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25 January 2011

GEOTECHNICAL REVIEW MEMORANDUM

To: Deanna Christensen, Coastal Program Analyst
From: Mark Johnsson, Staff Geologist
Re: Sweetwater Mesa Project

In connection with the above-referenced project, I have reviewed the documents listed in Appendix A. In addition, I have attended numerous meetings and teleconferences among the Commission staff, applicants' consultants, and consultants for the Commission over the past two years. I visited the site on 8 April 2009.

Introduction
To summarize very briefly, the project consists of a lot-line adjustment, the construction of five single-family residences, the installation of a water line, and the construction of an access road extending from within the City of Malibu, into unincorporated Los Angeles County, and through multiple lots to the five proposed residences. This review will include all the proposed project elements except the part of the road within the City of Malibu.

The proposed access road within unincorporated Los Angeles County traverses the western side of a north-south oriented, sharp-crested ridge. At the City Limits the proposed road is at an elevation of approximately 835 feet, roughly 100 feet below, and 300 feet west of, the crest of the ridge. The proposed road and the ridgeline rise irregularly to a high point within the project area of approximately 1500 feet over a straight-line distance of approximately 0.53 miles. To the east of the somewhat meandering ridgeline is a very steep slope, marked by vertical cliffs, dropping into Carbon Canyon. To the west, somewhat gentler (but still very steep) slopes descend to Sweetwater Canyon. Several drainages extending from both canyons modify these steep slopes.

The bedrock making up this ridge is primarily layered sedimentary rocks (conglomerates, volcanic breccias, sandstones, siltstones and shales) assigned to The Vaqueros Formation, underlain by sandstones of the Sespe Formation. These rocks are broadly folded and lie on the east limb of syncline, or downwarp, and so primarily dip to the west. The Vaqueros Formation makes up most of the western side of the ridge, and the underlying Sespe Formation makes up most of the eastern side of the ridge. This broad structure is interrupted by many minor folds and inactive faults. Isolated igneous rocks, known as the Conejo Volcanics, were intruded into the sedimentary rocks.

Exhibit 25
CDP 4-10-040 through 4-10-045
Mark Johnsson Memorandum

Due to the fact that layered sedimentary rocks of diverse strengths broadly dip in the same direction as the slope on the western side of the ridge, this slope has been very susceptible to landsliding over recent geologic time. As mapped by Mountain Geology, Inc. (MGI), three large, ancient landslides, themselves cut by younger landslides, extend almost the entire distance from their headscarps at or near the ridge crest, to the canyon bottom. Evidence, such as the formation of soils on the surfaces of these landslides, indicates that they are likely of prehistoric origin. None show evidence of recent slope movement. The eastern side of the ridge also is susceptible to rockfall and landsliding, but since such slope movement would not threaten the proposed development it will not be discussed further.

Following my site visit and review of the 2007-2008 MGI Geological reports, I was willing to accept MGI's interpretation of the bedrock and surficial geology at the site. In response to preliminary questions raised by the County of Los Angeles, Department of Public Works, Materials and Engineering Division (the County), MGI prepared two sets of addendum reports, clarifying details and demonstrating, to my satisfaction, that the proposed building sites for the residences can be made stable through appropriate foundation design.

I had concerns, however, with the assumptions and soil strength parameters that CalWest Geotechnical Engineers (CalWest) had used in the generation of their slope stability analyses. These slope stability analyses would be used to generate the design forces which would apply to the construction of a support system for the road. Indeed, even the forces that CalWest generated with the suspect soil strength parameters would require a very large engineering effort in the form of supporting piles, caissons, and retaining walls. Further, these analyses were performed on preliminary grading plans. Accordingly, I asked several times in early summer 2009 for a geotechnical review of final grading plans (review of which would allow further evaluation of the soil strength values) and for structural calculations and plans for the stabilization system that would support the road. The latter would be evaluated by the Commission's Civil Engineer.

From 7 August until 30 November 2009, I was away from the office on vacation and then medical leave. During my absence, additional materials, including the requested structural calculations and plans, were delivered to Commission staff. In my absence, review of all aspects of the project was assigned to the Commission's Civil Engineer, Ms. Lesley Ewing. The proposed road stabilization system was a complex structural engineering system of a type unfamiliar to Ms. Ewing. She concluded that review of such a system required structural engineering outside her area of expertise. To obtain the needed expertise for the review of this system, the consulting firm Cotton, Shires and Associates (CSA), was hired to assist Staff's review of this project.

CSA's professional responsibility in accepting this type of review was not simply to accept the load values derived by others and check the structural engineering, but also to verify that they could stand behind those values (derived through geotechnical engineering, handled in this project primarily by CalWest), and the geologic interpretation underlying the geotechnical engineering values. Accordingly, CSA essentially went back to the initial point of my review, the interpretation of the geology, and performed the review of the engineering geology (geotechnical review of final grading plans) that I had asked for before my leave of absence. Their initial report of findings was completed on 8 March 2010. Upon my return to duty, I resumed my role in

reviewing the applicant's response to CSA's review. In mid-January 2011 it was demonstrated to my satisfaction that the applicants had demonstrated that all aspects of the proposed project can adequately mitigate for the unavoidable geologic hazards at the site. CSA's 21 January 2011 report reaches the same conclusion.

In the remainder of this memo, I will concentrate on the two major issues that they identified as requiring further evaluation: 1) the interpretation of the extent and nature of the landslides, and 2) the appropriate soil strength parameters to be used in the slope stability analyses.

Nature and extent of landslides

Early in their review of the project, CSA examined aerial photographs and identified a large landform centered on the Morleigh parcel as a possible landslide not recognized by MGI. Numbering the landslides from south to north, they labeled this landform "Landslide 3." Landslides 1, 2, and 4 had been previously identified by MGI. CSA felt, however, that the limits of these slides were poorly constrained. CSA also took the position that, by including the headscarps of the landslides as part of the landslide to be avoided, MGI may have been recommending an overly conservative design; the headscarp areas have not, by definition, moved and may be more easily stabilized than the landslide mass itself. The 8 March 2010 CSA report concluded that, "By refining the geologic landslide mapping, it is our preliminary opinion that some reductions in the amount and size of the stabilization elements could be realized." In addition, the position of the slide plane for Landslide 2 was poorly constrained. Accordingly, CSA recommended additional subsurface exploration in their 8 March 2005 report, consisting of:

- "additional subsurface exploration … along the roadway north of B-9 to characterize the subsurface materials along the steep slope"
- "exploratory trenching …in the gently sloping area (possible graben) near the proposed Morleigh residence to help determine the presence or absences of landsliding"
- "subsurface exploration … downslope of the proposed Lunch residential site … to constrain the location of the slide plane in the vicinity of the roadway where mitigation elements are to be implemented"
- "additional boring exploration … with the intent of obtaining hand samples of the slide plane materials for appropriate laboratory testing, and to further constrain the subsurface landslide geometries where only one positive pick on the basal shear surface has been obtained."

The additional trenching, excavation and exploratory boring work was undertaken, as recommended by CSA. An additional large diameter borehole (B-38) was logged and several test pits at the upper part of the road (near the border with the City of Malibu) and trenches (near the proposed Morleigh residence) were excavated and logged. Additional information on the site conditions and the slide plane were developed through these field efforts. This work improved the geologic site characterization. Most significantly, trenching across the putative graben at the head of CSA's Landslide 3 clearly demonstrated that this feature is not a landslide.

Since the terrain at and downslope of the proposed development area is very rugged, it would have been difficult for drilling equipment to access to the main portion of the slides. The upper slide masses could be well characterized but the rest of the slide mass was characterized only through surficial investigations. This would lead to some uncertainty in the slide geometries, leading to some issues (discussed in the next section) regarding development of the slope stability analyses.

The main focus of the geologic, geotechnical and engineering review has been on the roadway since the access road crosses two large landslides (Landslides 1 and 2). The geologic characterization of the road easement has provided the information necessary to develop slope stability analyses, which in turn will lead to the derivation of the design loads for the structural mitigation measures necessary to assure stability of the roadway.

The proposed building sites are placed at or near the ridgelines. Four of the building sites are outside the identified slide areas; however, the proposed Lunch residence site is on landslide debris associated with Landslide 2. This debris will be removed as part of the site development or mitigated by the foundation design for the house. The hummocky terrain identified by CSA as a possible landslide (Landslide 3) on the Morleigh site has been shown to be not related to slope movement; i.e., CSA's putative Landslide 3 does not exist. CSA's review has shown that the five proposed building envelopes will be or can be made structurally stable for the proposed development. There may be other locations on the property that would be able to support the proposed development; but, no analysis of alternative building sites was undertaken.

Soil shear strength parameters and slope stability analyses

As noted above, I was not satisfied that CalWest had adequately justified the soil shear strength parameters that they used for the ancient landslide slip surfaces in their slope stability analyses. The values of cohesion (210 psf) and friction angle (22°) they obtained through direct shear tests seemed more typical of landslide debris than for the slide plane itself. CSA came to the same conclusion in their review, and recommended that a relatively undisturbed sample of the material along the slide plane be obtained and subjected to a torsional ring test and Atterburg Limits testing to obtain correlations with shear strengths. From the 8 March 2011 report:

> Grab samples should be obtained from the landslide basal shear plane of each landslide to be mitigated and Atterberg Limits tests performed on each grab sample to obtain correlations with residual shear strengths (Stark, et al., May 2005). According to the Southern California Earthquake Center, June 2002, Recommended Procedures for Implementation of DMG Special Publication 117 for Analyzing and Mitigating Landslide Hazards in California: "DS testing devices can be used to subject a sample to multiple cycles of shearing, which allows an estimation of residual strength. Unfortunately, the results may be unconservative … and should always be checked against either correlations … or results of ring shear testing …". Consideration should be given to torsional ring shear strength testing (fully softened and residual shear strength) of representative basal landslide shear plane materials

Samples of the slide plane material were taken from boring B-38 and this sample was eventually tested The results were as expected by CSA; the torsional ring test yielded a cohesion of 0 psf and a friction angle of 9°. The Atterburg Limits correlation method (Stark et al. 2005) yielded a cohesion of 150 psf and a friction angle of 9°.

Numerous discussions ensued among CalWest, CSA, and Commission staff. CSA and I felt that the results of the torsional ring test and Atterburg Limits correlation were more reasonable values for the slide plane, and CalWest continued to feel that these values were too low. Ultimately, it was decided that disagreements about the appropriateness of various types of testing and the number and nature of samples to be tested could be avoided by using an alternative method to arrive at the soil shear strength parameters. After identifying the most critical cross section, CalWest would assume that the current landslide geometry had a factor of safety of 1.0, and calculate what combination of cohesion and friction angle would yield a factor of safety of 1.0. This is a method known as "back-calculation" of the shear strength parameters. Since the geometry of the landslide plane was poorly constrained, a range of geometries would be considered and the lowest shear strengths would be adopted for the calculation of load factors to carry through to the structural engineering phase of the project.

As summarized by CSA in their 21 January 2011 report:

> …it was agreed that CalWest would circumvent concerns about the laboratory test results by conducting backcalculation analysis on a range of possible reasonable landslide geometries (since the downslope geometry was poorly constrained by subsurface exploration). A higher cohesion component was deemed acceptable for the overall potential failure plane because a landslide buttressed by the canyon would have to shear through landslide debris across bedding planes and not strictly on a previously sheared surface. For reasonable conservatism, a factor of safety of unity (1.0) was utilized for the backcalculation of shear strength parameters and CalWest determined a friction angle of 15 degrees with cohesion of 200 psf for this scenario. These shear strength parameters were then used for forward analyses and design of access road protection measures.

After much discussion CalWest agreed to adopt these shear strength parameters for both the static and pseudostatic (seismic) slope stability analyses. It was found that the same resisting forces that were needed to attain a factor of safety of 1.5 would yield a pseudostatic factor of safety of 1.1. These resisting forces are those that the structural support system must be designed to provide, and were carried forward to the structural engineering phase of the project. The Commission's Staff Civil Engineer has provided a review memorandum evaluating those aspects of the project

One final consideration regarding slope stability was the planned placement of excess fill on top of Landslide 2. This was desired in order to avoid numerous truck trips and attendant environmental, social, and economic impacts. This fill would be placed below the structural system stabilizing the road and would have no effect on the stability of the road. Placing fill on the upper portions of a landslide will, however, decrease overall stability. To be consistent with

section 30253 of the Coastal Act, the Commission must find that the development does not "…contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area…" CalWest performed slope stability analyses of the Landslide 2 in its current and configuration and with 14,000 cy of fill at the location planned for its placement. As summarized in CSA's 21 January 2011 report:

> Placement of fill materials upon the upslope portion of an existing landslide could potentially have an adverse effect on global slope stability. Therefore, we recommended that CalWest perform appropriate slope stability analysis to evaluate the effect of fill placement on the landslide. CalWest has now analyzed the largest of the three areas and indicates that the stability of the slope below the protective measures will not be significantly adversely impacted (relative negative impact of on the order of 1 to 3 percent).

Rock Fall Hazard on Vera Parcel

MGI identified an area on the Vera parcel, below the residence and above a section of the access road, where a very steep slope presents a rock fall hazard to vehicles traversing the access road. This hazard was evaluated by Kane Geotech, Inc., in a report dated 15 October 2007. They provided three options to mitigate the hazard: 1) Roadway relocation, 2) A 1500 ft-ton mitigation system (essentially a barrier at the road edge), or 3) A slope stabilization system (wire mesh).

Stability of Proposed Water Line

Also proposed is a 7800 foot water line extension north of the project to tie into existing water main at Costa Del Sol Way to the north. The line and its access road would, like most of the building sites, lie on stable bedrock and should not be subject to slope instability. This was confirmed by CSA in the field.

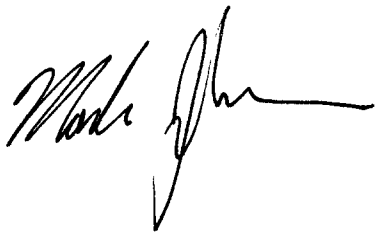
Conclusion and Recommendations

During this review, no analysis was undertaken to determine if risks could be reduced through hazard avoidance through alternate road easements or building sites. Rather, the focus has been on the accurate determination of the forces needed to attain the desired factor of safety for the proposed development location given the site conditions. After an unusually thorough review, including the extensive use of outside consultants, I feel that I can recommend the adoption of the geologic interpretation summarized in CSA's 21 January 2011 report, as well as the resistant forces calculated through CalWest's final slope stability analyses. The Commission's Civil Engineer has provided an evaluation of whether these forces are appropriately used to fully mitigate the hazard through structural design. I have reviewed her memorandum, and I am in agreement with her recommendation regarding special conditions. In addition, I would

recommend a special condition that the rockfall hazard on the Vera parcel be mitigated by adopting one of the options in the Kane Geotechnical report dated 15 October 2007 and all recommendations associated with that option be implemented.

I hope that this review is helpful. Please do not hesitate to contact me with any further questions.

Sincerely,



Mark Johnsson, Ph.D., CEG, CHG
Staff Geologist

APPENDIX A: Reviewed Documents and Drawings

CalWest Geotechnical Engineering Consultants, May 25, 2007, Geotechnical Engineering Report, Proposed Custom Single-Family Residential Development, APN 4453-005-037 (Lunch), Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, May 25, 2007, Geotechnical Engineering Report, Proposed Custom Single-Family Residential Development, APN 4453-005-018 (Vera), Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, June 1, 2007, Geotechnical Engineering Report, Proposed Custom Single-Family Residential Development, APN 4453-005-092 (Mulryan), Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, June 4, 2007, Geotechnical Engineering Report, Proposed Custom Single-Family Residential Development, APN 4453-005-091 (Morleigh), Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, October 2, 2007, Geotechnical Engineering Report, Proposed Custom Single-Family Residential Development, APN 4453-005-038 (Ronan), Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, December 20, 2007, Geotechnical Engineering Addendum Report, APN 4453-005-018 (Vera), Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, December 27, 2007, Geotechnical Engineering Addendum Report, APN 4453-005-037 (Lunch), Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, December 28, 2007, Geotechnical Engineering Addendum Report, APN 4453-005-091 (Morleigh), Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, December 28, 2007, Geotechnical Engineering Addendum Report, APN 4453-005-092 (Mulryan), Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, July 14, 2008, Addendum Geotechnical Engineering Report #2, Response to the County of Los Angeles Department of Public Works, Geotechnical and Material Engineering Division, Soils Engineering Review Sheet Miscellaneous Application No 0706150005.

CalWest Geotechnical Engineering Consultants, July 22, 2008, Addendum Geotechnical Engineering Report #2, Response to the County of Los Angeles Department of Public Works, Geotechnical and Material Engineering Division, Soils Engineering Review Sheet Miscellaneous Application No 0706150004.

CalWest Geotechnical Engineering Consultants, July 23, 2008, Addendum Geotechnical Engineering Report #2, Response to the County of Los Angeles Department of Public Works, Geotechnical and Material Engineering Division, Soils Engineering Review Sheet Miscellaneous Application No 0706150004.

CalWest Geotechnical Engineering Consultants, May 1, 2009, Geotechnical Sections and Geologic Map, APN 4453-005-018.

CalWest Geotechnical Engineering Consultants, May 15, 2009, Geotechnical Engineering Supplemental Report, Proposed Compacted “Non-Structural” Fill Areas (Mulryan).

CalWest Geotechnical Engineering Consultants, July 7, 2009, Geotechnical Engineering Letter II.

CalWest Geotechnical Engineering Consultants, July 28, 2009, Geotechnical Engineering Letter, Preliminary Grading Plan Review, Proposed Single-Family Residential Development, Malibu Area, County of Los Angeles.

CalWest Geotechnical Engineering Consultants, May 3, 2010, Supplemental Geotechnical Engineering Letter #1, Additional Clarification of Design Recommendations and Response to California Coastal Commission Review Prepared by Cotton, Shires and Associates, Inc., Proposed Extension of Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, September 13, 2010, Supplemental Geotechnical Engineering Letter #2, Clarification to E-Mail From David Schrier (dschrier@cottonshires.com) Sent Friday, September 10, 2010 5:54 PM on Behalf of The California Coastal Commission, Proposed Extension of Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, September 30, 2010, Supplemental Geotechnical Engineering Letter #3, Additional Comments, Clarification and Response to Items Discussed at the Meeting Held at The California Coastal Commission on September 15, 2010; Proposed Extension of Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, October 13, 2010, Addendum to Supplemental Geotechnical Engineering Letter #3 dated September 30,2010, Additional Comments, Clarification and Response to Items Discussed at the Meeting Held at The California Coastal Commission on September 15, 2010; Proposed Extension of Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, November 1, 2010, Supplemental Geotechnical Engineering Letter #4, Response to Items Discussed Within the Memorandum Prepared by Cotton, Shires and Associates, Dated October 26, 2010 (included in Appendix A), Proposed Extension of Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, November 8, 2010, Supplemental Geotechnical Engineering Letter #5, Response to Discussion Items at The California Coastal Commission Meeting in San Francisco on November 2, 2010 Regarding Sweetwater Mesa Road Extension, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, November 11, 2010, Supplemental Geotechnical Engineering Letter #6, Proposed Staging Area, Compacted “Non-Structural” Fill, Sweetwater Mesa Road Extension, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, November 15, 2010, Supplemental Geotechnical Engineering Letter #7, Clarification of Design Loads for the Sweetwater Mesa Road Extension, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, December 20, 2010, RE: Draft report by Cotton Shires & Associates, Inc. dated December 17, 2010.

CalWest Geotechnical Engineering Consultants, December 27, 2010, Supplemental Geotechnical Engineering Letter #8, Additional Comments and Clarification of Stability Analysis and Geotechnical Design Load Criteria, Sweetwater Mesa Road Extension, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, January 17, 2011, Supplemental Geotechnical Engineering Letter #9, Additional Comments and Clarification of Stability Analysis and Geotechnical Design Load Criteria, Sweetwater Mesa Road Extension, Malibu Area, County of Los Angeles, California.

CalWest Geotechnical Engineering Consultants, January 20, 2011, Supplemental Geotechnical Engineering Letter #8 (Revised), Additional Comments and Clarification of Stability Analysis

and Geotechnical Design Load Criteria, Sweetwater Mesa Road Extension, Malibu Area, County of Los Angeles, California.
Czerniak, E. 1957. “Resistance to Overturning of Single, Short Piles, in the Journal of the Structural Division, Proceedings of the American Society of Civil Engineers, Paper 1188, 1188-1 – 1188-25.
Cotton, Shires and Associates, Inc., March 8, 2010, Summary of Findings – Civil and Geotechnical Engineering and Engineering Geologic Peer Review Services, Sweetwater Mesa Development Project, Malibu, California.
Cotton, Shires and Associates, Inc., January 21, 2011, January 2011 Summary of Findings – Civil and Geotechnical Engineering and Engineering Geologic Peer Review Services, Sweetwater Mesa Development Project, Malibu, California.
County of Los Angeles, Dept of Public Works, Geotechnical and Materials Engineering Division, October 27, 2008, Soils Engineering Review Sheet, Review of Conceptual Design Pad for Single Family Residence and Access Road.
Hohbach-Lewin, Inc. Structural Engineers, December 6, 2010, Memo: Sweetwater Mesa Development Project – Civil and Geotechnical Engineering and Engineering Geological Peer Review.
Hohbach-Lewin, Inc. Structural Engineers, January 10, 2011, Memo: Sweetwater Mesa Road Extension Subject: Supplemental Geotechnical Letter #8, Additional comments and clarifications of Stability Analysis and Geotechnical Design Load Criteria.
Kane Geotechnical, October 15, 2007, Sweetwater Mesa Rockfall and Mitigation Study, Los Angeles County.
LC Engineering Group, Inc., September 27, 2009, Engineering Comments on California Coastal Commission’s Draft of Scope of Work for Third Party Review, Sweetwater Mesa Development Project.
LC Engineering Group, Inc., October 20, 2009, Structural Analysis and Design: Sweetwater Mesa Rd (Sta 26+70 to 75+52.43), 2930 Sweetwater Mesa Road, Parts 1 and 2.
LC Engineering Group, Inc., January 27, 2010, Structural Analysis and Design: Sweetwater Mesa Rd (Sta 26+70 to 75+52.43), 2930 Sweetwater Mesa Road.
LC Engineering Group, Inc., May 3, 2010, Structural Analysis and Design: Sweetwater Mesa Rd (Sta 26+70 to 75+52.43), 2930 Sweetwater Mesa Road.
LC Engineering Group, Inc., May 28, 2010, Structural Analysis and Design: Sweetwater Mesa Rd (Sta 26+70 to 75+52.43), 2930 Sweetwater Mesa Road.
LC Engineering Group, Inc., November 16, 2010, Mesa Road Improvements From Sta: 26+70 to 75+53.34, Malibu, Los Angeles County, California (Sheets S-T to S-8).
Mountain Geology, Inc., September 26, 2006, Report of Limited Engineering Geologic Study, Proposed Water Main, Costa del Sol Way to APN 4453-005-038, -091, -037, -092, and -018, County of Los Angeles, California.
Mountain Geology, Inc., May 11, 2007, Report of Engineering Geologic Study – Proposed Custom Single-Family Residential Development (APN 4453-005-092, Mulryan).
Mountain Geology, Inc., May 11, 2007, Report of Engineering Geologic Study – Proposed Custom Single-Family Residential Development (APN 4453-005-091, Morleigh).
Mountain Geology, Inc., May 11, 2007, Report of Engineering Geologic Study – Proposed Custom Single-Family Residential Development (APN 4453-005-018, Vera), Electronic Copy.
Mountain Geology, Inc., May 11, 2007, Report of Engineering Geologic Study – Proposed Custom Single-Family Residential Development (APN 4453-005-037, Lunch), Electronic Copy.
Mountain Geology, Inc., August 28, 2007, Report of Engineering Geologic Study – Proposed Custom Single-Family Residential Development (APN 4453-005-038, Ronan).

Mountain Geology, Inc., December 18, 2007, Addendum Engineering Geologic Report #1 (APN 4453-005-037, Lunch).
Mountain Geology, Inc., December 19, 2007, Addendum Engineering Geologic Report #1 (APN 4453-005-092, Mulryan).
Mountain Geology, Inc., December 19, 2007, Addendum Engineering Geologic Report #1 (APN 4453-005-018, Vera).
Mountain Geology, Inc., December 20, 2007, Addendum Engineering Geologic Report #1 (APN 4453-005-091, Morleigh).
Mountain Geology, Inc., July 7, 2008, Addendum Engineering Geologic Report #2 (APN 4453-005-018, Vera) – Electronic Reference Copy.
Mountain Geology, Inc., July 8, 2008, Addendum Engineering Geologic Report #2 (APN 4453-005-091, Morleigh).
Mountain Geology, Inc., July 8, 2008, Addendum Engineering Geologic Report #2 (APN 4453-005-092, Mulryan).
Mountain Geology, Inc., July 8, 2008, Addendum Engineering Geologic Report #2 (APN 4453-005-037, Lunch).
Mountain Geology, Inc., May 18, 2009, Engineering Geologic Memorandum – Proposed Minor Modifications of Grading Plan, Northerly Terminus of Sweetwater Mesa Road.
Mountain Geology, Inc., April 23, 2010, Supplemental Engineering Geologic Report #1 – Engineering Geologic Responses to California Coastal Commission Engineering Geologic, Geotechnical Engineering and Civil Engineering Peer Review, APN 4453-005-037, -018, -038, -092, -091 Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.
Mountain Geology, Inc., September 14, 2010, Supplemental Engineering Geologic Report #2 – Engineering Geologic Responses to Email from David Schrier and Pat Shires Received on September 10, 2010, APN 4453-005-037, -018, -038, -092, -091 Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.
Mountain Geology, Inc., September 30, 2010, Supplemental Engineering Geologic Report #3 – Additional Responses to California Coastal Commission Engineering Geologic, Geotechnical Engineering and Civil Engineering Peer Review, APN 4453-005-037, -018, -038, -092, -091 Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.
Mountain Geology, Inc., October 29, 2010, Supplemental Engineering Geologic Report #4 – Additional Responses to California Coastal Commission Engineering Geologic, Geotechnical Engineering and Civil Engineering Peer Review, APN 4453-005-037, -018, -038, -092, -091 Sweetwater Mesa Road, Malibu Area, County of Los Angeles, California.
Southern California Earthquake Center, June 2002, Recommended Procedures for Implementation of DMG Special Publication 117 for Analyzing and Mitigating Landslide Hazards in California.
Whitson Engineering, January 1, 2008, Revised March 9, 2009, 20' Driveway to Proposed Single Family Residence Plans, Sweetwater Mesa Road, (APN 4453-005-018, Vera).
Whitson Engineering, March 11, 2009, Driveway, Grading and Drainage Plans for a Single Family Residence (APN 4453-005-092, Mulryan).
Whitson Engineering, March 25, 2009, Driveway, Grading and Drainage Plans for a Single Family Residence (APN 4453-005-091, Morleigh).
Whitson Engineering, April 3, 2009, Driveway, Grading and Drainage Plans for a Single-Family Residence (CDP Submittal Not for Construction), (APN 4453-005-037, Lunch).
Whitson Engineering, April 28, 2009, Contour Grading Exhibit – 2839 Sweetwater Mesa Road (APN 4453-005-037).
Whitson Engineering, August 5, 2009, Driveway, Grading and Drainage Plans for a Single-Family Residence (CDP Submittal Not for Construction), (APN 4453-005-037, Lunch).
Whitson Engineering, August 5, 2009, 2851 U Sweetwater Mesa Road: Driveway, Grading and Drainage Plans for a Single-Family Residence (APN 4453-005-091, Morleigh).

Whitson Engineering, August 5, 2009, 2857 U Sweetwater Mesa Road: Driveway, Grading and Drainage Plans for a Single-Family Residence (APN 4453-005-092, Mulryan).
Whitson Engineering, August 5, 2009, 2863 U Sweetwater Mesa Road: Driveway, Grading and Drainage Plans for a Single-Family Residence (APN 4453-005-018, Vera).
Whitson Engineering, October 20, 2009, Sweetwater Mesa Project Summary Analysis Letter, Attn: Leslie Ewing of California Coastal Commission.
Whitson Engineering, October 21, 2009, Sweetwater Mesa Road Improvement Plans from Sta: 26+70 to 75+53.43.
Whitson Engineering, November 4, 2009 (Revised), Sweetwater Mesa Road Improvement Plans from Sta: 26+70 to 75+53.43.
Whitson Engineering, May 28, 2010, Sweetwater Mesa Road Improvement Plans from Sta: 26+70 to 75+53.43 (Site Plans)
Whitson Engineering, June 2, 2010, Sweetwater Mesa Road Improvement Plans from Sta: 26+70 to 75+53.43 (LACFD/CDP Submittal; Not for Construction).
Whitson Engineering, November 16, 2010 (revised), Plan Set, Sweetwater Mesa Road Improvements From STA: 26+70 to 75+53.43, Malibu, Los Angeles County, California.