

3 EASY STREET RUN HAZARD REDUCTION AND DEMONSTRATION PROJECT

I. Background

“Easy Street,” ski run located near the top of the Gondola, was approved in 1999 as a component of the Gondola Project. At that time, it was identified as Ski Run 81. The entire project, including the ski runs, was analyzed in the 1998 *Gondola Project Environmental Assessment*. The lower section of the run was implemented in 2000 with the remainder of the project completed in 2003. The entire run was implemented in a manner consistent with ski run prescriptions outlined in the *Tamarack Express Environmental Assessment* (1996) for ski runs 29, 29a, and 81 (Cascade, Sam’s Dream, and Tamarack Return), which were implemented in 1997.

In 2003, the Big Easy chairlift was implemented. It provides access to Easy Street and other ski runs near Von Schmidt’s Flats. In 2004, a below ground snowmaking system is being installed as approved in the Gondola Project. At the same time, skier safety and hazard reductions which were included and approved as a part of the Permanent BMPs included in the Project Description (Gondola Project Draft EA Section 2.5) will also be implemented. This paper outlines the implementation and monitoring methods to be used for the skier safety and hazard reductions.

II. Site Description

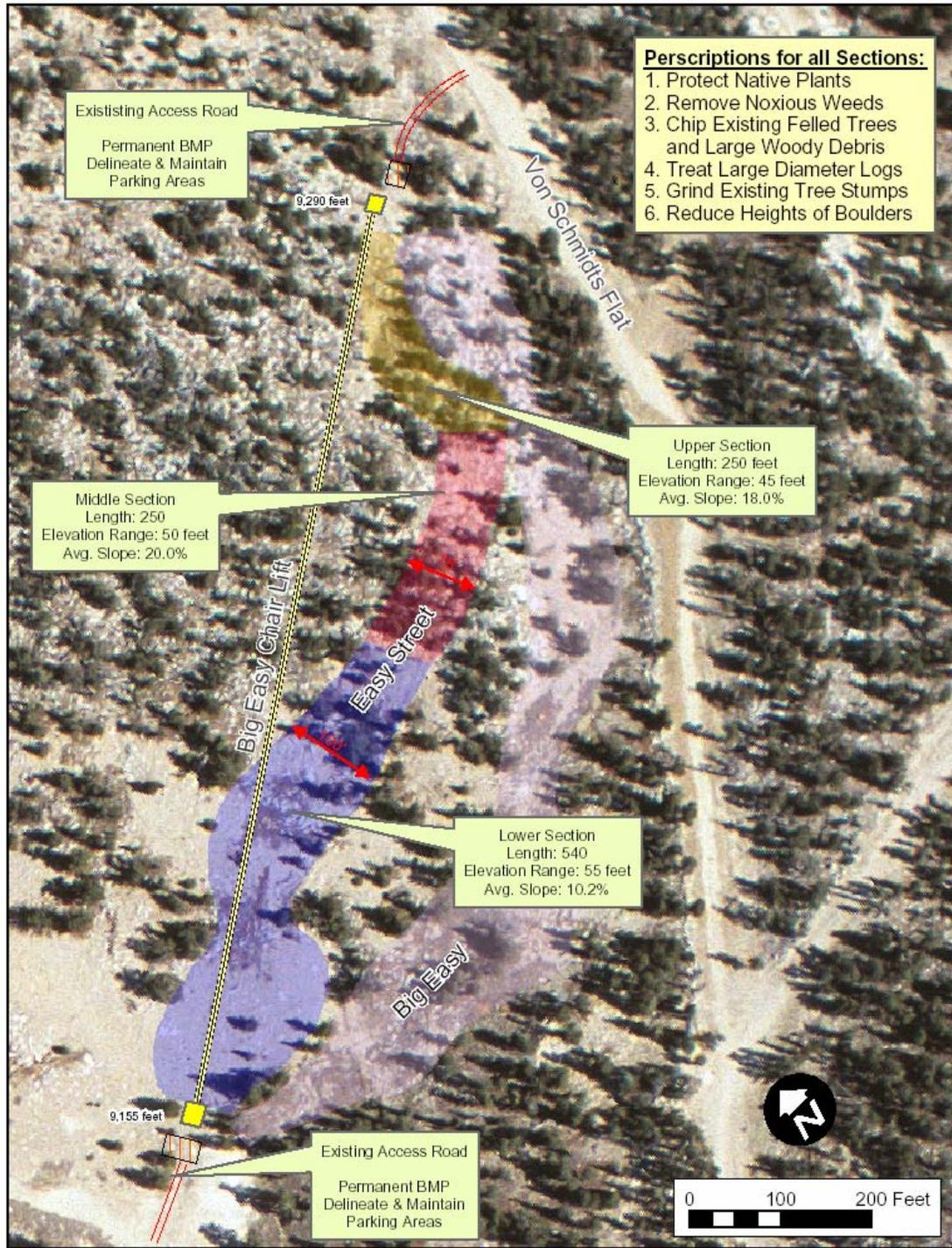
Easy Street is located in a portion of upper Heavenly Valley Creek, watershed CA-1. General ski run characteristics for Easy Street are provided in Table 1. The existing effective soil cover and gradients are variable across the project area. In response to these variable conditions, the run can be characterized into three separate segments: “Upper Section,” “Middle Section,” and “Lower Section.” Figure 1 illustrates the three sections and provides general descriptions.

TABLE 1: Ski Run Characteristics for Easy Street

Source: *Heavenly Ski Resort, 2004.*

Run Length:	1,040 ft
Run Width:	50-200 ft variable width
Elevation:	9,280 ft to 9,150 ft
Average Gradient:	16.06%
Existing Effective Soil cover:	Boulders Felled trees and associated large woody debris Stumps Native shrubs
Existing Erosion:	To be determined during pre-project monitoring

Existing conditions along the Upper Section are illustrated in Photo 1. The Upper Section includes a 250 foot run segment with numerous large boulders, felled trees, and large woody debris. Photo 2 depicts the area of the Middle Section commonly referred to as the “Rocky Knoll.” An additional portion of the 250 foot Middle Section is presented in Photo 3. Photo 4 presents existing conditions along Lower Section (540 ft) of the project area. This section has coverage in the form of boulders, felled trees, large woody debris, and transitions into bare ground with sparse shrub and rock cover towards the lower portion of the run. The Upper, Middle, and Lower sections are addressed separately due to differences in slope and total effective soil cover.



Heavenly
Ski Resort

**Easy Street Run Hazard Reduction
and Demonstration Project**

PARSONS

FIGURE 1: Easy Street Run Hazard Reduction and Demonstration Project sections.



PHOTO 1: The Upper Section has areas of bare ground and a few felled trees and corresponding stumps. However, large boulders are the primary coverage. The average slope is 18%. While overall height of effective soil cover will be reduced to between 12 and 18 inches, total effective soil cover may increase due to better placement of large woody debris and native mulch application. The upper section is delineated as the first 250 feet of the ski run, beginning at the top station of Big Easy moving down slope.



PHOTO 2: The Middle or “Rocky Knoll” Section has an average slope of 20% with effective soil cover mainly in the form of large boulders, medium-sized felled trees, and corresponding stumps. Existing conditions demand a snow base of close to 72 inches for adequate and safe coverage of large boulders and felled trees.



PHOTO 3: The Middle Section of Easy Street, with an average slope of 20% is also covered by large boulders, felled trees, and stumps, but amounts and average heights of effective soil cover are less extreme than the “Rocky Knoll” area.



PHOTO 4: The Lower Section of the project area is partially illustrated in the photo above. The remainder of the lower portion has less large woody debris and more areas without coverage. The average slope of the Lower Section is 10.2%.

III. Purpose and Need

For several ski runs within the resort, including Easy Street, a need exists to reduce dependency on man-made snow and associated resource use (i.e., water, electrical), while continuing to provide for skier safety and a consistent, high quality recreational opportunity. With existing effective surface cover heights along Easy Street, a snow depth of no less than 36 inches is necessary to provide coverage of obstacles (mainly poorly placed logs, tree stumps cut at two to three feet and large boulders) along the run prism (Photo 1). An additional 24 inches of snow is needed to provide for skier safety and grooming operations. In the Middle Section, the area referred to as the “Rocky Knoll” typically requires a minimum of 72 inches of snow depth to provide for skier safety and operation of the lift (Photo 2).

During the 2003-2004 ski season, natural snow was collected on site with wind fences and harvested from adjacent areas during grooming operations in order to supply and maintain adequate snow cover on this high use, beginner-level ski run. Harvesting additional snow is time consuming and potentially damaging to snow grooming equipment. A below ground snowmaking system will be installed in 2004 as approved in the Gondola Project EA. With existing run cover conditions, potential snowmaking operation and energy costs are estimated at \$30,000 to \$35,000 to provide for and maintain a safe snow depth of 36 inches. Additional costs may accrue as a result of equipment damage sustained during grooming operations. By decreasing the effective surface cover heights, operation and energy costs will be reduced by approximately two-thirds.

Implementation of the Easy Street Run Hazard Reduction and Demonstration Project is coordinated with the installation of the snowmaking system and the associated best management practices (BMPs). The demonstration project is proposed on Easy Street because it is of low environmental risk due to gentle slopes, notable absence of an active stream channel, and adequate distance to receiving waters with sufficient forested vegetation buffers.

IV. Project Objectives

- Reduce height of existing effective surface cover (felled trees, large woody debris, stumps, and boulders) to between 12 to 18 inches;
- Reduce consumption of electrical energy and water resources;
- Attain and Maintain the 70% total effective surface cover as required by the Cumulative Watershed Effects (CWE) Analysis;
- Provide a variety of surface cover for wildlife microhabitat.

V. Project Prescriptions

The following prescriptions which are included in the permanent BMP section of the Gondola Project Description (Draft EA, page 2-46), will be implemented in all project areas (Upper Section, Middle Section, and Lower Section). A combination of prescriptions, outlined below, will be field-verified by Heavenly representatives and those of other agencies in order to achieve the stated objectives.

A. Prescription 1: Protect Native Plants and Revegetate

- Existing Native shrubs in the treatment areas will be field identified and avoided to the greatest extent possible;
- Within the snowmaking construction corridor, revegetation activities will be completed as planned.

B. Prescription 2: Remove Noxious Weeds

- Noxious weeds shall be flagged by a qualified Heavenly representative or consultant, isolated from project activity, and reported to the Lake Tahoe Basin Management Unit's (LTBMU) Ecosystem Conservation Department for formal taxonomic identification and removal activity scheduling.

C. Prescription 3: Chip Existing Felled Trees and Large Woody Debris (less than 10 inches)

- Existing felled trees and logs less than 10 inches will be treated in the same manner. The following options will be implemented in combination:
- All existing limbs shall be either chipped and spread evenly or scattered where the maximum height does not exceed 12 to 18 inches;
- Existing felled trees shall be chipped and the resulting mulch evenly distributed to an average depth of three inches.

D. Prescription 4: Treat Existing Large Diameter Logs (greater than 10 inches)

Large diameter logs cannot be mechanically chipped and will be treated separately as described below.

- Existing large diameter logs shall be remove from run with excavator on site for snowmaking construction;
- Logs shall be placed in adjacent forested areas off of the designated ski run to mimic natural surroundings;
- Logs at the bottom of the steeper Middle Section will be mechanically placed perpendicular to the slope where needed to reduce soil erosion hazards.

E. Prescription 5: Grind Existing Tree Stumps

The following options will be implemented in combination:

- Stumps shall not be removed and soil disturbance will not occur;
- Stumps shall be cut or ground to less than 6 inches in height from the soil surface whenever safely possible;
- Existing rounds shall be removed in order to provide a more natural appearing condition.

F. Prescription 6: Reduce Height of Boulders

- Boulders shall be capped (blasted with explosives) to a height between 12 and 18 inches;
- Boulders will be moved by hand whenever possible, but the excavator onsite for the snowmaking installation may also be utilized;
- Fragments shall be placed as to maximize contact with the soil surface with efforts to mimic the natural surroundings.

VI. Best Management Practices

A. Temporary Best Management Practices

Temporary BMPs approved in the Gondola EA for the snowmaking system installation will be installed and maintained.

B. Permanent Best Management Practices

Permanent BMPs for both the skier safety and run hazard reduction are prescribed in Section 2.5 of the Gondola EA. In addition to the BMPs listed, following measures will be added:

- Delineate and maintain designated vehicle parking areas at Big Easy Lift top and base stations;
- Install proper signage identifying closure of the area to summer use;
- Install summer interpretive signage describing the objectives of Easy Street Run Hazard Reduction and Demonstration Project.

VI. Monitoring Plan

The following Monitoring Plan will be implemented to determine if the stated objectives are achieved. The monitoring activities will utilize the Effective Soil Cover Protocols for the existing *Heavenly Ski Resort Monitoring Program* lead by the LTBMU. Additionally, digital photograph documentation will also be taken.

A. Monitoring Objectives

- Determine and compare pre- and post-project conditions;
- Evaluate effectiveness of stated prescriptions in prevention of erosion;
- Determine the appropriateness of prescriptions for utilization on existing and future ski runs within the resort.

B. Monitoring Activities

1. Pre-project Effective Surface Cover Evaluation, Photopoint Establishment, and Reporting (June 2004)
 - Describe existing conditions;

- Determine existing effective soil cover percentage and make up;
 - Identify potential erosional features.
2. Post-Project Effective Surface Cover Evaluation/Photo Documentation (September/October 2004)
- Describe post-project surface conditions;
 - Determine the post-project effective surface cover percentage and composition;
 - Determine if prescriptions were implemented correctly and completely.
3. Post-Treatment Storm Evaluation, Photo Documentation, and Reporting (Weather Dependent)
- Determine the effectiveness of prescriptions during and/or following significant storm events (as soon as access permits);
 - Determine erosion impacts and where applicable, the distance of soil mobilization;
 - Include results as part of the *Heavenly Ski Resort Annual Monitoring Report*.
4. Seasonal Runoff Evaluation, Photo Documentation, and Reporting (June/July 2005)
- Determine if prescriptions are effective during spring runoff period;
 - Determine erosion impacts and when applicable, the distance of soil mobilization;
 - Monitor long term effectiveness for erosion control;
 - Include results as part of the *Heavenly Ski Resort Annual Monitoring Report*.
5. Noxious Weed Monitoring
- Visual monitoring for noxious weeds will continue during long term maintenance activities;
 - If encountered, noxious weeds will be flagged and reported to LTBMU's Ecosystem Conservation Department for formal taxonomic identification and removal scheduling.

C. Long Term Maintenance Activities

Long term maintenance activities will be determined by monitoring, as the demonstration project is considered an iterative and adaptive process to be continually improved upon as monitoring objectives are realized, including the need and ability to maintain 70% effective surface cover and the success of delineating parking areas over time.

VIII. Adaptive Management Considerations

Following the completion of the Easy Street project and field review by TRPA, Forest Service, Lahontan and Heavenly personnel in 2005, the following adaptive management practices were recommended and will be incorporated into subsequent run hazard reduction projects. The adaptive management practices can be grouped into the areas of improving soil resources, improving wildlife habitat, improving visual quality, incorporating underground utilities into the project, and construction techniques. They are as follows:

A. Improving Soil Resources

- Test soil permeability prior to design in order to assist in designing effective prescriptions. Retest following two-three years after project completion to better understand the effects of snow grooming equipment;
- Rather than simply spreading the wood chips or other organic material on top of the soil, use the aged organic material from the Heavenly stockpile to blend into the on-site soil when possible based on site constraints; and
- When using the aged material is not possible, till wood chips into the on-site soil rather than spreading them over the top of the soil.

B. Improving Wildlife Habitat

- Leave all shrubs and groundcover that are 18" in height or less on the run;
- Plant native shrub or groundcover seedlings in certain areas where they are most likely to survive that mimic the surrounding shrub and groundcover populations where possible in order to encourage plant establishment and provide shelter for rodents (this technique will also provide water quality benefits);
- Leave some areas of bare soil in order to serve as seed caches for rodents and birds;
- When placing rock on the slope, create pockets within groups of rock and create rock ledges with overhangs in order to provide refuge for rodents and small mammals;
- Rocks that are capped should have any removed pieces that are intact left on the run and arranged in such a manner that leaves overhangs and other spaces for wildlife shelter;
- Provide variety of higher heights of rock, not simply the minimum height of 12 inches (this technique will also provide visual quality benefits).
- Logs equal to or less than 18" diameter will be trimmed of branches so that all branches that are lower in height than the diameter of the log remain in order to provide micro-scale habitat for rodents and small mammals;
- Logs between 12" and 18" diameter should be present in densities at or greater than the surrounding forest or no less than 10 logs per acre, whichever is greater;
- Logs should be aligned across the slope on the ground surface; and
- Logs greater than 18" diameter shall be moved to the edge of the run and aligned across the slope so that the portion of the log that is 18" or less in diameter is left within the run.

In some cases, it may be desirable to leave larger diameter logs in place in the run (up to 24" diameter). In those cases, the prescriptions may be modified to account for larger diameter logs left and different amounts of logs per acre that will be left in the run.

C. Improving Visual Quality

- Randomly feather logs placed across the slope from the cleared run into the edges of the adjacent forested areas in order to add visual variety and avoid uniform log placement.

D. Incorporating Underground Utilities

- Do not create longitudinal depressions or troughs that can serve as conduits for surface water runoff when installing underground utilities and/or removing large volumes of soil or rock which results in a significant alteration of the slope shape.

E. Construction Techniques

- Select the optimum pieces of equipment given the site conditions to achieve the hazard reduction objectives while minimizing unwanted environmental effects. This will influence the type of prescription that is chosen;
- Consider the timing of the work relative to soil moisture, soil compaction potential, the ability to deliver equipment or materials to an unroaded slope while snow pack still exists; and
- Combine slope hazard reduction work with other tasks such as snowmaking installation in order to complete the work with one entry.