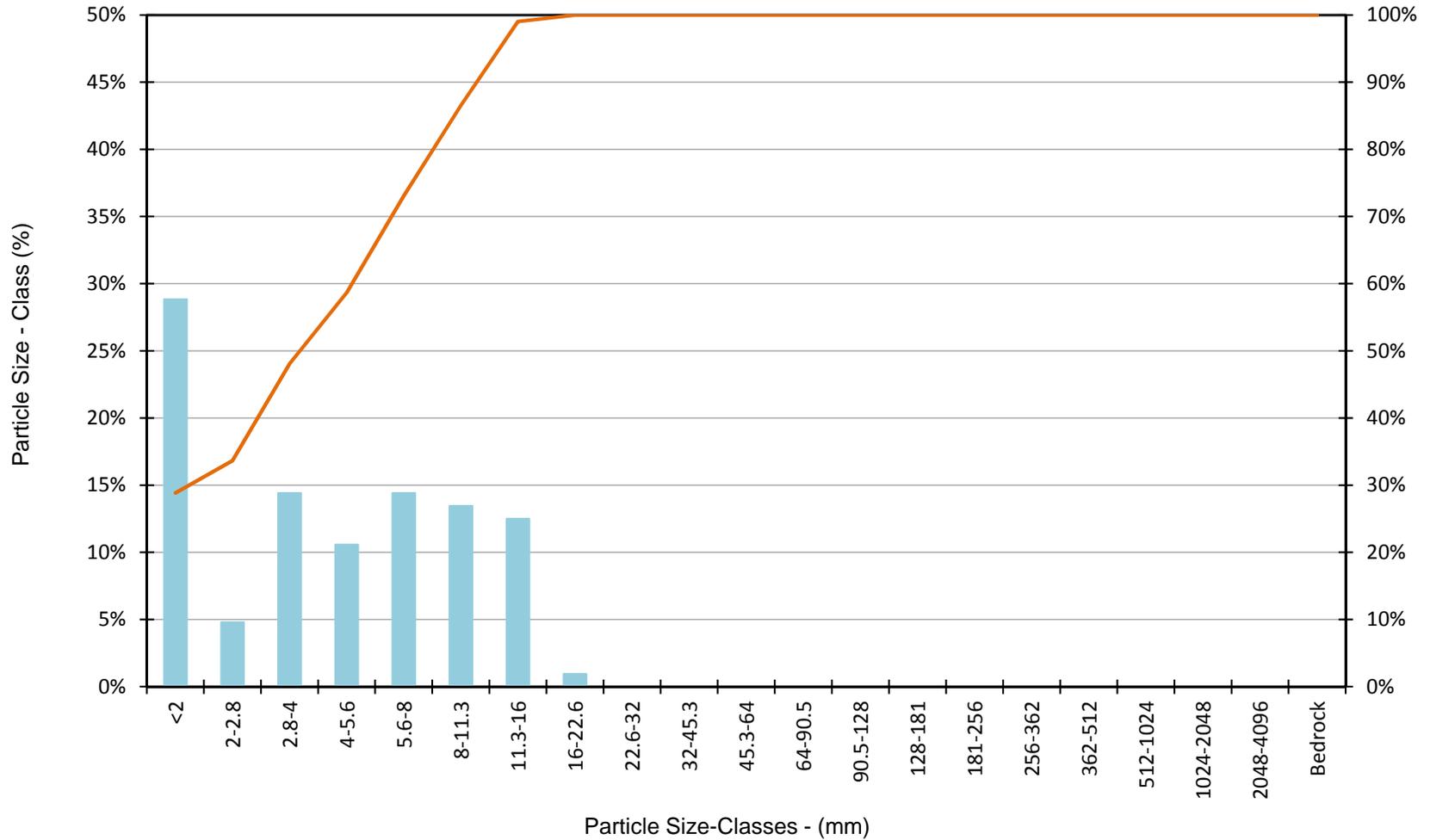
Lower Edgewood, Edgewood Creek (Station 20)

Pebble Count



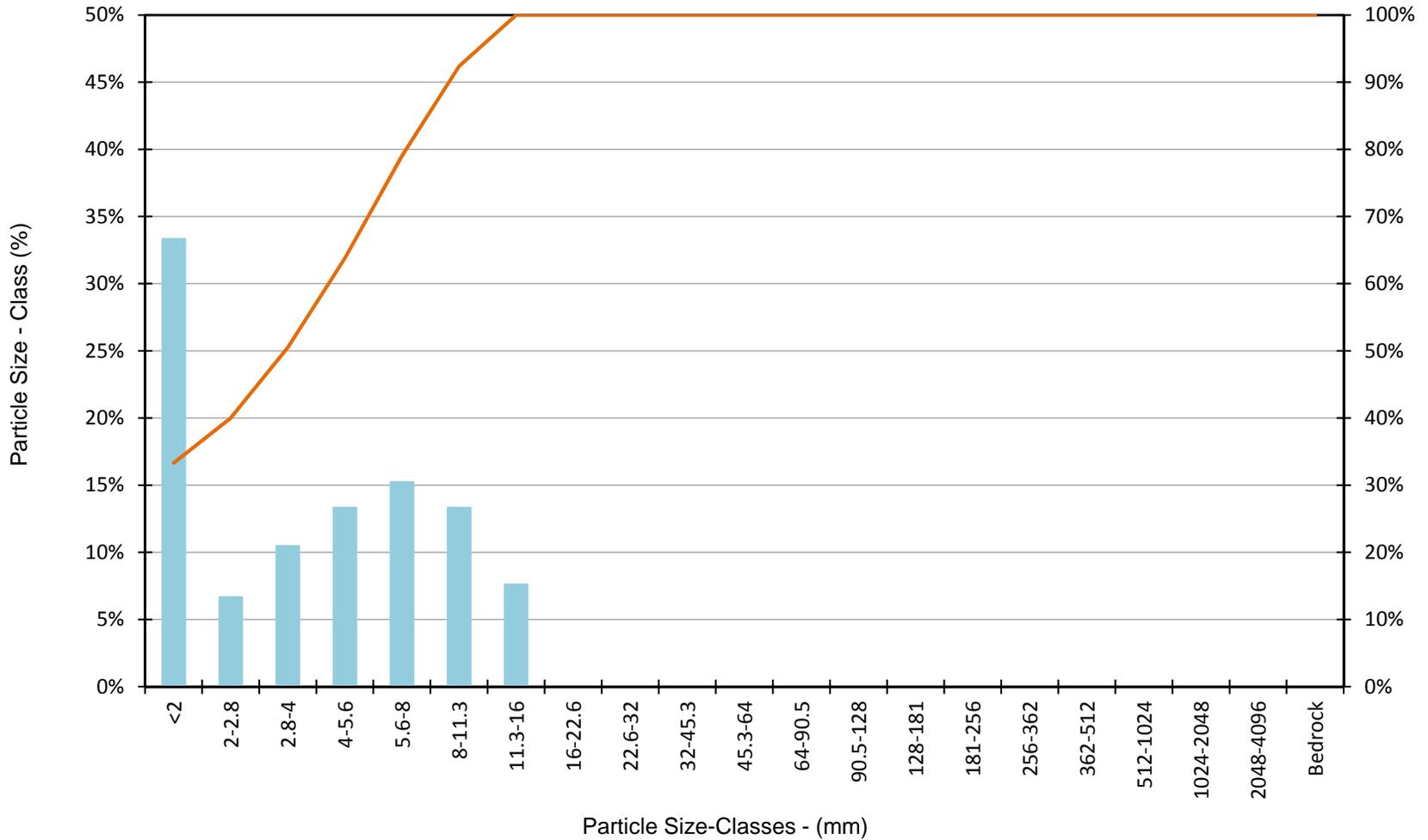
Bed Particle Size Distribution, Station 20, Lower Edgewood at Edgewood Creek

Lower Edgewood, Edgewood Creek (Station 116) Pebble Count



Bed Particle Size Distribution, Station 116, Lower Edgewood at Edgewood Creek

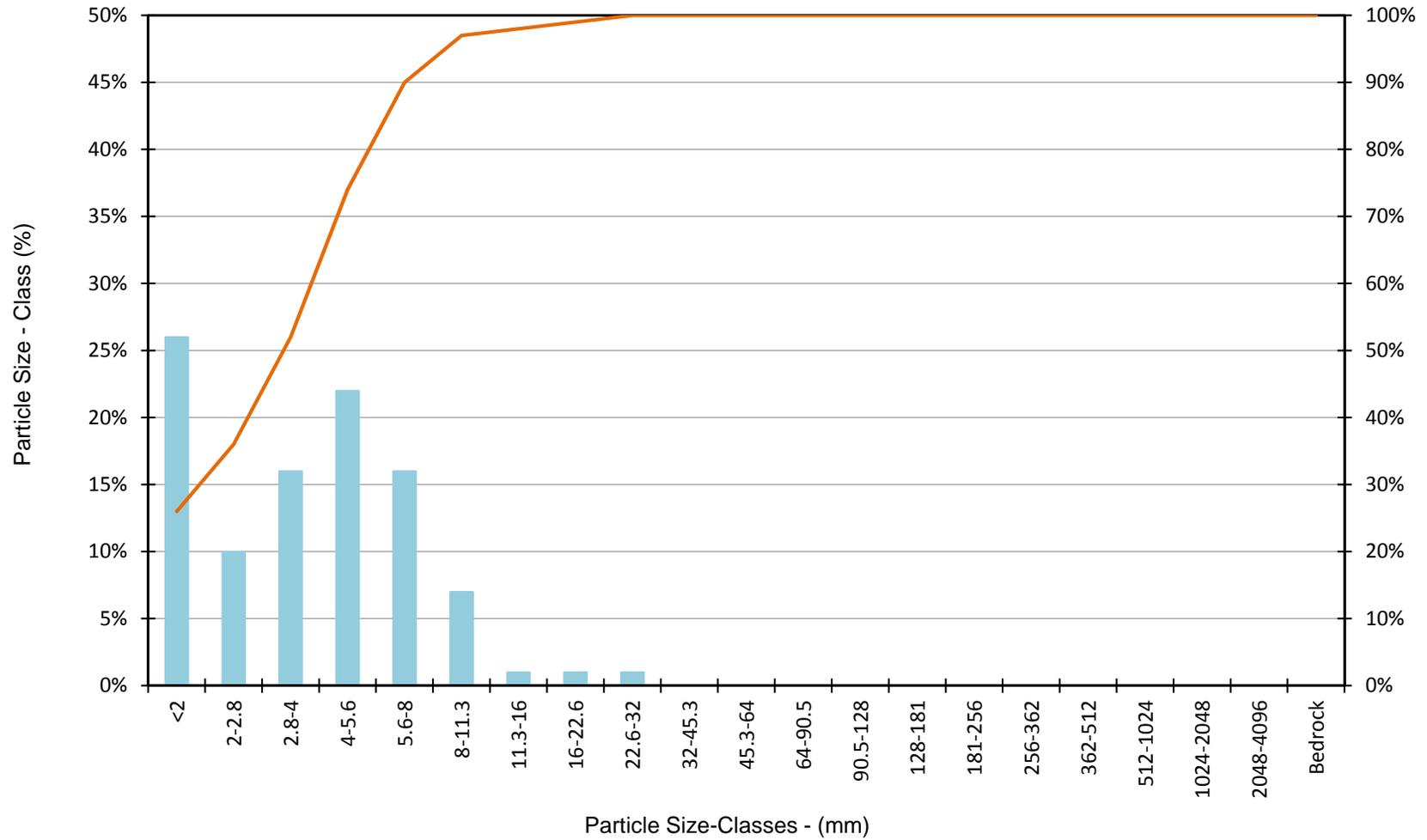
Lower Edgewood, Edgewood Creek (Station 242) Pebble Count



Bed Particle Size Distribution, Station 242, Lower Edgewood at Edgewood Creek

Lower Edgewood, Edgewood Creek (Station 264)

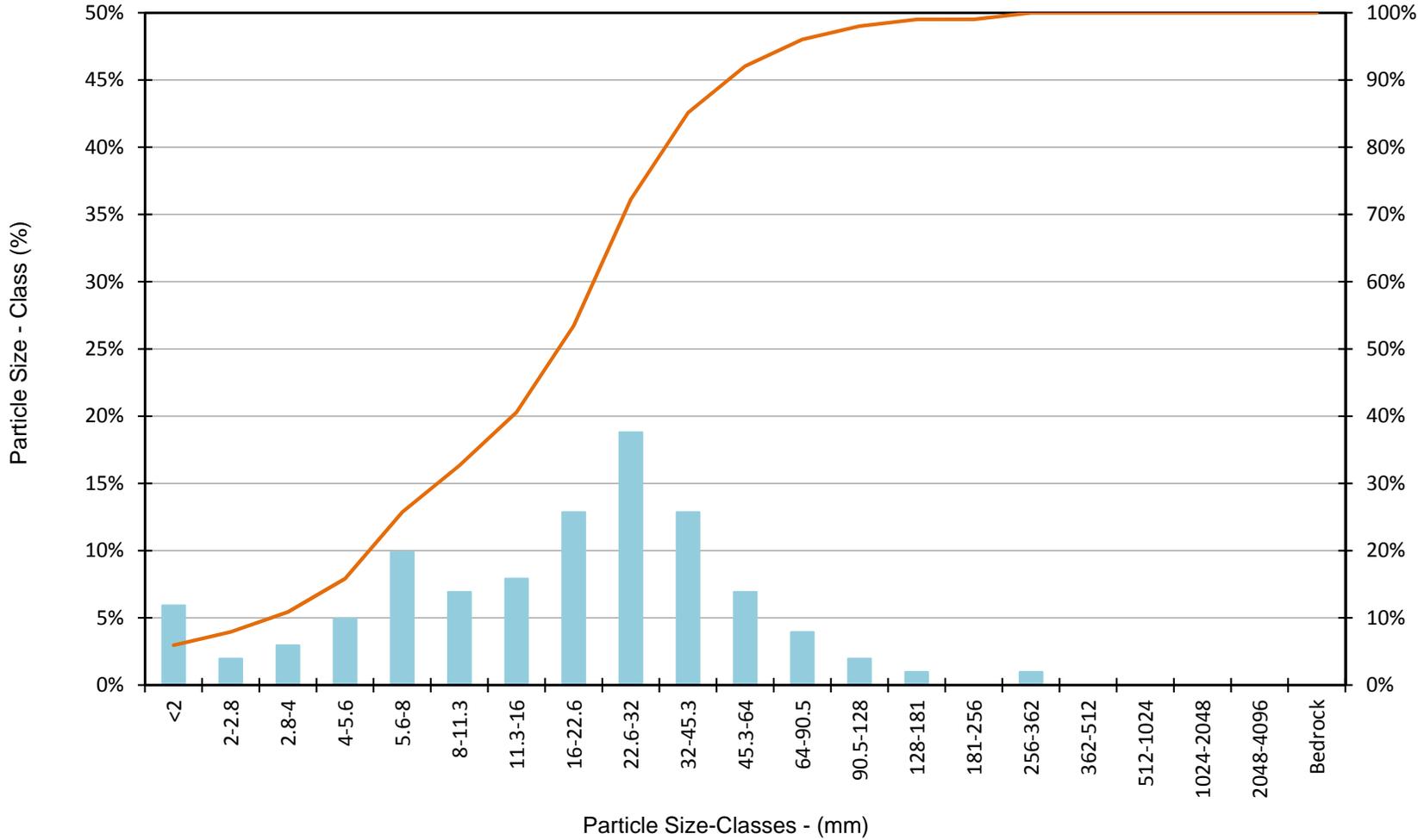
Pebble Count



Bed Particle Size Distribution, Station 264, Lower Edgewood at Edgewood Creek

Upper Daggett, Daggett Creek (Station 25)

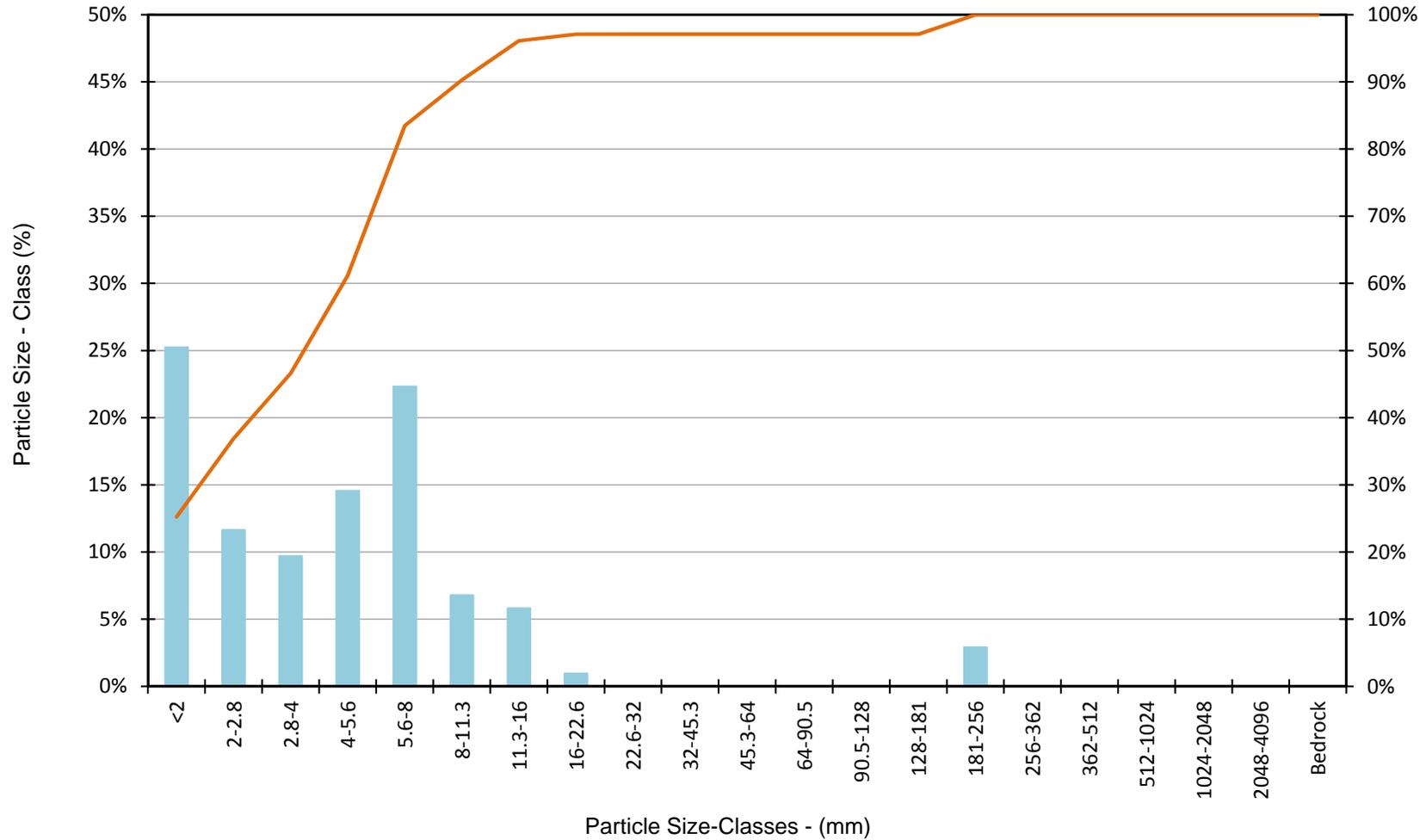
Pebble Count



Bed Particle Size Distribution, Station 25, Upper Daggett at Daggett Creek

Upper Daggett, Daggett Creek (Station 205)

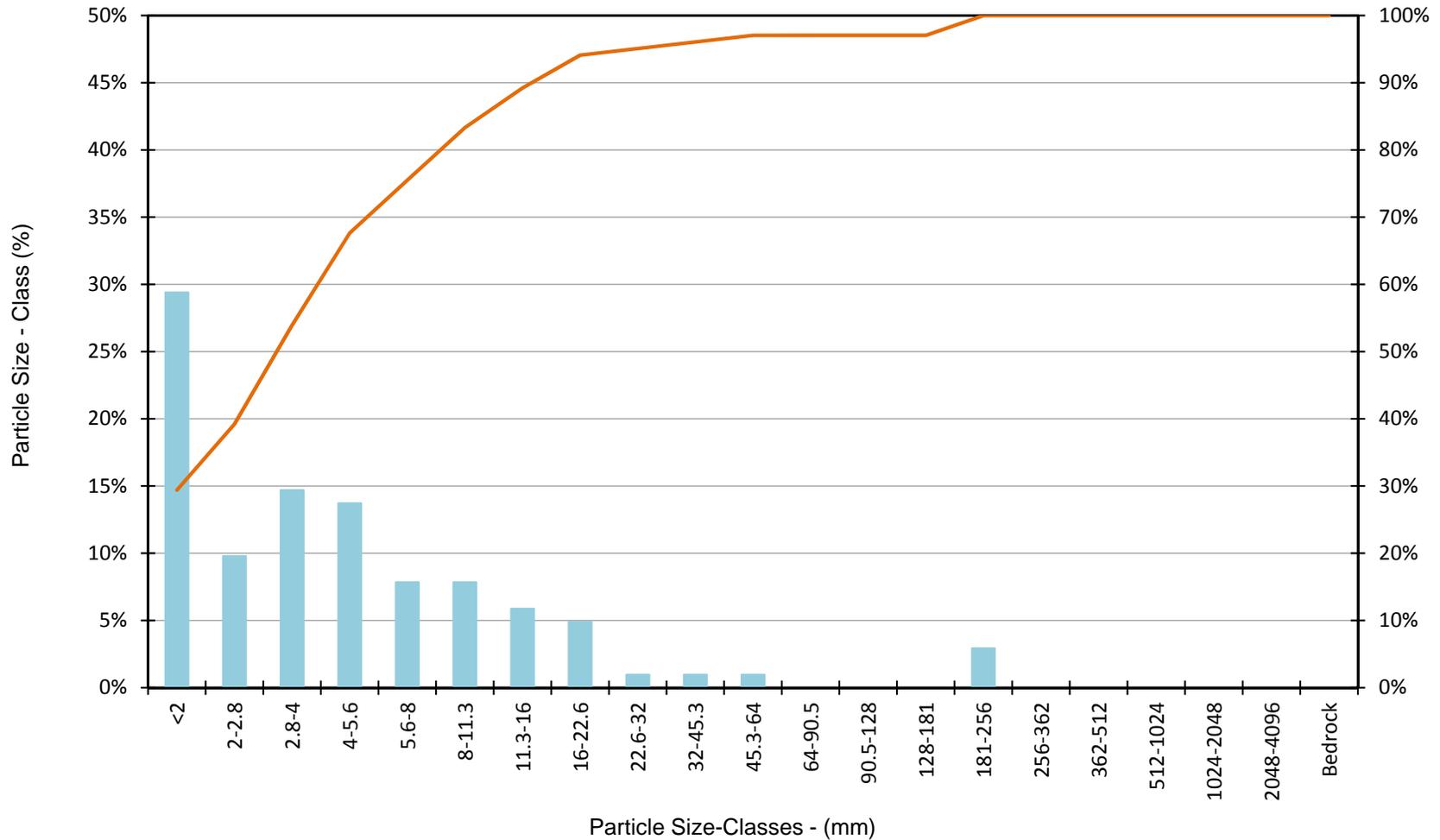
Pebble Count



Bed Particle Size Distribution, Station 205, Upper Daggett at Daggett Creek

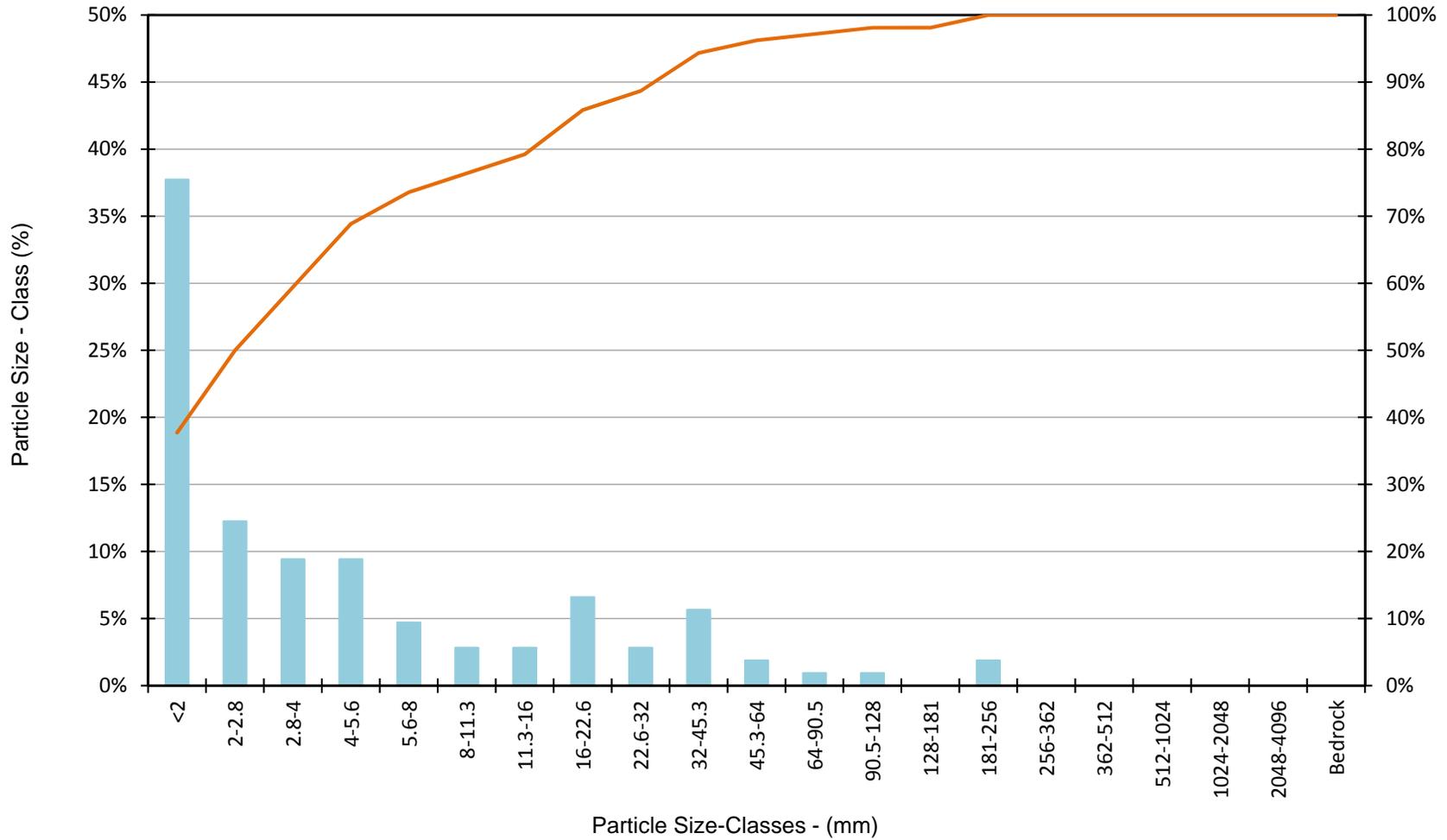
Upper Daggett, Daggett Creek (Station 231)

Pebble Count



Bed Particle Size Distribution, Station 231, Upper Daggett at Daggett Creek

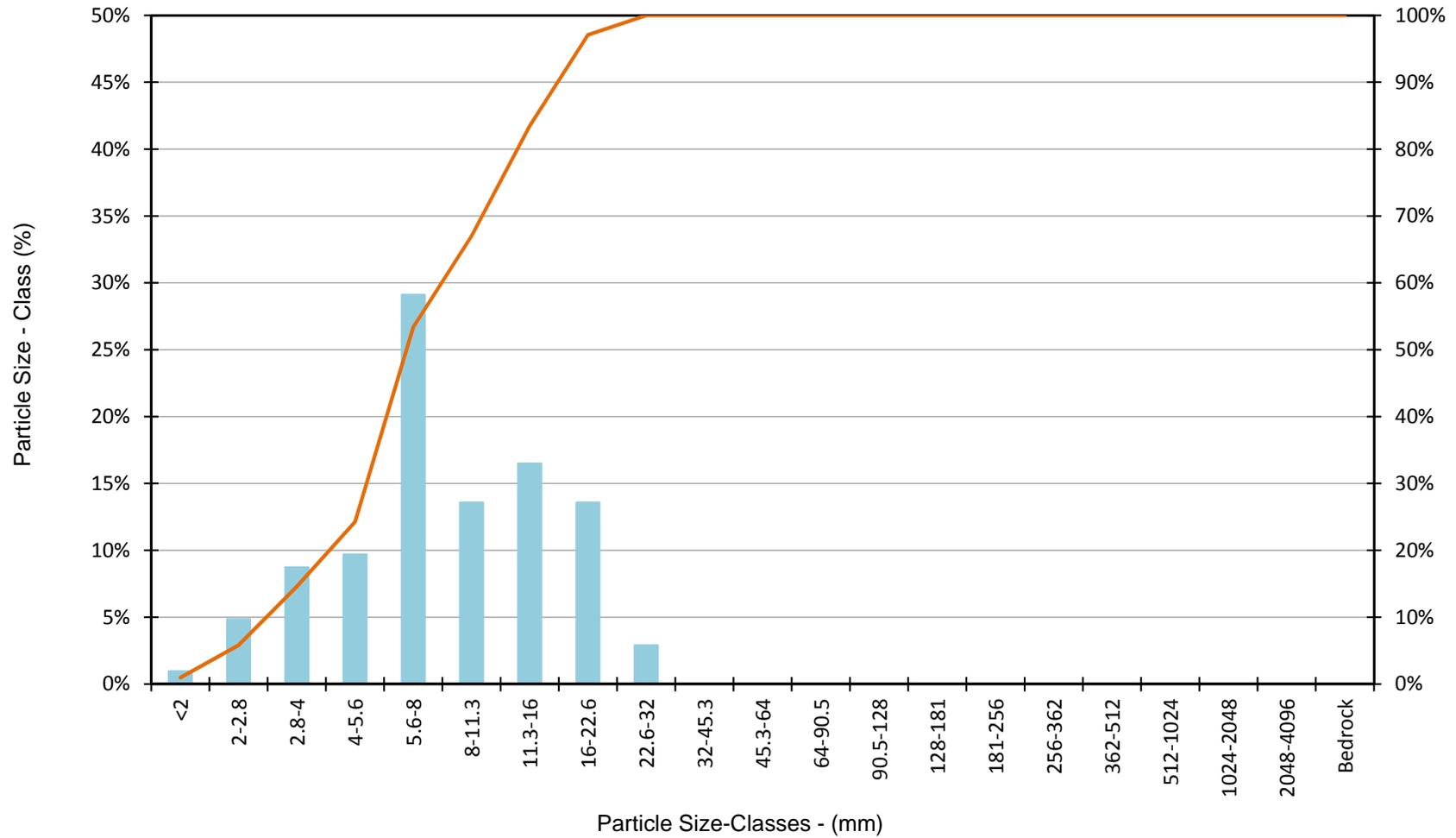
Upper Daggett, Daggett Creek (Station 290) Pebble Count



Bed Particle Size Distribution, Station 290, Upper Daggett at Daggett Creek

Lower Daggett, Daggett Creek (Station 50)

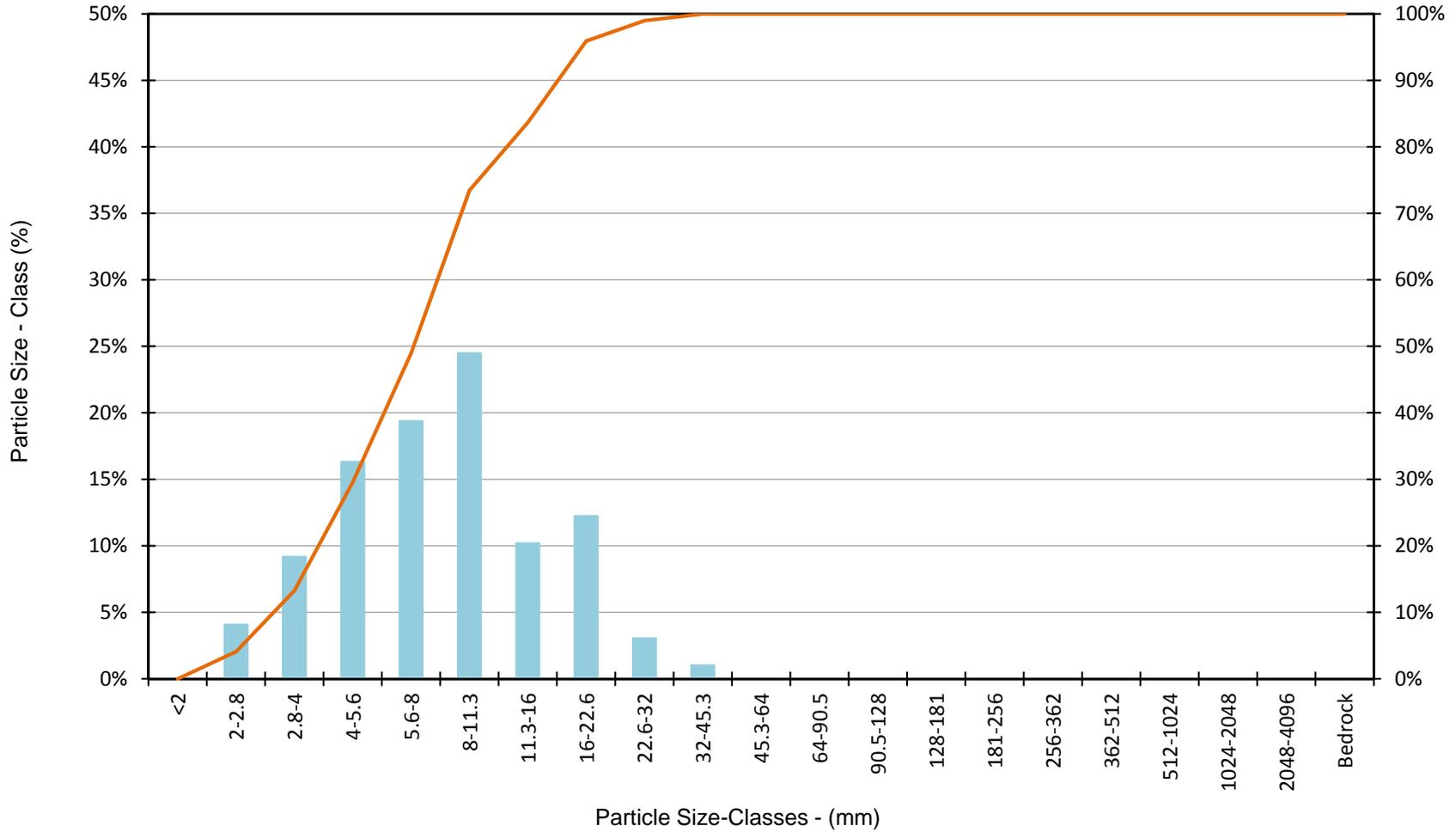
Pebble Count



Bed Particle Size Distribution, Station 50, Lower Daggett at Daggett Creek

Lower Daggett, Daggett Creek (Station 153)

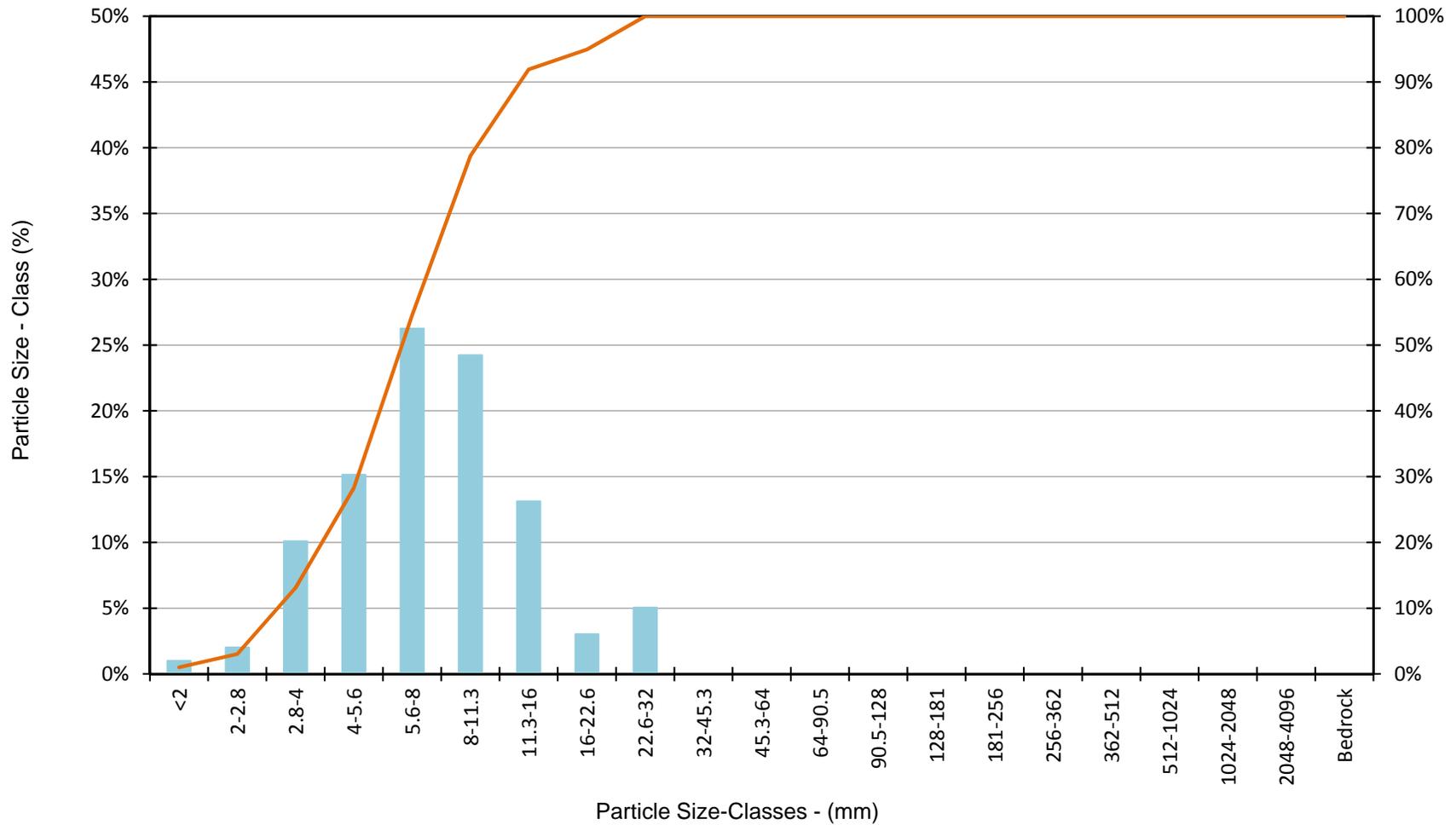
Pebble Count



Bed Particle Size Distribution, Station 153, Lower Daggett at Daggett Creek

Lower Daggett, Daggett Creek (Station 235)

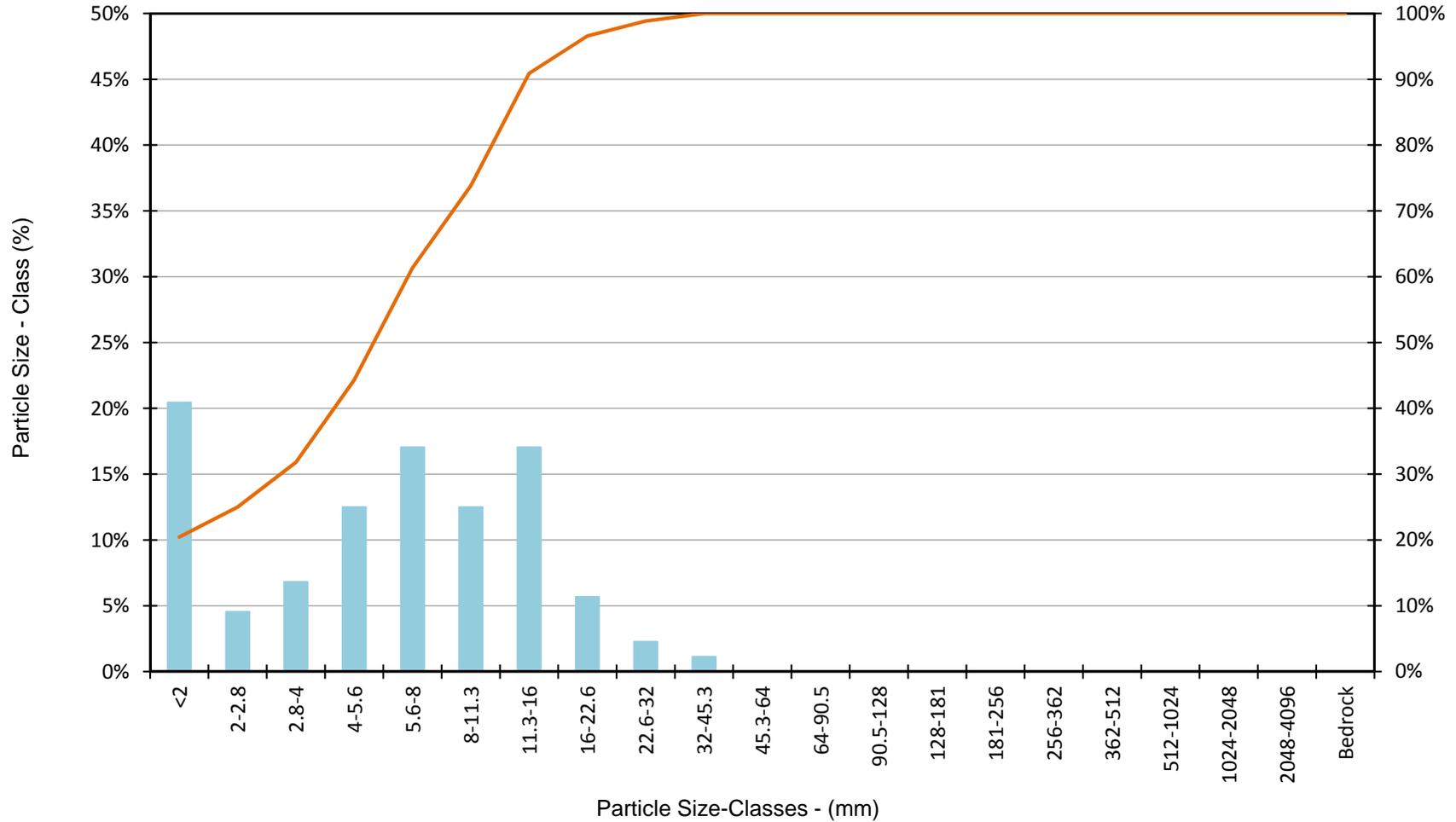
Pebble Count



Bed Particle Size Distribution, Station 235, Lower Daggett at Daggett Creek

Lower Daggett, Daggett Creek (Station 370)

Pebble Count



Bed Particle Size Distribution, Station 370, Lower Daggett at Daggett Creek

Mitigation and Monitoring Plan Annual
Report (October 2014 – September 2015)

APPENDIX XIV
FOREST SERVICE OLD GROWTH
COMPLETION LETTER

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United States
Department of
Agriculture

Forest
Service

Lake Tahoe Basin
Management Unit

35 College Drive
South Lake Tahoe, CA 96150
530 543-2600

File Code:

Date: March 19, 2009

Andrew Strain
Heavenly Mountain Resort
PO Box 2180
Stateline, NV 89449

Dear Andrew,

The High Meadows stand identified for hand thinning to improve long-term habitat conditions for northern Goshawk per the Heavenly Master Plan Amendment was treated in the fall of 2007. All contract work was completed and accepted per the contract requirements on December 6 2007. I will fax you the signed copies of the Certificate of Final Inspection and the Contract Release for this project for your records. If you have questions, please give me a call at (530) 543-2687.

Sincerely,

SCOTT PARSONS
Contracting Officer's Representative



U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE CERTIFICATE OF FINAL INSPECTION <i>(Reference FSH 6309.31)</i>	CONTRACT NUMBER AG-9A63-C-08-0015
	UNIT LTBMU
	PROJECT South Shore hand Thin 2007
TO: Matthew Gagnon CONTRACTING OFFICER	NAME AND ADDRESS OF CONTRACTOR Central Valley Forestry 18985C Road 256 Exeter, CA 93221

I hereby certify that the final inspection of the work under the above contract was made on 12-6-07.

The last day on which work was performed was 12-6-07 after which no calendar days should be charged against time. All materials have been furnished, all the work has been performed, and all the construction required by the contract in accordance with its terms has been completed.

A copy of the inspection report is enclosed.

Enclosure(s)

SIGNATURE Robert Guebard	TITLE Contracting Officer's Representative	DATE 12-6-07
------------------------------------	--	------------------------

Matthew 12-10-07

12/10/2007 14:37 FAX 530 543 2893

USDA FOREST SERVICE

005

FS-6300-18 (11/10)

USDA - Forest Service CONTRACT RELEASE (Reference FSH 6309.11)	CONTRACT NUMBER AG-0A63-C-08-0015
	UNIT LTBMU
	PROJECT South Shore Hand Thin 2007
TO: Matthew Gagnon CONTRACTING OFFICER	NAME AND ADDRESS OF CONTRACTOR Central Valley Forestry 18985C Road 258 Exeter, CA 93221

In consideration of the receipt of final payment in the amount of \$ 84,385.00 the undersigned hereby releases the United States of America from any and all obligations arising under this contract and any modifications thereof except as reserved below.

Reservations:

none

 12/10/07
 Date (mm/dd/yyyy)

 Central Valley Forestry
 Contractor

By _____

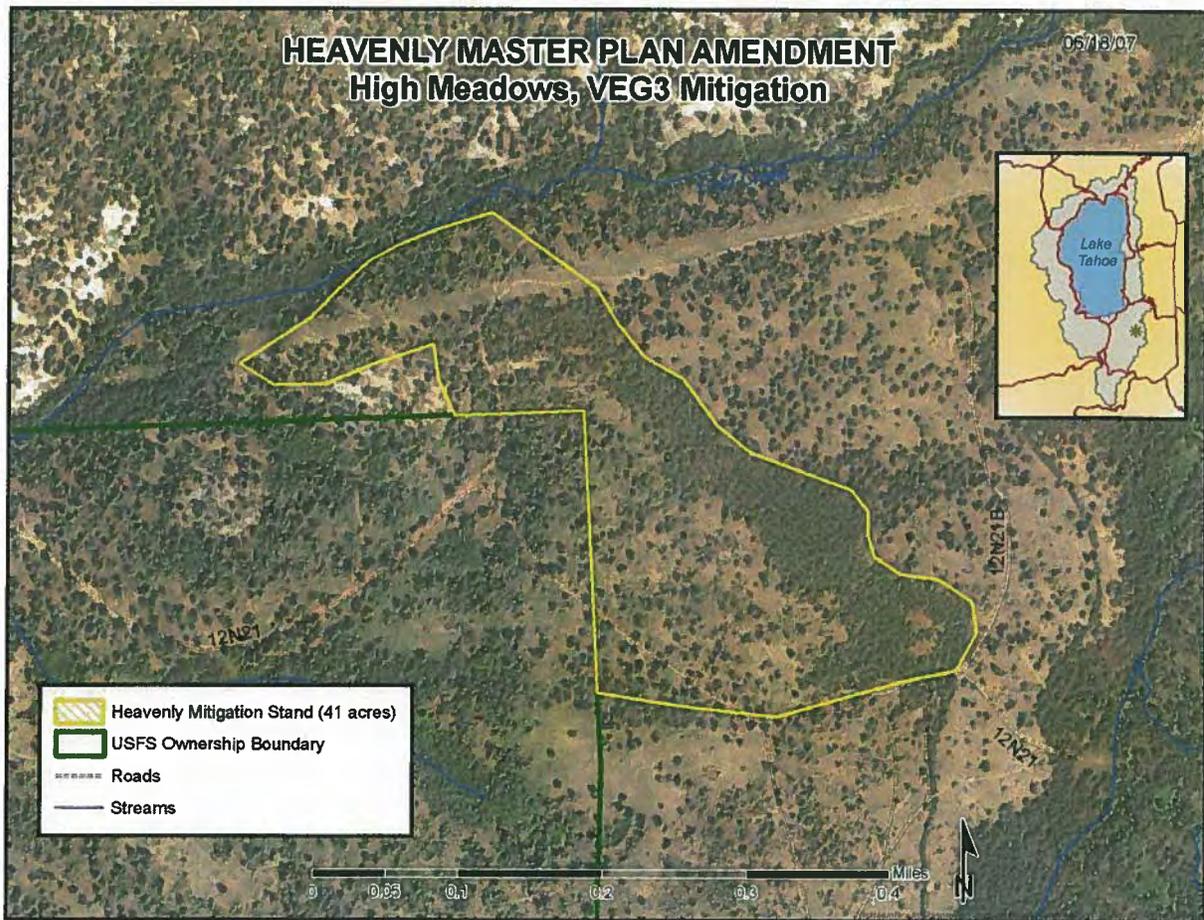
 Title Owner

7.5-25 Late Seral/Old Growth Forest Enhancement

To mitigate for any projects that involve the removal of late seral/old growth suitable habitat, Heavenly must enhance or restore twice the area to late seral/old growth characteristics.

Heavenly enhanced/restored a stand of forest equal to twice the area proposed for removal in the Master Plan Amendment. The enhanced forest was restored during the fall of 2007 and is located in the High Meadows area and is undergoing monitoring by the Forest Service every five years for success. The next monitoring report will be conducted in 2012. The Forest Service documentation certifying of completion of this task is located in Appendix XIII. (Text copied from the 2011 report.)

On May 1st 2013, Forest Silviculturist Rita Mustatia and Assistant VUFF Staff Officer David Fournier visited the Heavenly Mitigation Stand (see map below).



Portions of the mitigation stand included high levels of tree mortality that posed a high risk of stand replacing fire and relatively large older trees that were susceptible to bark beetle mortality.

The objectives of the mitigation were three-fold: 1) To reduce the fire hazard to the older forest portion of the stand, and 2) to improve the resiliency of the old forest stand to fire and insects, and 3) to monitor natural regeneration of early seral portions of the stand.

The result of the site visit to monitor the completion of these objectives proved satisfactory. The high levels of lodgepole mortality (from Mountain Pine Beetle) were cut, piled and burned, reducing the risk of stand replacing fire. The understory in the older portions of the stand was thinned to levels that would effectively improve resiliency for the long-term. There was evidence of adequate stocking of naturally regenerating seedlings throughout the treated area of the stand.

The photos below highlight the result of these treatments:

Photo 1: Reduction of fuel hazard and follow-up prescribed burning



Photo 2: Natural regeneration occurring within the stand.



Photo 3: Enhancement of older forest portion of the stand.



Photo 4: Enhancement of older portion of the stand.



This report certifies that the treatment goals for the mitigation stand have been met. As a result of the monitoring conducted, there is no further need for monitoring.

David P. Fournier

David Fournier, Assistant Staff Officer

4/10/2014

Rita Mustatia

Rita Mustatia, Silviculturist

4/10/2014

About Cardno

Cardno is a professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage and deliver sustainable projects and community programs. Cardno is an international company listed on the Australian Securities Exchange

Contact

Zephyr Cove

295 Highway 50

Suite 1

PO BOX 1533

Zephyr Cove, NV 89448

Phone +1 775 588 9069

Fax +1 775 588 9219

cardno@cardno.com

www.cardno.com

