

MEMORANDUM

Date: August 12, 2011

To: Mike Cavanaugh, TRPA Planning Branch

From: Phil Scoles, RPSS, Senior Soil Scientist

Re: California Base Lodge, Heavenly Limited Partnership
Land Capability Challenge, Cagwin CaE to CaD and EbC
LCAP2010-0210 for APN 30-370-04
3860 Saddle Road; South Lake Tahoe, El Dorado County, CS

Site Conditions and Landscape Setting

The subject parcel (APN 30-370-04) is situated on a north by northwest sloping hillside, near the south terminus of Ski Run Boulevard. The study area is the California Base Lodge for Heavenly Mountain Resort (aka Heavenly Valley ski area). The Longitude and Latitude of the California Base Lodge is 38.934806 deg. North and the latitude; - 119.940478 deg. West. Adjacent land uses are mostly residential, both single family and multi-family dwellings, in addition to open space and ski areas.

The site is situated on the lower slopes of the steep hillside that forms the south by southeast side of the Lake Tahoe basin (also known as the Carson Range). Within the site, the south edge (base of steep hillside) has a few outcrops of granitic bedrock and areas of very shallow depth to bedrock. Based on historical mapping, the site was designated in the 1974 Bailey land classification report as "C-1" geomorphic designation for granitic foothills and "C-4" for moderately dissected glaciated lands (i.e. steeper lands). The site is mapped by the 1974 Soil Survey of Lake Tahoe Basin, California and Nevada as Cagwin-Rock Outcrops, 5 to 15 slopes (Class 4 as per Bailey Land Classification), and Cagwin-Rock Outcrops, 15 to 30 percent slopes (Class 2). In addition, TRPA has mapped a Stream Environment Zone (SEZ) in the northwest corner of the subject study area.

The overall landscape of the California Base Lodge is highly modified, consisting of multi-level parking lots, ski lodge, administrative offices, maintenance buildings, medical facilities, ski lift and gondola loading, and related ski resort uses. The vast majority of the landscape has been excavated, filled, graded or a combination of these conditions. The escarpment between the upper and lower parking lot appears steeper than 30 percent slope, but that area is relatively small compared to the overall study area. While some of this escarpment contains willows (suspect of SEZ conditions), the escarpment is composed of fill material (5 to 12 feet thick), it is used for snow storage,

and it is artificially drained. Aside from parking lots, buildings and associated ski area features, the natural ground cover consists of pine, white fir, serviceberry, rabbit brush, gooseberry, prostrate ceanothus, and duff/pine needles. The site currently has slopes ranging from 1 percent (parking lots) to more than 20 percent slopes (extreme south edge, above ski lift loading area).

Methods and Procedures

In October 2010, R.J. Poff & Associates (herein R.J. Poff) conducted a soils investigation for the above-referenced file to determine if soil conditions matched the previously mapped soils types. Soil conditions were observed at three locations using a backhoe and three locations using a bucket auger. The backhoe dug locations provided a thorough examination of the soil profiles immediately south of a tall retaining wall – this is an area that was historically scalped, then filled with many feet of soil. The auger holes allowed rapid verification of similar soil profiles (south of the retaining wall) along the south edge of the study area. In addition, numerous core samples were evaluated from within the parking lot areas (not practicable for backhoe pits considering the inconsistent fill material underneath).

The field investigation by TRPA subcontractor Terra Science, Inc. (senior soil scientist Phil Scoles) coincided with the R.J. Poff field investigation on October 12 and 13, 2010. The field visits involved detailed examination of three soil profiles, several drilling core samples, review of aerial photographs, and examination of adjacent parcels to the east, west, north and northwest. The equipment used in the field investigation included: Backhoe, Montana sharpshooter shovel, bucket auger, soil sieve, tape measure, Munsell soil color charts, water bottles (to moisten soil), clipboard, note paper, digital camera, and hand towel.

In January 2011, R.J. Poff compiled a draft technical report, including soil descriptions, narrative text and maps. On behalf the Vail Resorts Development Co./Heavenly Valley Limited Partnership (applicant), this report was submitted to TRPA as a Land Capability Challenge (LCC). The draft report was reviewed and commented on by Phil Scoles (subcontractor for TRPA) and Heather Beckman (Land Capability Program Manager). The comments were incorporated in the final report, completed by R.J. Poff on April 18, 2011. The final report was submitted to TRPA on June 13, 2011.

Findings

The investigation found that soil conditions differed from those mapped by the 1974 Soil Survey of Lake Tahoe Basin, California and Nevada. The observed soil conditions resembled excavated and filled versions of the Cagwin series (same series as mapped by the 1974 soil survey). These soils, prior to filling and grading in the 1960s and early 1970s, were mostly less than 15 percent (hence, flatter than mapped). Lastly, the historic extent of SEZ was considerably smaller than currently mapped. The following summarizes the finding of each of the backhoe pits:

Soil pit no. 1A (as designated by R.J. Poff) was dug somewhat parallel to the tall retaining wall that separates the ski lift loading area and the upper parking lot. The pit location is within the area originally mapped CaE. This pit exposed over 60 inches of fill material, including soil, rock and wood fragments (see Appendix D of R.J. Poff report). The sources of the fill material are not known, but the soil composition suggests that the material was imported from a nearby source. While somewhat compacted, the fill material appears moderately permeable and lacking a water table in the upper 60 inches. That is, the fill material does not form a restricting layer. As noted in the R.J. Poff report, a small amount of soil redox features were observed around the buried wood fragments, which accelerated reducing conditions when wetted. Based on the historical aerials and topography maps (prior to ski resort construction), the natural slopes were less than 15 percent; thus, it qualifies as Class 4 (20 percent coverage) in accordance with the Bailey land classification system.

Soil pit no. 1B was situated mostly south by southeast of Soil pit 1A and west of the magic carpet beginners ski machinery. This pit also contained fill material somewhat similar to pit 1A, but only to a depth of 24 inches. The underlying soil profile suggests that 8 to 10 inches of the native Cagwin soil was excavated prior to filling. Unlike pit 1A, this location had a water table at approximately 30 inches below existing grade (secondary SEZ indicator). The soil immediately above and below the observed water table has numerous redox concentrations (mottles), which disappears below 35 inches. This pattern of redox features is atypical and infrequently occurs under natural circumstances. It is likely the redox concentrations formed as a consequence of excessive water introduced by snowmaking. The ski lift loading areas, as well as the adjacent ski runs, receive significant quantities of created snow, since these lower elevations melt snow more frequently (than higher elevations). Thus, the redox features are not a reliable indicator of natural wetness. Although this location has one secondary indicator, it does have a total of three secondary indicators – hence it does not qualify as SEZ. Based on the field observations and historical aerials, the historic soil condition at this location best resembles Cagwin soil, 5 to 15 percent slopes (CaD), which is Bailey Class 4 (20 percent land coverage).

Soil pit no. 1C was the last backhoe pit dug and it was situated just east of the magic carpet ski machinery. It was somewhat similar to Soil pit no. 1B, except it had about 14 inches of fill material. The buried soil also appeared to have a natural topsoil (or portion thereof) under the fill material. This location did not have any root-restricting layers above the paralithic horizon, which started at a 39-inch depth. Evidence of a seasonal water table was limited to a narrow horizon immediately above the paralithic layer near the bottom of the pit. This narrow layer had depleted soil colors, but no redoximorphic concentrations (iron mottles). The lack of redox concentrations, along with the depleted layer, indicates that groundwater likely moves across the top of the paralithic horizon, but does not accumulate. The lack of riparian or hydrophytic vegetation immediately east of the location (where undisturbed) corroborates this conclusion. That is, the pines, white firs, serviceberry, rabbit brush, gooseberry and

grasses indicate that ground water is not sufficiently close to the surface to facilitate the establishment of wetter-adapted vegetation. The buried portion of this soil is similar to the Cagwin series (CaD). Since the slopes in this vicinity are less than 15 percent, this somewhat excessively drained soil is considered Class 4 according to the Bailey land capability classification system.

The R.J. Poff report also describes three additional soil auger holes in the vicinity of 1A, 1B and 1C. These additional soil sample locations verified the field conditions observed on October 12 and 13. All of these hand augered locations had slopes less than 15 percent and resembled the Cagwin series. As such, these locations qualified as CaD (Class 4, 20 percent land coverage).

The remaining land evaluated by the LCC was accomplished using drilling cores from numerous locations within the parking lots, aerial photograph analysis, and old topographic map of the vicinity. The research and analysis for such lands is detailed in the R.J. Poff report, which was completed in a professional and thorough manner. Such methods conclude that the east portion of the parking lots – prior to filling and grading in the late 1960s and early 1970s – best resembled the Cagwin series. This was evident on similar vegetation patterns, similar soils on properties to the north and east, and similar topographic slopes and aspect. Thus, the east portion of the parking lot qualifies as Class 4 (20 percent land coverage).

The analysis also concluded the west portion of the parking lots was a combination of Elmira gravelly loamy coarse sand, 0 to 9 percent slopes, and SEZ in the lowest elevations. The Elmira soil, as observed on the adjacent parcel to the north, is a deep, sandy soil that is well drained with gentle slopes. The Elmira soil is considered Class 6 (30 percent land coverage). The SEZ portion of the west parking area was evident on the historical aerial photographs and currently exists on adjacent land immediately to the northwest. All SEZ lands, unless determined otherwise under man-modified procedures, are Class 1b (1 percent land coverage).

Man-Modified Determination for SEZ Land

The R.J. Poff report includes sufficient detail about the historic condition of the SEZ area to constitute a man-modified determination, as specified in TRPA Code of Ordinance Chapter 20.2.F (2). That is, the report describes existing and historic soil characteristics, as revealed by drilling core samples, historic aerial photographs, and correlation to downgradient and offsite SEZ conditions. Specifically, the report documents (via historic aerial photographs) that the subject SEZ was filled and graded prior to February 10, 1972. The report also discusses the hydrologic conditions of the SEZ that is buried under the west portion of the parking lot. While the report did not discuss the erosion hazard, it is not necessary under this circumstance where the SEZ has been filled over 5 to 12 feet deep and paved at the surface. And as a paved surface, there was no relevant vegetation to evaluate. The nearby escarpment (between the upper and lower parking lots) that supports several willows was not considered to be SEZ because

it is composed of fill material; it is used for snow storage (hence adding seasonal moisture), and it is artificially drained (curtain drain at base of slope).

As per Chapter 20.2.4 (3), the R.J. Poff reports provides sufficient explanation that the SEZ cannot be feasibly restored; that redevelopment of this area would not increase erosion/water quality problems, nor adversely impact adjacent sensitive lands; and that mitigation opportunities are available offsite for losses caused by the land modification. This memorandum concurs with the detailed discussion on this matter, as presented in Section 6.3 of the R.J. Poff report. Thus, the buried SEZ qualifies as Class 6 land (30 percent land coverage), which is the surrounding land capability to the west, south and east.

Conclusions: Field conditions for the California Base Lodge area did not match the original mapping of Cagwin-Rock outcrop complex, 5 to 15 percent (CaD) and 15 to 30 percent slopes (CaE) and SEZ. While the vast majority of the study was previously filled and graded, historical aeriels, buried soils, and adjacent property soils indicate that the land was less steep (under 15 percent slope). Such mapping refinements are common to Land Capability Challenges – this LCC relied upon a variety of field observations, aeriels, and old topography maps to validate the proposed re-mapping of the Cagwin boundaries. Consequently, the east portion of the study area, encompassing the east parking lot and loading areas for the ski lifts/gondola, were historically Cagwin, 5 to 15 percent slopes (CaD), Class 4 lands (prior to filling and grading). On the west side of the study area, the soils best resembled the Elmira gravelly loamy sand, 0 to 9 percent slopes (EbC), Class 6 on the higher elevations, and SEZ (Class 1b) in the lower elevations. See R.J. Poff maps (Plate 1 of Appendix A and Plate 1 of Appendix B)

The field study and subsequent analysis also documented that the area of SEZ was smaller than originally mapped. In particular, the report provided documentation and discussion to conclude that the buried SEZ has been filled, graded and paved in a manner that meets TRPA code for a man-modified determination. The surrounding land, as determined by the applicant's LCC, qualifies for Class 6, so the same designation is appropriate for the man-modified SEZ land within the study area.