CONEJO AREA CITY DOCUMENTS

2005 PRELIMINARY GEOLOGY OBSERVATIONS

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October 24, 2005

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City of Santa Barbara
Office of the City Attorney
P.O. Box 1990
Santa Barbara, California 93102-1990
Attention: Janet McGinnis
Assistant City Attorney

SUBJECT: Preliminary Geologic Observations, January 13 and February 1, 2005, of the Conejo Road Landslide Area, City of Santa Barbara, California

INTRODUCTION

Although dated October 18, 2005, this report updates 1998 geologic observations based upon and limited to January 13, 2005 and February 1, 2005 preliminary geologic site observations made by driving and walking the roads within the Conejo Slide area. Parcels were viewed from roads. Street pavement was observed for cracking. Recent City of Santa Barbara survey measurements were reviewed for changes. No geologic mapping was performed. The geologic maps prepared in 1998 are included for reference. Appendix A presents photographs taken January 13 and February 1, 2005.

Accompanying Figure, Plates and Appendix

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Preliminary Geologic Map Conejo Road Landslide Movement 1998	Plate 1	In Pocket
Preliminary Geologic Map Conejo Road Landslide Movement 1983-1998	Plate 2	In Pocket
Photographs		Appendix A

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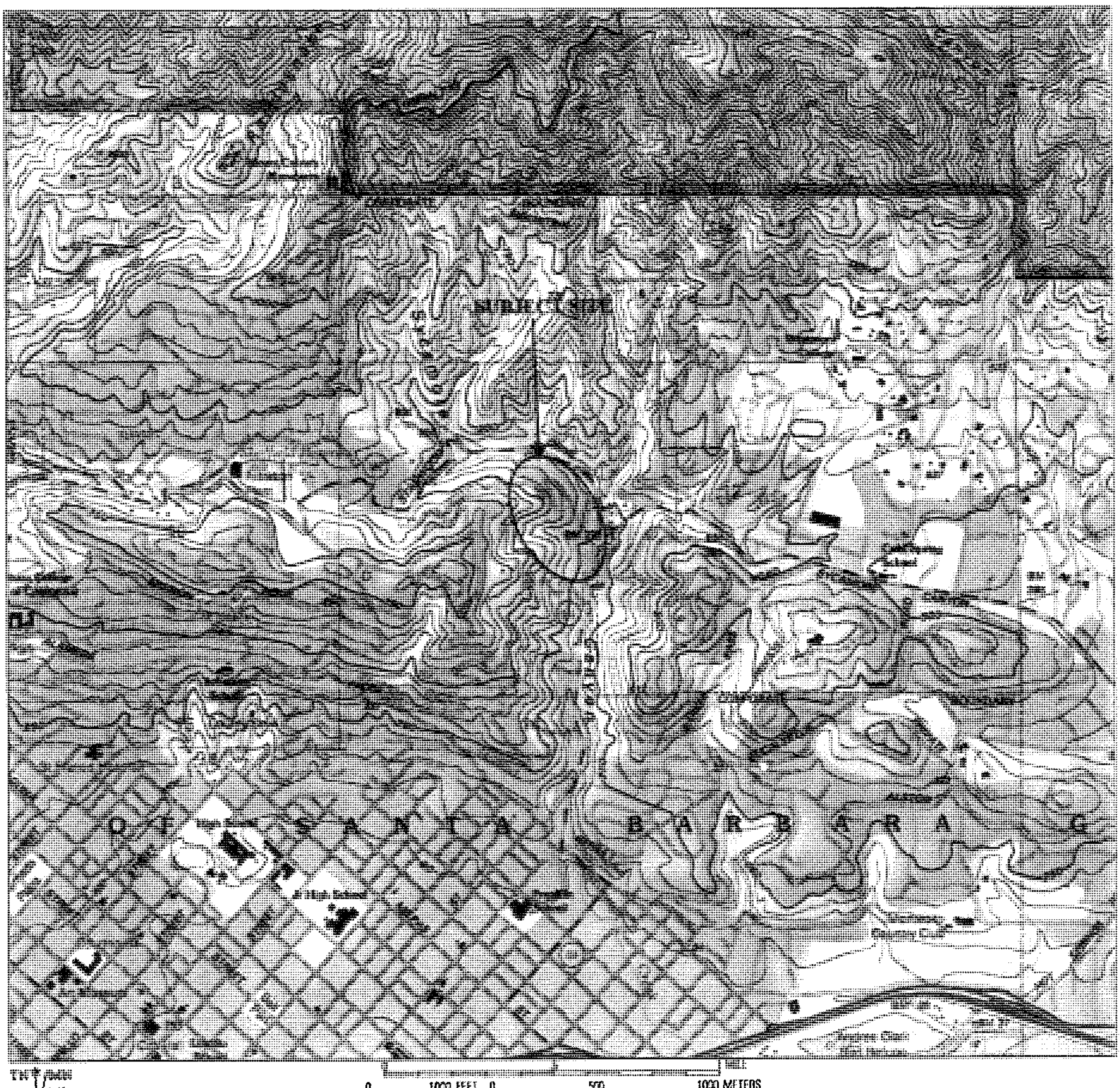
LOCATION MAP



Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)

CONEJO ROAD LANDSLIDE AREA
CITY OF SANTA BARBARA, CALIFORNIA

FIGURE 1

SITE DESCRIPTION

The Conejo Road Landslide area is located on an east-facing hillside that descends to Sycamore Creek.[1] The subject area is on the west side of Sycamore Creek. Site access is via Sycamore Canyon Road and Stanwood Drive. Conejo Road was constructed some time prior to 1928.[2] Residential development occurred gradually with a majority of home construction in the 1950s through the 1960s. Development continued to occur on parcel specific basis into 1984. With the adoption of Conejo Slide Ordinance 4294 on September 18, 1984, residential construction was prohibited and the size of home additions was limited.

The subject study area extends from Sycamore Creek to slopes descending to Ealand Place. The active 1998 landslide was approximately 840 feet in length and has an approximate maximum topographic relief of 170 feet. Landscaping and native vegetation cover the subject slopes.

Active earth movement is evident by ground cracks, down dropping and buckling of paved roads-driveways, separation of foundations and broken utility lines. Demolition of homes has occurred due to landslide movement. More specific details pertaining to earth movement are presented in the following sections of this report.

Figure 1 identifies the subject area on a USGS Topographic Map.

AERIAL PHOTOGRAPH REVIEW – SITE DEVELOPMENT HISTORY

Aerial photographs of the subject area from 1928 to 1998 were obtained through the Santa Barbara City Attorney's Office, from the University of Santa Barbara and Pacific Western Aerial Survey. These photographs are vertical and overlap providing stereoscopic coverage. They are very useful in documenting site history and geologic events. The following aerial photograph review presents a brief summary of site development history and is not a detailed chronology of each parcel.

The subject area is essentially undeveloped on the 1928 aerial photograph.[3] Conejo Road was observed between Sycamore Canyon Road and Las Alturas in the 1928 and 1929 aerial photographs.[4,5] No residential development was observed.

The next year aerial photographs were available for review was 1938.[6] Additional road grading had created Ealand Place and a residential building was observed at 21 Ealand Place. Residential structures were also observed at 486 and 403 Conejo Road. The

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[1] City of Santa Barbara photogrammetric topographic map dated February 27, 1998, prepared by Pacific Western Aerial Surveys, map scale 1" = 50'

[2] 1928, Aerial photographs, Flight Number C-311, B-14 and B-15

[3] 1928, Aerial photographs, Flight Number C-311, B-14, C-14 and C-15

[4] 1928, Aerial photographs, Flight Number C-311, B-14, C-14 and C-15

[5] 1929, Aerial photographs, Flight Number C-430, B-34 and B-35

[6] 1938, Aerial photographs, Flight Number 4950F, 84-86 and 96-98, Dated 1/11/38

future Conejo Lane was observed on the 1938 photo and a residence was observed at 545 Conejo Road.

The next aerial photographs showing development were 1947.[7] A structure was observed east of 508 Conejo Road and between 530 Conejo Road.

The 1948 aerial photographs[8] indicate recent road surfacing of Conejo Road and Ealand Place. An unpaved trail is seen where future Conejo Lane will be located. A house was observed at 1825 Stanwood Drive. A building or animal pens were located near the 1815 Stanwood parcel. An outbuilding was seen at 21 Ealand Place. A house was observed at 345 Conejo Road. Conejo Road was observed to be a single lane due to erosion or slippage near the future 413 to 425 Conejo Road parcels.

A second house was seen at 21 Ealand Place in the 1953 aerial photographs.[9] A mudflow was observed from Ealand Place downslope to the parcels near 438 Conejo Road. The slope descending from Conejo Road also was slipping in the vicinity of 444 to 434 Conejo Road.

Four new lot boundaries were visible east of Ealand Place in the area of 462, 468, 474, and 478 Conejo Road in the 1956 aerial photographs.[10]

Residential structures were present in the 1959 aerial photographs[11] at 350, 428, 462, 474, 481, 508, and 525 Conejo Road and at 10 and 29 Ealand Place.

Stereoscopic coverage was limited in the 1960 aerial photographs.[12] The development of Conejo Lane had occurred with residences at 403, 413, 419, 425, 427, 430, 435, 441, 447, 501, 507, 515, 523, 529, and 535 Conejo Road. Residences at 428, 434, 468, 478, and 535 were also observed in the 1960 aerial photographs.

Residences at 16 and 22 Ealand Place and 352, 418, 430, 444, 450, 456, and 494 Conejo Road were observed in the 1961 aerial photographs.[13] In the 1962 aerial photographs,[14] a new residence was observed at 494 Conejo Road. Development continued to occur at specific sites until the adoption of the 1984 Conejo Slide Ordinance.

GEOLOGIC MAPPING 1998

Geologic observations of active earth movement were recorded on a topographic map compiled by photogrammetric methods. This map is based upon the February 27, 1998

[7] 1947, Aerial photographs, Flight Number GS-EM, 6-112 and 6-113, Dated 8/21/47
[8] 1948, Aerial photographs, Flight Number 12790, 12-20 through 12-23, Dated 7/30/48
[9] 1953, Aerial photographs, Flight Number CC, 2-34 and 2-33, Dated 11/18/53
[10] 1956, Aerial photographs, Flight Number HA-AN, 1-182 through 1-184, Dated 2/27/56
[11] 1959, Aerial photographs, Flight Number HA-GN, 79 through 81, Dated 11/23/59
[12] 1960, Aerial photograph, Flight Number HA-JX, 10, Dated 11/17/60
[13] 1961, Aerial photographs, Flight Number BTM 7BB, Dated 7/05/61
[14] 1962, Aerial photographs, Flight Number HA-01 51 through 53 Dated 3/24/62

aerial photographs and geologic observations in July 1998. Areas of ground cracks were recorded. These cracks were then traced and trends noted by field observation. Lateral boundaries of the active earth movement areas are presented on Plate 1 of this report. This preliminary geologic map represents regional trends and does not include all cracks at each residence.

Stereoscopic pairs of aerial photographs were also reviewed during the geologic mapping process. These aerial photographs include both selected historic and recent flights. Pertinent data from these aerial photographs was also utilized in geologic map preparation and data analysis.

All geologic work performed in the preparation of this report is limited to surface feature observations.

GEOLOGIC SETTING

The subject site is located on the south flank of the Santa Ynez Mountains in the westmost part of the Transverse Range Province. This is a regional province located in the State of California that is characterized by east-west-trending structures. Geologic structures that dominate this province are a result of compressional tectonic forces that are thought to be caused by a bend in the San Andreas Fault. East-west-trending reverse faults such as the Mission Ridge are a common element of this tectonic framework. The Conejo Road Landslide is bounded on the north and south by splays of the Mission Ridge Fault.[15] Near Conejo Road large old landslides bury the Mission Ridge Fault. West of the subject area the Mission Ridge Fault offsets fanglomerate deposits. The relationship of the Mission Ridge Fault to the fanglomerate deposits has been the subject of many geological studies to determine the age of the fault. The Mission Ridge Fault has been classified as a B Fault by the State of California.[16]

Bedrock formations are shown to be structurally complex and highly folded on various published geologic reports.[17] Geologic reports reviewed to date are generally in agreement as to regional formation names and material types underlying the site.[18,19,20]

Rincon Shale (Tr) underlies the Conejo Road Landslide. Regionally, this unit is described as a soft, fissile, shale with interbeds of hard siliceous shale that contains thin

[15] Dibblee, Thomas W., Jr., 1986, Geologic Map of the Santa Barbara Quadrangle, Santa Barbara County, California, DF-06
[16] Cao, Tianqing, et al., June 2003, The Revised 2002 California Probabilistic Seismic Hazard Maps, California Geological Survey
[17] Dibblee, Thomas W., Jr., 1986, Geologic Map of the Santa Barbara Quadrangle, Santa Barbara County, California, DF-06
[18] Dibblee, Thomas W., Jr., 1986, Geologic Map of the Santa Barbara Quadrangle, Santa Barbara County, California, DF-06
[19] Geotechnical Consultants, Inc., 1984, Geotechnical Investigation, Conejo Road Landslide, Santa Barbara, California, Consultant Report prepared for the City of Santa Barbara, Dated April 1984
[20] Hoover, Michael F., 1978, Geologic Hazards Evaluation of the City of Santa Barbara, Consultant Report prepared for the City of Santa Barbara, Dated October 27, 1978

limestone or impure dolomite beds. The regional orientation of the bedrock in the vicinity of the site is striking approximately east-west and has dips of 60 to 80 degrees to the south. Overturned beds (dipping to the north) occur in closer proximity to the Mission Ridge Fault.[21]

Rincon Shale locally consists predominantly of claystone and weathers to a moderately plastic clay. This bedrock unit is generally deeply weathered and commonly develops a thick soil profile at the surface. Soils can be very expansive. The Rincon Shale is landslide-prone.

Younger age unconsolidated dissected surficial sediments or fanglomerate (Qog) have been mapped by Thomas W. Dibblee, Jr. adjacent to Sycamore Creek.[22] This deposit is composed of boulders and cobbles in a silty clay to sandy clay matrix. The fanglomerate is a high-energy deposit that mantles the underlying formations. "Torrential downpours"[23] are attributed as the mechanism for deposition. These severe flood weather conditions also may be associated with the formation of the very large old landslides in Sycamore Canyon. Only eroded, dissected remnants of the fanglomerate remain in this area.

OLDER LANDSLIDES

Very large old landslides (Qlso) underlie the subject area. These old landslide masses can be observed on historic aerial photographs. Old landslide movement in the subject area is evident by an east and north deflection of Sycamore Creek, compound-complex series of slumps and debris flow features. Due to the age of these old landslides, some features are obscured or have a subdued appearance when compared to recent active landslides.

The old landslides in this area are such a large scale that it was not possible to map complete landslide boundaries on Plate 1 and Plate 2. These boundaries extend beyond the map area. As a result, a boundary between two older landslides is depicted on the map. These older landslide are overlaid by recent active earth movement. Arrows showing the general movement direction of the older landslides have also been included. Available historic aerial photographs between 1928 and 1995 from the U.C. Santa Barbara Collection and recent 1998 aerial photographs were reviewed as part of this report preparation.

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[21] Dibblee, Thomas W., Jr., 1986, Geologic Map of the Santa Barbara Quadrangle, Santa Barbara County, California, DF-06
[22] Dibblee, Thomas W., Jr., 1986, Geologic Map of the Santa Barbara Quadrangle, Santa Barbara County, California, DF-06
[23] Dibblee, Thomas W., Jr., 1966, Geology of the Central Santa Ynez Mountains, Santa Barbara County, California, California Division of Mines and Geology, Bulletin 186

EARTH MOVEMENT 2005

Rainstorms of long duration and high intensity occurred on December 28, 2004 and on January 9 and 10, 2005. These rainstorms brought the water year total to 31.16 inches by January 11, 2005. This partial water year total ranked the 2005 water year as the seventh highest recorded at the Stanwood Fire Station since record keeping commenced in 1954.[24] In addition, the January 10, 2005 twenty-four hour total was the second highest recorded at that station. More rainfall most likely will occur thus increasing the water year total.

The Conejo Road Landslide has a documented history of earth movement during years of high rainfall. Earth movement can be slow and sometimes lags after the rainstorms while water infiltrates to the slide planes. Geologic observations were performed of the Conejo Road Landslide on January 13, 2005 and February 1, 2005 to look for surface expressions related to active earth movement. In addition, the City of Santa Barbara survey crew measured established survey monitoring points in the area.

Survey data from 1998 through 2004 showed the Conejo Road Landslide continued to creep after the significant 1998 slippage. The creep slowed with survey data for the last six months showing movement to be less than two inches.[25] Survey point 5017 is outside of active Slide Mass A, Slide Mass B and Slide Mass C has showed little or no vertical movement since measurements began; however, a vertical up movement of 0.14 feet was recorded in January 2005. The survey monitoring point uplift is discussed in more detail later in this section.

The January 2005 rainstorms caused erosion along Sycamore Creek at the toe of the old landslide (Qlso). This erosion caused creek bank retreat. The residence at 1815 Stanwood Drive was adversely impacted. Erosion and bank slippage resulted in the undermining of an area being used for storage and the yard between the house and the creek. Photographs 1 and 2 in Appendix A illustrate these conditions.

Asphalt cracking near the head and lateral scarps of Slide Mass A was observed. This cracking appeared to be relatively fresh and is occurring in an area with historic and significant earth movement. An extension crack was forming downslope from survey monitoring point 5043. Several other less defined pavement cracks were also observed on Conejo Road near its intersection with Conejo Lane. The crack trend lines up with a ground crack in the soil. Theses cracks appear to be extension in movement. Soil cracking may represent an old lateral slide scarp. Creep appears to be occurring. Photographs 3, 4, 5, and 6 in Appendix A illustrate the observed conditions.

Several areas of recent pavement cracking were observed outside of active Slide Mass A, Slide Mass B and Slide Mass C. A pavement crack that cuts diagonally across Conejo

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[24] Santa Barbara Count Flood Control & Water Conservation District Official Rainfall Records STA 228-Stanwood Fire Station

[25] City of Santa Barbara Public Works Department, Interoffice Memo, Monitoring on Sycamore Canyon and Conejo Road Areas, Dated January 19, 2005

Road was observed near 444 Conejo Road. Hardscaped areas visible from the road appeared to be relatively new and showed no obvious signs of cracking. This crack did not fit other road crack patterns. The cause of the crack is unknown and could be attributed to settlement or earth movement. Photograph 7 in Appendix A illustrates this crack.

The next adjacent residence is 450 Conejo Road. Survey monitoring point 5017 is located in front of the home. Pavement and block walls are showing signs of distress. The survey point is showing uplift. Plastic sheeting was observed covering a slope descending to the backyard of another nearby residence. That residence showed signs of distress. Preliminary observations suggest that other landslide movement may be occurring outside Slide Mass A, Slide Mass B and Slide Mass C. All features observed from the road may not be related. However, there is enough data to suggest incipient earth movement. This earth movement would involve the descending slope and homes located there. Photograph 8 in Appendix A illustrates the survey monitoring point in relation to 450 Conejo Road.

Pavement cracks were also observed in the road near 428 and 434 Conejo Road. These cracks are open and appear active. The cracks are roughly parallel to the outside edge of the road. Material underlying the road in this area appears to be creeping downslope. Conejo Lane residences may be located downslope in some areas. No obvious indication of slope movement on the descending slopes could be observed from the edge of Conejo Road. Continued expansion or enlargement of creep in this area may require the walking of these slopes and geologic observations. Photographs 9 and 10 in Appendix A illustrate this area.

The pavement in Ealand Place underlain by Slide Mass C was down dropped but did not show obvious signs of recent pavement cracking. However, the driveway to 16 Ealand Place was covered with plastic sheeting. Some slippage in the head scarp area may be occurring. This slippage is upslope from the Ealand Place survey monitoring point. Earth movement may not be immediately reflected at the survey point. Photographs 11 and 12 in Appendix A illustrate this area.

EARTH MOVEMENT 1998

Active 1998 earth movement within the Conejo Road Landslide was observed as ground cracking, landscape buckling and separation, down dropping of paved areas, and cracking and separation of structures from footings. Utility lines were broken and were brought above ground on flexible connections where feasible. The magnitude of distress induced by earth movement varied depending upon the specific location and movement ranged from less than an inch to five feet or more in some locations. Plate 1 accompanying this report presents preliminary geologic observations of the 1998 active earth movement. Active earth movement involved the previously mapped 1983 landslide masses and extended beyond those boundaries in some areas. Observed 1998 features relative to previously mapped landslide boundaries are discussed in more detail later in this report. A well-developed landslide head scarp was observed forming in the front yards of 16 and

22 Ealand Place. This head scarp trended parallel to Ealand Place, crossed the driveway and Ealand Place, and trended in an east direction toward 11 and 17 Ealand Place. The residence at 11 Ealand Place is located within the active 1998 landslide mass. Enough earth movement occurred to rotate the northmost caisson support holding up the garage.

In a south direction toward 27 Ealand Place, the head scarp could be traced along the west side of 27 Ealand Place and observed descending toward the canyon bottom. The residential structure located at 27 Ealand Place was experiencing cracking and earth movement on all sides. The house and garage were separated by a several inch crack. Soil was down dropping and moving away from 27 Ealand Place. The residence immediately to the east, 29 Ealand Place, was vacated due to landslide distress. Active earth movement at 17 and 29 Ealand Place appears to be moving in a more south direction into the canyon bottom. Landsliding in this area did not encounter any other structures before the canyon bottom.

The active north landslide boundary was easily traceable in a northwest direction from 474 Conejo Road through the backyard of 468 Conejo Road and then to 17 Ealand Place. At 468 Conejo Road there was a pronounced upward buckle of the drive that was suggestive of compression. It was uncertain at the time if the uplift was the result of toe out of an upper descending landslide mass or reflective of a bend in the lateral landslide scarp. There were pronounced cracks and separation along the outside west edge of the residence. The residence at 474 Conejo Road is within the active landslide mass.

The landslide lateral boundary then crossed Conejo Road, Conejo Lane and Conejo Road again as the boundary trends in an east direction. There were noticeable well-defined down drops in the roads. The road surfaces were resurfaced to provide vehicle access. The landslide traverses an undeveloped slope and toes out at 1815 Stanwood Drive. The landslide toe came to rest at the back of the residence.

The south boundary of the 1998 active landslide continued upslope from 1815 Stanwood Drive through 508 Conejo Road. The residence at 508 Conejo Road was on jacks and being releveled as the landslide continued to creep. Also, additional ground cracks outside the main lateral boundary were observed. These ground cracks were suggestive of continued earth movement and landslide growth. Active landsliding was believed to be continuing to develop in the area.

From 508 Conejo Road, the south landslide boundary trends west toward 494 Conejo Road. Between 494 and 508 Conejo Road, there was an area where shallow debris-mudflow deposits were observed. These deposits are believed to be shallower than the 1998 active landslide mass and separate from the deeper-seated 1998 active landslide.

A well-defined ground crack at 494 Conejo Road was observed trending upslope and through the residence. This residence was experiencing continued landslide creep and the plumbing was reported by the property owner to require continued repair. New ground cracks were continuing to develop in a west direction and upslope from 494

Conejo Road where a recent crack was reported by the property owner to have cut through a small fish pond.

The 1998 ground cracking by the fish pond was outside the south landslide boundary and suggested continued landslide creep and growth. These cracks trended toward 29 Ealand Place. Continued ground cracking in this area may be the result of earth movement expansion of the landslide mass near 29 Ealand Place or upslope retreat of the landslide boundary underlying 494 Conejo Road.

Residences located at 486 and 478 Conejo Road and 21 Ealand Place were in the center portion of the 1998 active landslide.

A separate and unrelated debris-mudflow occurred in the canyon south of the Conejo Road Landslide and was named the Conejo South Mud Slide. This debris-mudflow is shown on the Preliminary Geologic Map as a portion of the failure crossed the previously mapped limits of the Conejo Road Landslide.

A separate and unrelated landslide in the vicinity of 265 Conejo Road is also included on the Preliminary Geologic Map. This landslide consists of an undeveloped hillside that was moving downslope onto Conejo Road. The toe of the landslide moved onto Conejo Road reducing the road width. Landslide material blocked one of two drains that intercept surface runoff and directed the surface runoff toward the north. As of July 1998 the lowermost drain was operational.

Water from this drain outlets downslope at 1985 Stanwood Drive and flows between the residence and detached garage before reaching Sycamore Creek. The owner reported minor erosion occurring on the property in 1998.

The 1998 landslide movement resulted in the demolition of homes located at 494 Conejo Road and at 21, 27, and 29 Ealand Place.

EARTH MOVEMENT 1998 AND 1983

Major earth movement was reported by Geotechnical Consultants to have occurred on December 19 and 25, 1983. Observed areas of 1998 landslide movement were compared to 1983 landslide features discussed in 1984 and 1985 geotechnical reports.[26,27,28] The 1998 landslide movement included areas previously mapped as Slide Mass A, Slide Mass B and Slide Mass C. Earth movement in the 1984 report was very active within Slide Mass A. Slide Mass B had six to twelve inches of down drop and Slide Mass C was

[26] Geotechnical Consultants, Inc., 1984, Geotechnical Investigation, Conejo Road Landslide, Consultant Report prepared for the City of Santa Barbara, Dated January 13, 1984

[27] Geotechnical Consultants, Inc., 1984, Geotechnical Investigation, Conejo Road Landslide, Santa Barbara, California, Consultant Report prepared for the City of Santa Barbara, Dated April 1984

[28] Leighton & Associates, 1985, Final Phase I Report of Engineering Design Services for Improvements to Surface and Subsurface Drainage in the Vicinity of the Conejo Road Landslide, City of Santa Barbara, California, Consultant Report prepared for the City of Santa Barbara, Dated January 4, 1985

primarily ground cracking. The 1998 landslide combined all three slide masses and moved more uniformly as a single mass.

The 1998 active landslide boundary located at 22 and 16 Ealand Place expanded and also included 27 Ealand Place. Ground cracking in front of 10 Ealand Place and 350 Conejo Road were present in 1984 and existed in 1998 with no signs of downslope earth movement on the paved road. However, survey data indicates uplift in this area that may be influenced by the ground cracking. The north landslide boundary followed the same area as the 1983 earth movement in Slide Mass C and Slide Mass B trending between 11 and 17 Ealand Place and the backyard of 468 Conejo Road.

The 1998 active landslide boundary connects with the 1983 Slide Mass A and follows the same boundary as the 1983 failure. Landslide material again toed at 1815 Stanwood Drive as it did in 1983 and 1978. However, the toe area was not quite as large as previously reported.

The south boundary of the 1998 active landslide included Slide Mass A and Slide Mass B at 508 Conejo Road and Slide Mass C was additionally included at 494 Conejo Road and 27 Ealand Place. A separate and unrelated debris-mudflow occurred in the canyon south of the Conejo Road Landslide. This earth movement has been named the Conejo South Mud Slide. The mudflow deposited material in the toe area of Slide Mass C and cut Slide Mass C in the vicinity of 498 Conejo Road destroying an outbuilding. Plate 2 of this report presents the relationship of the 1983 landslide movement and the 1998 landslide movement.

EARTH MOVEMENT 1983-1984

Landslide movement occurred in December 1983. Geotechnical Consultants, Inc. was retained to investigate earth movement.[29] Their investigation identified three separate landslide masses that were referred to as Slide Mass A, Slide Mass B and Slide Mass C.

Slide Mass A was reported to have the most movement. This landslide undermined and partially collapsed the house at 481 Conejo Road. Homes at 508 and 530 Conejo Road and 1815 Stanwood Drive were also adversely impacted.[30] In addition, utility lines were broken and Conejo Road became impassable. This landslide adversely impacted the same homes reported in the Hoover 1979 geologic report.[31]

Slide Mass B began to develop further upslope from Slide Mass A and was reported by Geotechnical Consultants, Inc. to display vertical movement of six inches to one foot between January and February 1984.

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[29] Geotechnical Consultants, Inc., 1984, Geotechnical Investigation, Conejo Road Landslide, Consultant Report prepared for the City of Santa Barbara, Dated January 13, 1984

[30] Geotechnical Consultants, Inc., 1984, Geotechnical Investigation, Conejo Road Landslide, Consultant Report prepared for the City of Santa Barbara, Dated January 13, 1984

[31] Hoover, Michael F., 1979, Geologic Investigation, Conejo Road Landslide, Consultant Report, Dated June 22, 1979

Slide Mass C was identified extending upslope to Ealand Place and encompassed 17, 21 and 29 Ealand Place. Slide Mass C was reported as not showing observable movement in April 1984.[32] By January 4, 1985 pavement cracking was reported in the driveways at 10 and 16 Ealand Place.[33] Very slow creep was occurring in Slide Mass C.

The Conejo Slide Ordinance 4294 was adopted on September 18, 1984. This ordinance prohibited any new construction in the area identified as Slide Mass C in the Geotechnical Consultants 1984 report. In addition, surface drainage improvements were made, all homes were made to connect to a sewer system and a network of survey monitoring points were established and routinely surveyed to identify areas of ground movement. Survey monitoring and the Conejo Slide Ordinance have been in effect since implementation.

EARTH MOVEMENT 1978

Landslide movement was reported by Michael F. Hoover[34] to have occurred in the spring and summer of 1978. The landslide head scarp was reported to be adjacent to and east of 481 Conejo Road. The landslide head scarp continued to the northeast and crossed upslope from the Conejo Road-Conejo Lane intersection. The south side of the landslide impacted 508 Conejo Road and the landslide encompassed 530 Conejo Road. Landslide movement continued downslope to the west side of 1815 Stanwood Drive.

Landslide movement was reported to have broken sewer, water and natural gas utility line service to the area. The active landslide mass was reported to be approximately 300 feet long and 200 feet wide.

EARTH MOVEMENT 1969

Documentation of 1969 landslide movement in the Conejo Road area is sparse with reported landslide movement in the vicinity of 530 Conejo Road. Review of low altitude stereoscopic aerial photographs taken on January 26, 1969[35] also showed areas of active landsliding on the south-facing slope surrounding 27 Ealand Place and the vicinity between 427 and 501 Conejo Lane. A dark area was observed on Conejo Road near properties at 481 and 487. The reason is unknown although it does not appear to be a shadow. Conejo Lane earth movement is located on the east-facing slope descending from Conejo Lane.

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[32] Geotechnical Consultants, Inc., 1984, Geotechnical Investigation, Conejo Road Landslide, Santa Barbara, California, Consultant Report prepared for the City of Santa Barbara, Dated April 1984

[33] Leighton & Associates, 1985, Final Phase I Report of Engineering Design Services for Improvements to Surface and Subsurface Drainage in the Vicinity of the Conejo Road Landslide, City of Santa Barbara, California, Consultant Report prepared for the City of Santa Barbara, Dated January 4, 1985

[34] Hoover, Michael F., 1979, Geologic Investigation, Conejo Road Landslide, Santa Barbara, California, Consultant Report, Dated June 22, 1979

[35] 1969, Aerial photographs, Flight Number HB NH, 144 through 147, Dated January 26, 1969

EARTH MOVEMENT 1952

The most recent aerial photo flight available to cover the 1952 rainstorm season was dated November 18, 1953.[36] In these photographs, changes were observed in the area adjacent to Stanwood Drive and Sycamore Creek. This area appears to have been subject to flooding. Also, there were subtle signs of erosion and obvious signs of earth movement. Features suggestive of a landslide head scarp were observed on the slope descending from Ealand Place to Sycamore Creek. When this feature is compared to earlier aerial photographs dated July 30, 1948,[37] shoulder loss of Conejo Road was observed in the area of landsliding. Conejo Road appears to have been moved into slope. This 1952 landslide included portions of Slide Mass B and Slide Mass C[38] as identified in the 1983 active earth movement. The 1952 earth movement also extended further to the north and outside the area of active 1983 and 1998 active earth movement. Other areas of landslide movement were also observed in the 1953 aerial photographs.

DRAINAGE FACILITIES LANDSLIDE DAMAGE

In 1998 a base map was prepared by the City of Santa Barbara locating drainage facilities within the Conejo Road area. Superimposed on this base map are approximate locations of utility line breakage.[39] All 1998 reported line breaks were within or adjacent to the boundaries of active earth movement. These areas of breakage correlate well with 1952, 1983, and 1998 areas of observed landslide movement. Line breakage is the result of applied stress due to creep and active landslide movement.

RAINFALL IMPACT ON THE CONEJO ROAD LANDSLIDE

Soil failure (slips), landslide debris flows and rainstorms can be correlated. While the Conejo Road Landslide has continued to enlarge over the years, all reported significant earth movement has occurred during times of unseasonably high rainfall. There have been reported episodes of active earth movement at the Conejo Road Landslide area in 1969, 1978, 1983-84, 1998, and 2005 . The following table presents annual rainfall and dates of reported earth movement. Stanwood Fire Station records were utilized for rainfall data from 1954 (earliest records) to present. For rainfall data earlier than 1954, El Estero Station records were utilized.

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[36] 1953, Aerial photographs, Flight Number CC-2, 33 through 35, Dated November 18, 1953
[37] 1948, Aerial photographs, 12-20 through 12-23, Dated July 30, 1948
[38] Geotechnical Consultants, Inc., 1984, Geotechnical Investigation, Conejo Road Landslide, Santa Barbara, California, Consultant Report prepared for the City of Santa Barbara, Dated April 1984
[39] City of Santa Barbara, July 17, 1998, Conejo Area Drainage Facilities Sheet 1, Scale 1" = 50'

Table 1 – Rainfall Impact on the Conejo Road Landslide

Annual Rainfall	1952[40]	1969[41]	1978[42]	1983[43]	1984	1995	1998	2005
Annual Rainfall in Inches[44]	31.21	33.73	43.96	43.12	16.53	48.48	51.69	31.16*
Area of Earth Movement	Ealand Pl. Conejo Rd. Conejo Ln. Stanwood Dr.	Conejo Rd. Ealand Pl. Conejo Ln.	Conejo Rd. Conejo Ln. Conejo Rd. South Landslide Area	Conejo Rd. Conejo Ln. Ealand Pl. Stanwood Dr.	Conejo Rd. Conejo Ln. Stanwood Dr. Ealand Pl.	Creep at Survey Points	Conejo Rd. Ealand Pl. Conejo Ln. Stanwood Dr.	Creep at Survey Points

* Season recorded through January 11, 2005

Rainfall total for the 1998 year exceeded the total recorded rainfall in years of previous reported landsliding (1969, 1978, and 1983). Furthermore, the rainfall total for 1998 is the highest for any of the recorded years. The partial rainfall total for the 2005 year, September 1, 2004 through January 11, 2005, when compared with Stanwood Fire Station yearly recorded totals, ranks seventh highest since 1954. The January 10, 2005 twenty-four hour total of 5.75 inches is the second highest recorded total. The highest twenty-four hour total recorded was 9.61 inches on January 10, 1995.

CONCLUSIONS

1. Prior to January 2005 the Conejo Road Landslide area had geologic report documented episodes of movement in 1969, 1978, 1983, and 1998. Earlier episodes of earth movement can be observed on aerial photographs. This landslide movement is the reactivation of portions of a larger older underlying landside. Active 2005 landslide movement continues within the earlier landslide masses and is expanding outside of the previously mapped active landslide boundaries. This expanding earth movement is underlain by older landslides.

2. Earth movement in 1983 occurred as separate slide blocks with different rates of slippage. These individual blocks were identified as Slide Mass A, Slide Mass B and Slide Mass C. Slide Mass A had previously failed in 1978 in almost the same configuration. Slide Mass B and Slide Mass C were 1983 upslope enlargements. Earth movement in 1998 occurred within the previously mapped Slide Mass A, Slide Mass B and Slide Mass C. In some areas the 1998 landslide movement extended beyond the previously mapped 1983 slide boundaries. In 1998,

[40] Santa Barbara County Flood Control & Water Conservation District Official Rainfall Records – El Estero Station
[41] Geotechnical Consultants, Inc., 1984, Geotechnical Investigation, Conejo Road Landslide, Santa Barbara, California, Consultant Report prepared for the City of Santa Barbara, Dated April 1984
[42] Hoover, Michael F., 1979, Geologic Investigation, Conejo Road Landslide, Consultant Report, Dated June 22, 1979
[43] Geotechnical Consultants, Inc., 1984, Geotechnical Investigation, Conejo Road Landslide, Santa Barbara, California, Consultant Report prepared for the City of Santa Barbara, Dated April 1984
[44] Santa Barbara County Flood Control & Water Conservation District Official Rainfall Records STA228 – Stanwood Fire Station

landsliding within Slide Mass A, Slide Mass B and Slide Mass C moved more uniformly as one mass.

3. The most obvious landslide movement within the Conejo Road Landslide has always been during or after periods of high annual rainfall when rainfall infiltration reaches the basal slide plane. Earth movement in the past has been relatively slow. As more disturbed material accumulates the potential for more rapid movement becomes greater. In addition, the potential increases for the active landslide toes to reach Sycamore Canyon.

4. The magnitude of earth movement will be influenced by infiltration of rainwater received to date and unknown future storms. Landslide movement can lag behind rainstorms, creep can occur without obvious ground cracking and any signs of movement can take several months or longer before becoming apparent.

5. Geologic observations of the Conejo Road Landslide in 2005 found some landslide blocks associated with Slide Mass A, Slide Mass B and Slide Mass C that may be slowly creeping based upon subtle cracking. Subtle cracking was observed in areas outside the Conejo Road Landslide that are underlain by similar old landslide material and shows that these areas are also creeping. Some slide blocks in the outside areas are some distance from the measured survey points and may not directly influence the survey data.

6. Vertical rise in survey monitoring point 5017 near 450 Conejo Road suggests the area may be at the toe of incipient landslide movement. Survey monitoring to confirm this vertical rise needs to be performed. Continued movement in this area will require further geologic evaluation.

7. Conejo Road pavement cracking shown in Photographs 9 and 10, Appendix A, are near 428 and 434 Conejo Road. These pavement cracks may be occurring close to and south of an area where Conejo Road was one lane wide in the 1948 aerial photographs.

8. Historically creep and active earth movement within the Conejo Road Landslide have caused stress to buried utility lines. When line failure and repair locations are plotted on a map, these failure areas correlate with slide boundaries or blocks within the landslide. Utility lines have been placed aboveground where practical.

9. Between 1983 and 1998 episodes of active earth movement, improvements to surface drainage along Conejo Road were made by the City of Santa Barbara. These improvements, such as storm drain boxes, storm water drain lines, road resurfacing and pavement crack sealing, have helped reduce surface water runoff infiltration.

REMARKS

The conclusions and recommendations contained herein are based upon the findings and observations made primarily from geologic interpretation of aerial photographs and surface observations. Subsurface exploration is necessary to determine conditions at depth.
This report is issued for forensic purposes. Active and inactive earth movement will result in changed conditions over time. This report is not to be used for residential development, building improvements, property transfers or to obtain building permits. Detailed site-specific evaluation with subsurface exploration by a California certified engineering geologist is required.

The scope of our services did not include any environmental assessment or investigation of the presence or absence of hazardous or toxic materials in the soil, surface water, groundwater or air, on, below or around the site.

This report has been compiled for the exclusive use of the City of Santa Barbara, and its agents or representatives. It shall not be transferred to or used by other parties, or applied to any project in this study area, other than as described herein, without consent and/or thorough review by Frank J. Kenton.

Thank you for the opportunity to be of service. If you have any questions, please contact me at (805) 520-0831.

Respectfully submitted,

PROFESSIONAL GEOLOGIST
Frank J. Kenton
No. EG1254
exp 6/30/06
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Frank J. Kenton,
California Certified Engineering Geologist CEG 1254

FJK:de

Distribution (4) Addressee

Appendix A

Photo 1   Sycamore Creek erosion near 1815 Stanwood Drive, 1/13/05.

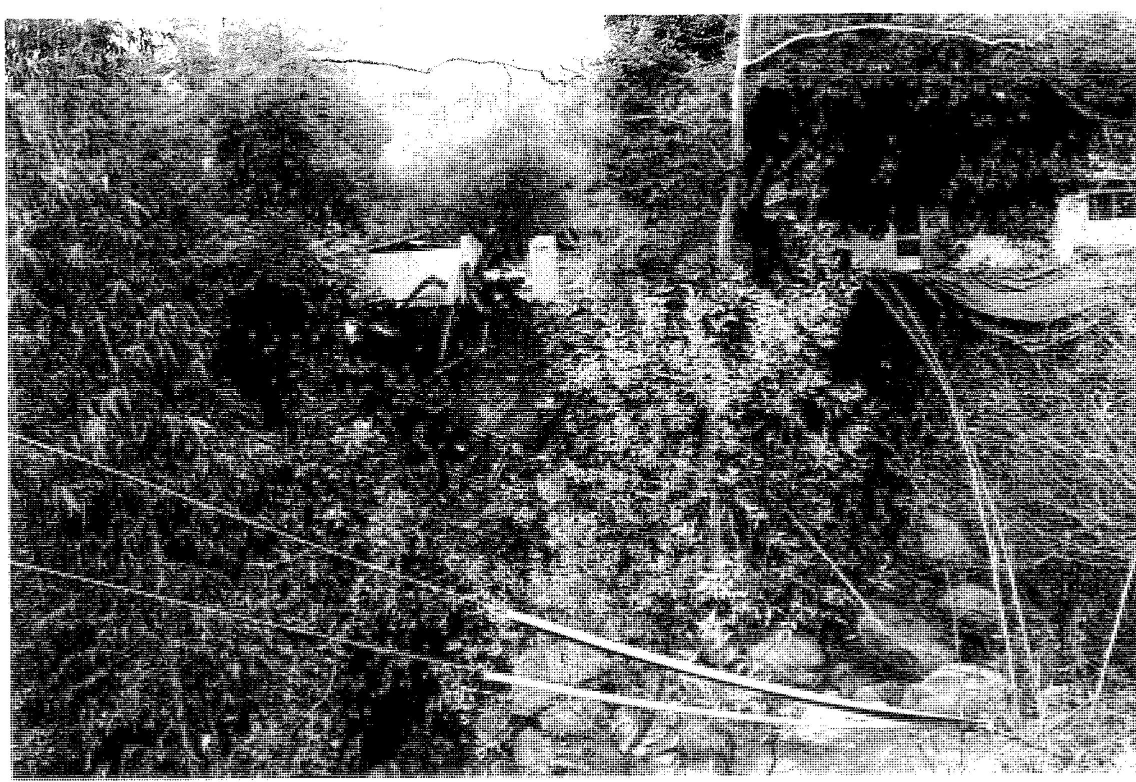


Photo 2   Sycamore Creek erosion near 1815 Stanwood Drive, 1/13/05.

Photo 3 Pavement cracking Conejo Road Slide Mass A near survey monitoring point 5043, 1/13/05.

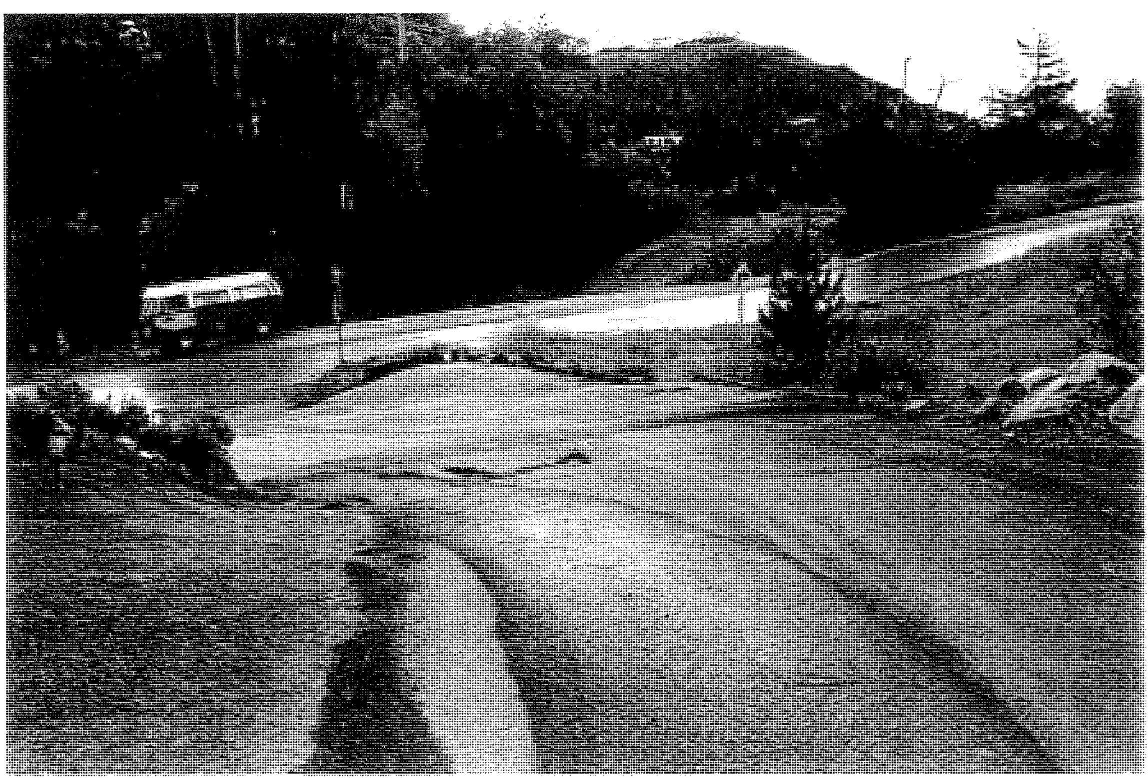


Photo 4 Slide Mass A scarp viewed from Conejo Lane, 1/13/05.

Photo 5 Pavement cracks Conejo Road slide Mass A near the Conejo Road / Conejo Lane intersection, 2/1/05.

Photo 6 Ground crack that correlates with pavement cracks in Photo 5, 2/1/05.

Photo 7 Pavement crack near 444 Conejo Road, 1/13/05.

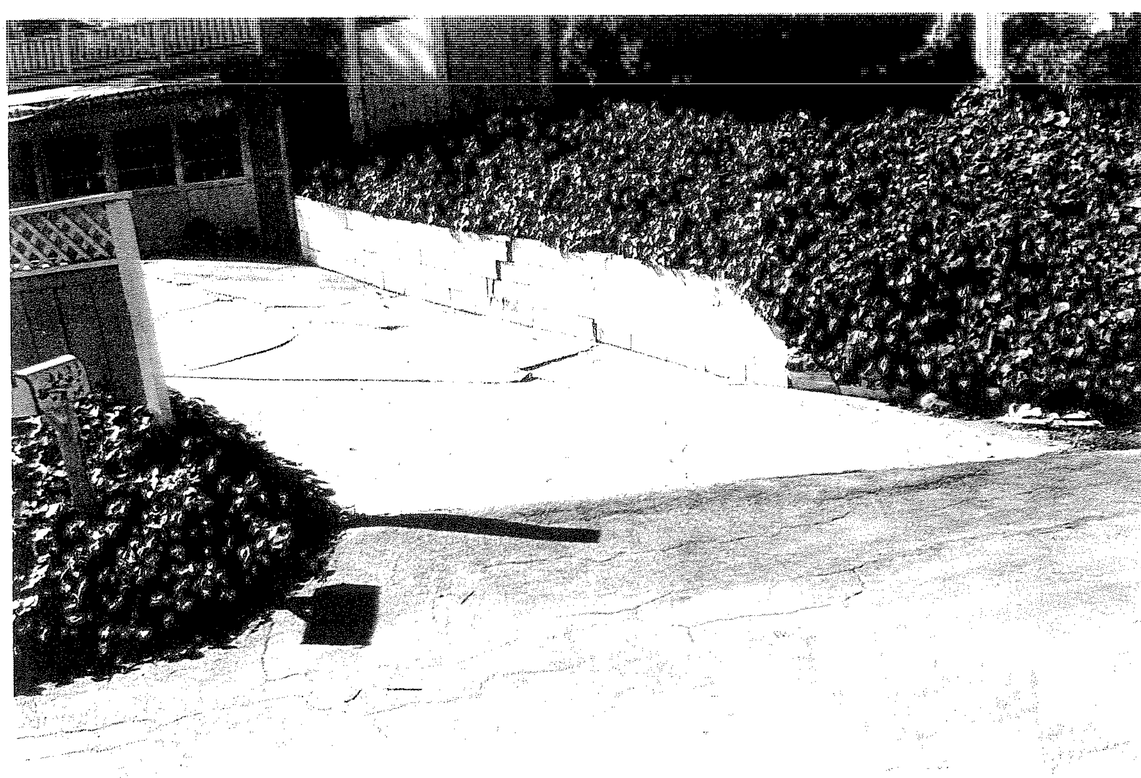


Photo 8 Survey monitoring point 5017 near 450 Conejo Road, 2/1/05.

Photo 9 Pavement cracks near 428 Conejo Road, 1/13/05.

Photo 10 Pavement cracks near 434 Conejo Road, 1/13/05.

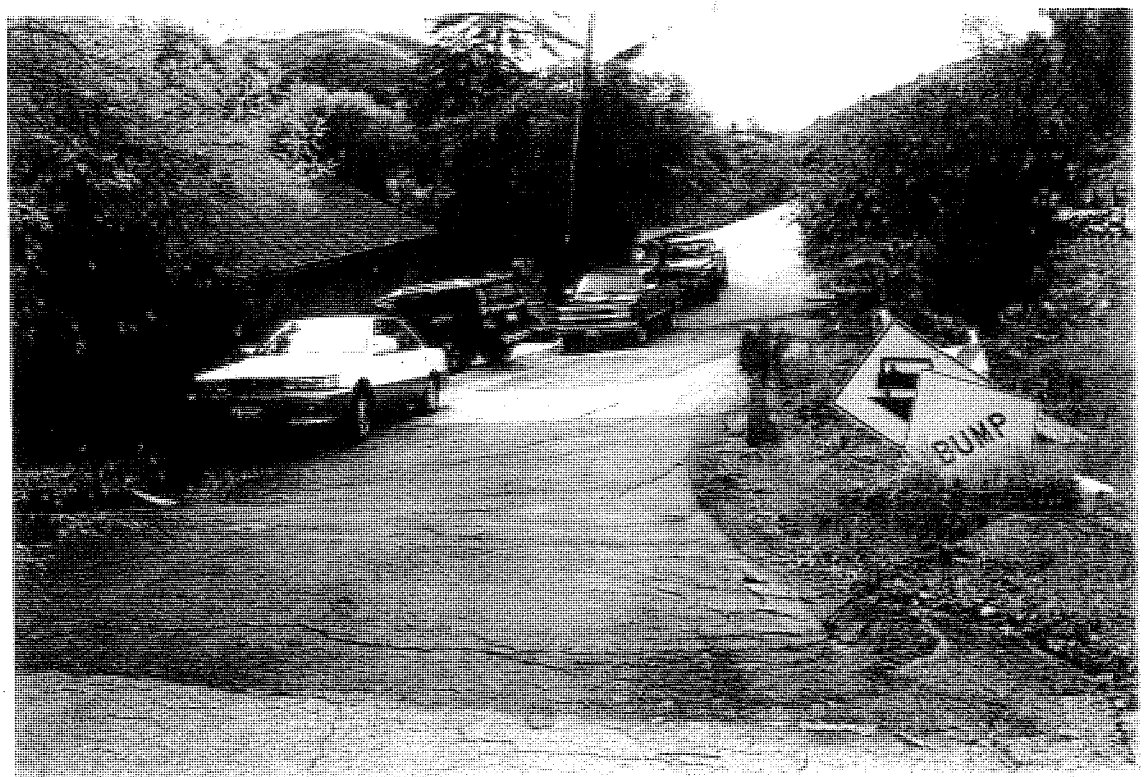


Photo 11 Looking south near 10 Ealand Place across Slide Mass C lateral scarp, 1/13/05.

Photo 12 Looking north at driveway entrance to 16 Ealand Place, 1/13/05.

SURVEY DATA

City of Santa Barbara
Public Works Department

Interoffice Memorandum

DATE: December 18, 2007

TO: Pat Kelly, Assistant Public Works Director/City Engineer

FROM: Charley Brown, Survey Party Chief CB

SUBJECT: CONEJO ROAD SETTLEMENT SURVEY REPORT – NOVEMBER 2007

This report is an update on the history of the movement of monitoring points on Conejo Road after our most recent GPS monitoring campaign on November 6 and 7, 2007.

SCHEDULING

Since 1998, when the landslide occurred, through 2004, we monitored the movement on Conejo Road annually in July. In 2005 we started monitoring Conejo Road on a semi-annual basis, both before and after the rainy season. This decision was made due to the closure of Sycamore Canyon Road in the fall of 2005, and the landslide at La Conchita in January 2005.

HORIZONTAL MOVEMENT

Per Exhibit A, Monuments 5014 and 5018 continue to show the greatest horizontal movement. These two points moved more horizontally in the five-month period of January 13, 2005, through June 23, 2005, than in the previous three-and-a-half-year period of July 16, 2001, through January 13, 2005. During the six-month period of June 23, 2005, through December 8, 2005, the rate of movement diminished, but then increased in the subsequent two six-month periods of December 8, 2005, through May 24, 2006, and May 24, 2006, through December 6, 2006. Since December 6, 2006, the rate of movement has diminished significantly.

	7/16/01 to 1/13/05	1/13/05 to 6/23/05	6/23/05 to 12/8/05	2/08/05 to 05/24/06	05/25/06 to 12/06/06	12/06/06 to 11/08/07	Overall 3/01/98 to 11/08/07
Point No. 5014	0.70'	1.00'	0.22'	0.25'	0.35'	0.13'	7.97'
Point No. 5018	0.97'	1.63'	0.27'	0.64'	0.45'	0.14'	13.02'

VERTICAL MOVEMENT

Per Exhibit B, Monuments 5014 and 5018 continue to show the greatest vertical movement. During the overall vertical measuring period of December 1987, through November 8, 2007, Monument 5014 has decreased in elevation by 3.6' and Monument 5018 has decreased in elevation by 1.3'. Other Monuments display vertical movement consistent with unstable slopes.

H:\Group Folders\ENGR\wp\Brown\conejo\ConejoMemo2007Nov

TERMINATION OF MONITORING POINTS 5016 and 5017

In December 2005, we stopped measuring Monitoring Points 5016 and 5017 as they have shown no significant movement since monitoring began in 1984 and 1998, respectively, and also because they present multiple obstructions to satellite observation.

TERMINATION OF MONITORING POINT 543

In May 2007, we added Monitoring Point 543 to our monitoring campaign, which is at the intersection of Stanwood Drive and Conejo Lane. We first measured Point 543 in March 2006. We have now decided to remove it from our monitoring campaign as it has shown no significant movement and because it presents multiple obstructions to satellite observation.

SUMMARY

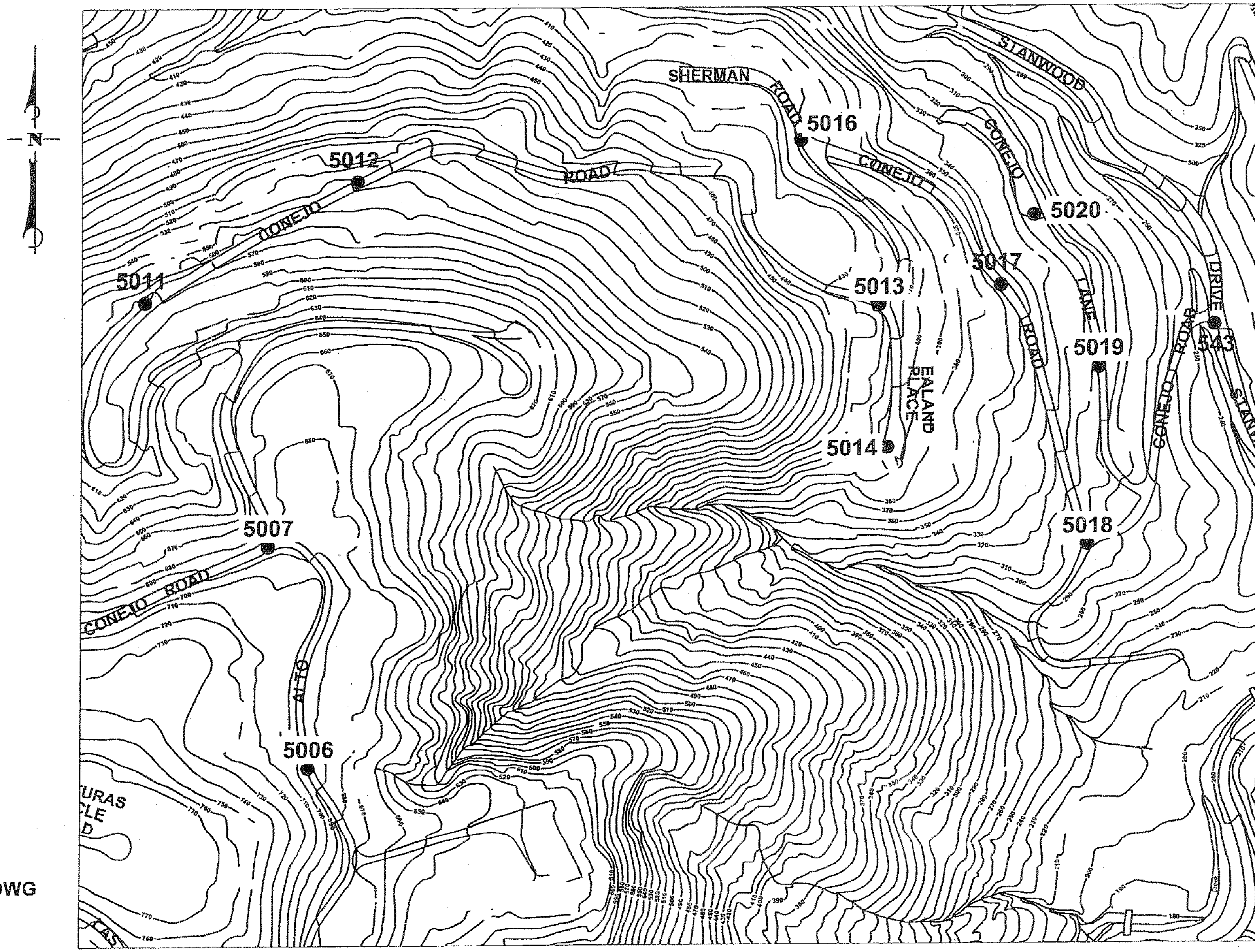
In summary, monitoring our points on Conejo Road indicates that the area remains unstable. The next monitoring campaign is scheduled for May, 2008.

CB/MM/sk

Attachments:
1. Vicinity Map
2. Exhibit A – Conejo Road Horizontal Movement Table
3. Exhibit B – Conejo Road Vertical Movement Table

cc: Paul Casey, Acting Public Works Director
George Estrella, Chief Building Official
Jon Peebles, Water Distribution Superintendent
Manuel Romero, Wastewater Collection System Superintendent
Homer F. Smith II, Principal Civil Engineer
Rick Fulmer, Streets Manager
Dru van Hengel, Supervising Transportation Engineer
Public Works Front Desk Binder
David Postada, Engineering Technician

SURVEY MONITORING POINTS
IN THE CONEJO ROAD VICINITY



SCALE: 1" = 300'

DRAWING: 33-00011.DWG
DATE: 7-20-2005

Exhibit A

Conejo Road Settlement Survey
Horizontal Movement
March 1998 - November 2007

Point No.	3/01/98 - 3/10/98		3/10/98 - 3/18/98		3/18/98 - 3/26/98		3/26/98 - 7/13/98		7/13/98 - 10/20/98	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5004	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5005	*	*	*	*	*	*	*	*	*	*
5006	*	*	*	*	*	*	*	*	*	*
5007	*	*	NM	NM	NM	NM	*	*	*	*
5008	*	*	*	*	*	*	*	*	*	*
5009	*	*	*	*	*	*	*	*	*	*
5010	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5011	*	*	*	*	*	*	*	*	*	*
5012	*	*	NM	NM	NM	NM	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*
5014	110	0.12'	100	0.11'	97	0.13'	102	2.50'	99	0.34'
5015	*	*	*	*	*	*	*	*	*	*
5016	*	*	NM	NM	NM	NM	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*
5018	101	0.24'	110	0.19'	100	0.23'	104	4.35'	101	0.41'
5019	*	*	NM	NM	NM	NM	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*
5023	*	*	*	*	*	*	*	*	*	*
5024	*	*	*	*	*	*	*	*	*	*
5025	*	*	*	*	*	*	*	*	*	*
5026	*	*	*	*	*	*	*	*	*	*
5027	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5030	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5031	*	*	*	*	*	*	*	*	*	*
5043	115	0.10'	93	0.14'	96	0.25'	Destroyed during road re-surfacing			- - -

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North
# =	Station is severely obstructed; accuracy is 0.2'.

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Exhibit A

Conejo Road Settlement Survey
Horizontal Movement
March 1998 - November 2007

Point No.	10/20/98 - 7/22/99		7/22/99 - 7/10/00		7/10/00 - 7/16/01		7/16/01 - 7/16/02		7/16/02 - 7/09/03	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5006	*	*	*	*	NM	NM	*	*	*	*
5007	*	*	*	*	*	*	*	*	*	*
5011	*	*	*	*	*	*	NM	NM	*	*
5012	*	*	*	*	*	*	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*
5014	102	0.20'	103	0.45'	102	1.47'	98	0.32'	104	0.16'
5016	*	*	*	*	*	*	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*
5018	104	0.26'	102	0.76'	104	2.45'	100	0.38'	106	0.25'
5019	*	*	*	*	*	*	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*

Point No.	7/09/03 - 7/16/04		7/16/04 - 1/13/05		1/13/05 - 6/23/05		6/23/05 - 12/07/05		12/07/05 - 05/24/06	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5006	*	*	*	*	*	*	*	*	*	*
5007	*	*	*	*	*	*	*	*	*	*
5011	*	*	*	*	*	*	*	*	*	*
5012	*	*	*	*	*	*	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*
5014	96	0.12'	110	0.10'	103	1.00'	102	0.22'	116	0.25'
5016	*	*	*	*	*	*	NM	NM	NM	NM
5017	#	#	#	#	#	#	#	#	NM	NM
5018	102	0.19'	111	0.15'	104	1.63'	104	0.27'	106	0.64'
5019	*	*	*	*	*	*	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North
# =	Station is severely obstructed; accuracy is 0.2'.

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Exhibit A

Conejo Road S..lement Survey
Horizontal Movement
March 1998 - November 2007

Point No.	05/24/06 - 12/06/06		12/06/06 - 05/09/07		05/09/07 - 11/08/07		Overall Movement 3/01/98 - 11/08/07	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5006	*	*	*	*	*	*	*	*
5007	*	*	*	*	*	*	128	0.14'
5011	*	*	*	*	*	*	318	0.16'
5012	*	*	*	*	*	*	134	0.11'
5013	*	*	*	*	*	*	*	*
5014	95	0.35'	106	0.06'	110	0.07'	102	7.97'
5018	103	0.45'	81	0.08'	112	0.07'	104	13.02'
5019	*	*	*	*	*	*	74	0.10'
5020	*	*	*	*	*	*	16	0.07'
543	March 2006 to November 20		*	*	*	*	*	*

Note: Due to severe satellite obstructions and history of lack of movement, we no longer monitor points 5016, 5017 and 543.

Comments: Only monitoring points 5014 and 5018 show significant movement.

The next monitoring compaign will be in May 2008.

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North
# =	Station is severely obstructed; accuracy is 0.2'.

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Exhibit B

Conejo Road Settlement Survey
Vertical Movement
December 1984 - November 2007

		Elevation Measurements Taken Prior to Using GPS* - From December 1984 to February 1998:											
GPS Point No.	Original Point No.	Dec 1984	Nov 1985	Dec 1987	Mar 1988	May 1989	Jun 1990	Jul 1991	Jul 1992	Jan 1993	Aug 1995	Sep 1997	Feb 1998
5006	110	694.0	694.0	NM	NM	NM	693.9	693.9	693.9	693.9	693.9	693.9	NM
5007	109	681.2	681.2	NM	681.3	681.3	681.3	681.3	681.2	NM	681.2	681.3	NM
5011	Set in '98												
5012	Set in '98												
5013	107B				NM	417.9	417.8	417.7	417.8	417.7	418.0	418.0	418.0
5014	106B			395.0	395.0	395.0	395.1	395.0	395.1	395.0	394.9	394.8	394.6
5016	101	397.0	397.0	397.0	397.0	396.9	397.0	397.0	397.0	397.0	396.9	396.9	397.0
5017	Set in '98												
5018	105B			297.5	297.5	297.4	297.4	297.4	297.4	297.4	297.4	297.4	297.2
5019	103B											307.3	307.4
5020	102B											319.3	319.3
5010	108	594.5	594.5	NM	594.5	594.5	594.3	594.4	594.5	594.5	594.3	594.3	NM
	102	316.8	316.8	316.8	316.8	NM	316.7	316.7	613.9	316.8	316.8	Destroyed	
	103	312.6	312.6	312.5	312.6	NM	312.3	312.3	312.5	312.4	312.3	Destroyed	
	104	253.7	253.6	253.6	253.6	Destroyed							
	105	294.4	294.4	Destroyed									
	106	395.1	395.1	Destroyed									
	107	417.1	417.0	Destroyed									

Note: * Measurements from December 1984 to February 1998 have been adjusted by +2.43 feet to reconcile them to the NAVD 88 datum.

** Adjustments have been made to elevations on point #5013 from 1989 to 2001 to reflect its new elevation re-set in the same location in September 2001.

NM = Not Measured

City of Santa Barbara
Public Works Department

Interoffice Memorandum

DATE: June 5, 2007

TO: Pat Kelly, Assistant Public Works Director/City Engineer

FROM: Charley Brown, Survey Party Chief CB

SUBJECT: CONEJO ROAD SETTLEMENT SURVEY REPORT – MAY 2007

This report is an update on the history of the movement of monitoring points on Conejo Road after our most recent GPS monitoring campaign on May 8 and 9, 2007.

SCHEDULING

Since 1998, when the landslide occurred, through 2004, we monitored the movement on Conejo Road annually in July. However, in 2005 we started monitoring Conejo Road on a semi-annual basis, both before and after the rainy season. This decision was made due to the closure of Sycamore Canyon Road in the fall of 2005, and the landslide at La Conchita in January 2005.

HORIZONTAL MOVEMENT

Per Exhibit A, Monuments 5014 and 5018 continue to show the greatest horizontal movement. These two points moved more horizontally in the five-month period of January 13, 2005, through June 23, 2005, than in the previous three-and-a-half-year period of July 16, 2001, through January 13, 2005. During the six-month period of June 23, 2005, through December 8, 2005, the rate of movement diminished, but then increased in the subsequent two six-month periods of December 8, 2005, through May 24, 2006, and May 24, 2006, through December 6, 2006. Since December 6, 2006, the rate of movement has again diminished.

	7/16/01 to 1/13/05	1/13/05 to 6/23/05	6/23/05 to 12/8/05	2/08/05 to 05/24/06	05/25/06 to 12/06/06	12/06/06 to 05/09/07	Overall 3/01/98 – 05/09/07
Point No. 5014	0.70'	1.00'	0.22'	0.25'	0.35'	0.06'	7.91'
Point No. 5018	0.97'	1.63'	0.27'	0.64'	0.45'	0.07'	12.95'

VERTICAL MOVEMENT

Per Exhibit B, Monuments 5014 and 5018 continue to show the greatest vertical movement. During the overall vertical measuring period of December 1987, through May 9, 2007, Monument 5014 has decreased in elevation by 3.5' and Monument 5018 has decreased in elevation by 1.2'. There was no change in elevation in these points since our last monitoring in December 2006. Other Monuments display vertical movement consistent with unstable slopes.

TERMINATION OF MONITORING POINTS 5016 and 5017

In December 2005 we stopped measuring Monitoring Points 5016 and 5017 because they have shown no significant movement since monitoring began in 1984 and 1998, respectively, and also because they present multiple obstructions to satellite observation.

ADDITION OF MONITORING POINT 543

We have added Monitoring Point 543 which is at the intersection of Stanwood Drive and Conejo Lane. We first measured Point 543 in March 2006 and we will now include it in our annual monitoring program.

SUMMARY

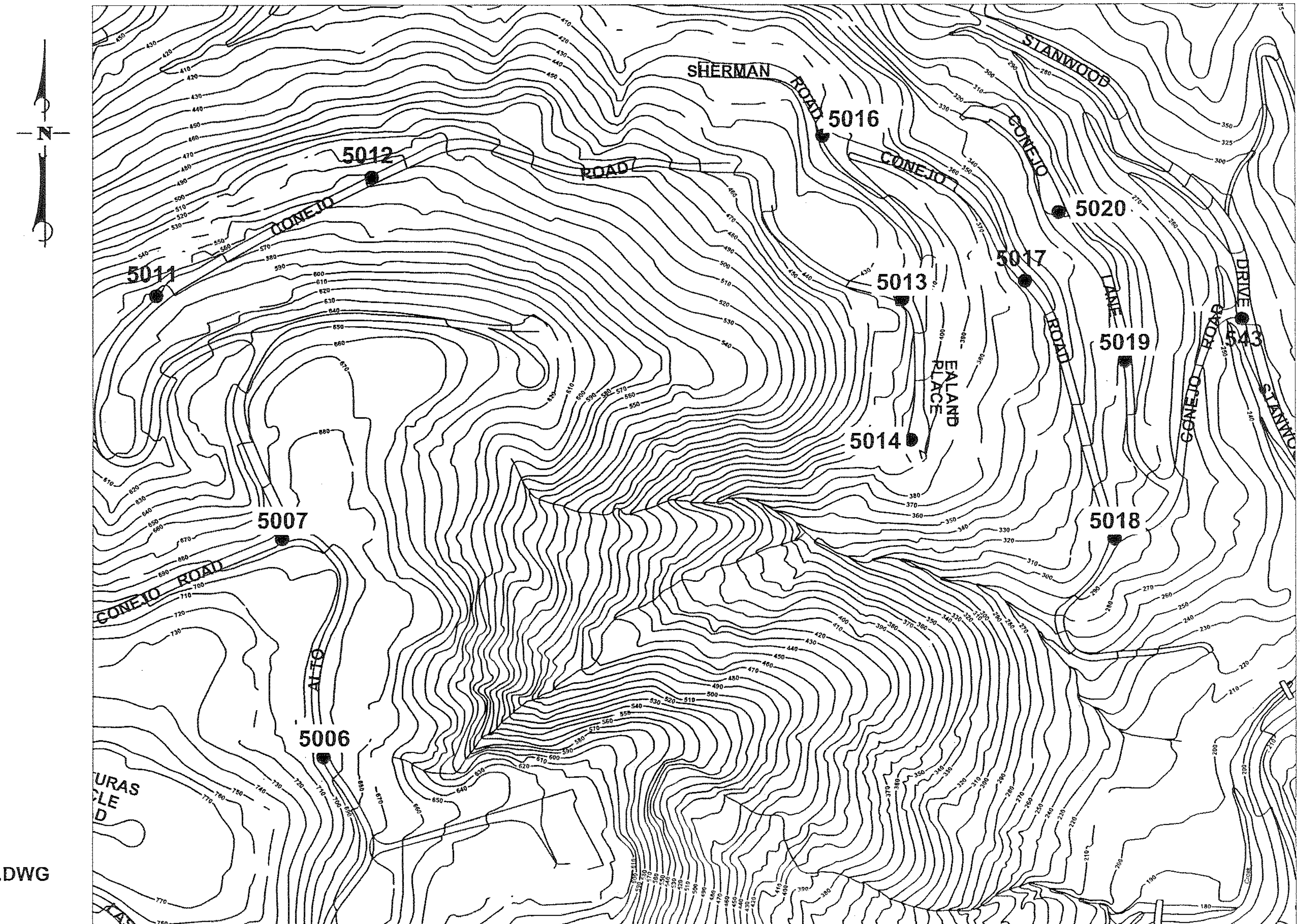
In summary, monitoring our points on Conejo Road indicates that the area remains unstable. The next monitoring campaign is scheduled for December, 2007.

CB/MM/ah

Attachments:
1. Vicinity Map
2. Exhibit A – Conejo Road Horizontal Movement Table
3. Exhibit B – Conejo Road Vertical Movement Table

cc: George Estrella, Chief Building Official
Jon Peebles, Water Distribution Superintendent
Manuel Romero, Wastewater Collection System Superintendent
Homer F. Smith II, Principal Civil Engineer
Dru van Hengel, Supervising Transportation Engineer
Public Works Front Desk Binder

SURVEY MONITORING POINTS
IN THE CONEJO ROAD VICINITY



SCALE: 1" = 300'

DRAWING: 33-00011.DWG
DATE: 7-20-2005

Exhibit A

Conejo Road Settlement Survey
Horizontal Movement
March 1998 - May 2007

Point No.	3/01/98 - 3/10/98		3/10/98 - 3/18/98		3/18/98 - 3/26/98		3/26/98 - 7/13/98		7/13/98 - 10/20/98	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5004	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5005	*	*	*	*	*	*	*	*	*	*
5006	*	*	*	*	*	*	*	*	*	*
5007	*	*	NM	NM	NM	NM	*	*	*	*
5008	*	*	*	*	*	*	*	*	*	*
5009	*	*	*	*	*	*	*	*	*	*
5010	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5011	*	*	*	*	*	*	*	*	*	*
5012	*	*	NM	NM	NM	NM	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*
5014	110	0.12'	100	0.11'	97	0.13'	102	2.50'	99	0.34'
5015	*	*	*	*	*	*	*	*	*	*
5016	*	*	NM	NM	NM	NM	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*
5018	101	0.24'	110	0.19'	100	0.23'	104	4.35'	101	0.41'
5019	*	*	NM	NM	NM	NM	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*
5023	*	*	*	*	*	*	*	*	*	*
5024	*	*	*	*	*	*	*	*	*	*
5025	*	*	*	*	*	*	*	*	*	*
5026	*	*	*	*	*	*	*	*	*	*
5027	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5030	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5031	*	*	*	*	*	*	*	*	*	*
5043	115	0.10'	93	0.14'	96	0.25'	Destroyed during road re-surfacing			- - -

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North
# =	Station is severely obstructed; accuracy is 0.2'.

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Exhibit A

Conejo Road Settlement Survey
Horizontal Movement
March 1998 - May 2007

Point No.	10/20/98 - 7/22/99		7/22/99 - 7/10/00		7/10/00 - 7/16/01		7/16/01 - 7/16/02		7/16/02 - 7/09/03	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5006	*	*	*	*	NM	NM	*	*	*	*
5007	*	*	*	*	*	*	*	*	*	*
5011	*	*	*	*	*	*	NM	NM	*	*
5012	*	*	*	*	*	*	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*
5014	102	0.20'	103	0.45'	102	1.47'	98	0.32'	104	0.16'
5016	*	*	*	*	*	*	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*
5018	104	0.26'	102	0.76'	104	2.45'	100	0.38'	106	0.25'
5019	*	*	*	*	*	*	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*

Point No.	7/09/03 - 7/16/04		7/16/04 - 1/13/05		1/13/05 - 6/23/05		6/23/05 - 12/07/05		12/07/05 - 05/24/06	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5006	*	*	*	*	*	*	*	*	*	*
5007	*	*	*	*	*	*	*	*	*	*
5011	*	*	*	*	*	*	*	*	*	*
5012	*	*	*	*	*	*	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*
5014	96	0.12'	110	0.10'	103	1.00'	102	0.22'	116	0.25'
5016	*	*	*	*	*	*	NM	NM	NM	NM
5017	#	#	#	#	#	#	#	#	NM	NM
5018	102	0.19'	111	0.15'	104	1.63'	104	0.27'	106	0.64'
5019	*	*	*	*	*	*	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North
# =	Station is severely obstructed; accuracy is 0.2'.

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

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Exhibit A

Conejo Road Settlement Survey
Horizontal Movement
March 1998 - May 2007

Point No.	05/24/06 - 12/06/06		12/06/06 - 05/09/07		Overall Movement 3/01/98 - 05/09/07	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5006	*	*	*	*	210	0.05'
5007	*	*	*	*	113	0.10'
5011	*	*	*	*	299	0.12'
5012	*	*	*	*	123	0.15'
5013	*	*	*	*	106	0.05'
5014	95	0.35'	106	0.06'	103	7.91'
5018	103	0.45'	81	0.08'	104	12.95'
5019	*	*	*	*	64	0.06'
5020	*	*	*	*	12	0.08'
543	March 2006 to May 2007		*	*	*	*

Note: Due to severe satellite obstructions and history of lack of movement, we no longer monitor points 5016 and 5017.

Comments: Only monitoring points 5014 and 5018 show significant movement.

The next monitoring compaign will be in December 2007.

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North
# =	Station is severely obstructed; accuracy is 0.2'.

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

H:\Group Folders\ENGR\wp\Brown\conejo\ConejoHorizontal07May.xls

Exhibit B

Conejo Road Settlement Survey
Vertical Movement
December 1984 - May 2007

GPS Point No.	Original Point No.	Elevation Measurements Taken Prior to Using GPS* - From December 1984 to February 1998: Dec 1984	Nov 1985	Dec 1987	Mar 1988	May 1989	Jun 1990	Jul 1991	Jul 1992	Jan 1993	Aug 1995	Sep 1997	Feb 1998
5006	110	694.0	694.0	NM	NM	NM	693.9	693.9	693.9	693.9	693.9	693.9	NM
5007	109	681.2	681.2	NM	681.3	681.3	681.3	681.3	681.2	NM	681.2	681.3	NM
5011	Set in '98												
5012	Set in '98												
5013	107B				NM	417.9	417.8	417.7	417.8	417.7	418.0	418.0	418.0
5014	106B			395.0	395.0	395.0	395.1	395.0	395.1	395.0	394.9	394.8	394.6
5016	101	397.0	397.0	397.0	397.0	396.9	397.0	397.0	397.0	397.0	396.9	396.9	397.0
5017	Set in '98												
5018	105B			297.5	297.5	297.4	297.4	297.4	297.4	297.4	297.4	297.4	297.2
5019	103B											307.3	307.4
5020	102B											319.3	319.3
5010	108	594.5	594.5	NM	594.5	594.5	594.3	594.4	594.5	594.5	594.3	594.3	NM
	102	316.8	316.8	316.8	316.8	NM	316.7	316.7	613.9	316.8	316.8	Destroyed	
	103	312.6	312.6	312.5	312.6	NM	312.3	312.3	312.5	312.4	312.3	Destroyed	
	104	253.7	253.6	253.6	253.6	Destroyed							
	105	294.4	294.4	Destroyed									
	106	395.1	395.1	Destroyed									
	107	417.1	417.0	Destroyed									

Note: * Measurements from December 1984 to February 1998 have been adjusted by +2.43 feet to reconcile them to the NAVD 88 datum.

** Adjustments have been made to elevations on point #5013 from 1989 to 2001 to reflect its new elevation re-set in the same location in September 2001.

NM = Not Measured

Conejo Road Settlement Survey
Vertical Movement
December 1984 - May 2007

Exhibit B

Elevation Measurements Taken Using GPS - starting March 1998:

GPS Point No.	Original Point No.	Mar 1998	Jul 1999	Jul 2000	Jul 2001	Jul 2002	Jul 2003	Jul 2004	Jan 2005	Jun 2005	Dec 2005	May 2006	Dec 2006	May 2007	Overall Vertical Difference
5006	110	694.1	694.0	693.9	694.0	693.9	693.9	693.9	694.1	694.0	694.1	694.0	693.9	694.1	Insignificant
5007	109	681.3	681.3	681.4	681.4	681.6	681.6	681.6	681.7	681.6	681.6	681.7	681.6	681.7	+0.5'
5011	Set in '98	585.3	585.3	585.2	585.2	NM	585.2	585.1	585.2	585.2	585.1	585.2	585.1	585.2	-0.1'
5012	Set in '98	543.2	543.4	543.4	543.3	543.4	543.3	543.2	543.2	543.3	543.2	543.3	543.2	543.4	+0.2'
5013	107B	418.0	418.0	418.0	418.0	417.9**	417.9	417.9	418.0	418.1	418.0	418.1	417.9	418.0	Insignificant
5014	106B	394.4	393.2	393.0	392.5	392.3	392.3	392.2	392.2	391.8	391.7	391.7	391.5	391.5	-3.5'
5016	101	396.9	396.9	396.9	396.8	396.9	397.0	396.8	396.9	396.8	NM	NM	NM	NM	-0.2'
5017	Set in '98	351.4	351.4	351.4	351.4	351.4	351.3	351.3	351.4	351.4	351.4	NM	NM	NM	NM
5018	105B	297.1	296.8	296.7	296.5	296.5	296.5	296.4	296.5	296.4	296.3	296.3	296.3	296.3	-1.2'
5019	103B	307.5	307.1	307.3	307.2	307.4	307.5	307.4	307.5	307.5	307.5	307.5	307.6	307.6	+0.3'
5020	102B	319.3	319.3	319.2	319.2	319.2	319.1	319.1	319.1	319.2	319.1	319.1	319.1	319.1	-0.2'
5010	108	594.4	NM	Determined to be out of slide area											
543	Set in '06												250.0	250.1	+0.1'

GPS Point No.	Original Point No.														Overall Vertical Difference
5006	110														
5007	109														
5011	Set in '98														
5012	Set in '98														
5013	107B														
5014	106B														
5018	105B														
5019	103B														
5020	102B														

Note: * Measurements from December 1984 to February 1998 have been adjusted by +2.43 feet to reconcile them to the NAVD 88 datum.
** Adjustments have been made to elevations on point #5013 from 1989 to 2001 to reflect its new elevation re-set in the same location in September 2001.
NM = Not Measured

City of Santa Barbara
Public Works Department

Interoffice Memorandum

DATE: December 29, 2006

TO: Pat Kelly, Assistant Public Works Director/City Engineer

FROM: Charley Brown, Survey Party Chief CB

SUBJECT: CONEJO ROAD SETTLEMENT SURVEY REPORT – DECEMBER 2006

This report is intended to update the history of movement of monitoring points on Conejo Road after our most recent GPS monitoring campaign on December 5 and 6, 2006.

SCHEDULING

Since the landslide in 1998 through 2004, we have monitored the movement on Conejo Road annually in July. However, in 2005 we started monitoring Conejo Road on a semi-annual basis, both before and after the rainy season, due to the closure of Sycamore Canyon Road in the fall of 2005 and the landslide at La Conchita in January, 2005.

HORIZONTAL MOVEMENT

Per Exhibit A, Monuments 5014 and 5018 continue to show the greatest horizontal movement. These two points moved more horizontally in the five-month period of January 13, 2005 through June 23, 2005, than in the previous three-and-a-half-year period of July 16, 2001 through January 13, 2005. During the six-month period of June 23, 2005 through December 8, 2005, the rate of movement diminished, but the rate of movement has increased again in the last two six-month periods of December 8, 2005 through May 24, 2006 and May 24, 2006 through December 6, 2006.

	7/16/01 to 1/13/05	1/13/05 to 6/23/05	6/23/05 to 12/8/05	12/08/05 to 05/24/06	05/25/06 to 12/06/06	Overall 3/01/98 – 12/06/06
Point No. 5014	0.70'	1.00'	0.22'	0.25'	0.35'	7.84'
Point No. 5018	0.97'	1.63'	0.27'	0.64'	0.45'	12.88'

VERTICAL MOVEMENT

Per Exhibit B, Monuments 5014 and 5018 continue to show the greatest vertical movement. During the overall vertical measuring period of December 1987 through December 6, 2006, Monument 5014 has decreased in elevation by 3.5' and Monument 5018 has decreased in elevation by 1.2'. Other Monuments display vertical movement consistent with unstable slopes.

TERMINATION OF MONITORING POINTS 5016 and 5017

We did not measure Monitoring Points 5016 and 5017 during this monitoring campaign because they have shown no significant movement since monitoring began in 1984 and 1998 respectively, and also because of the multiple obstructions to satellite observation that their locations present.

SUMMARY

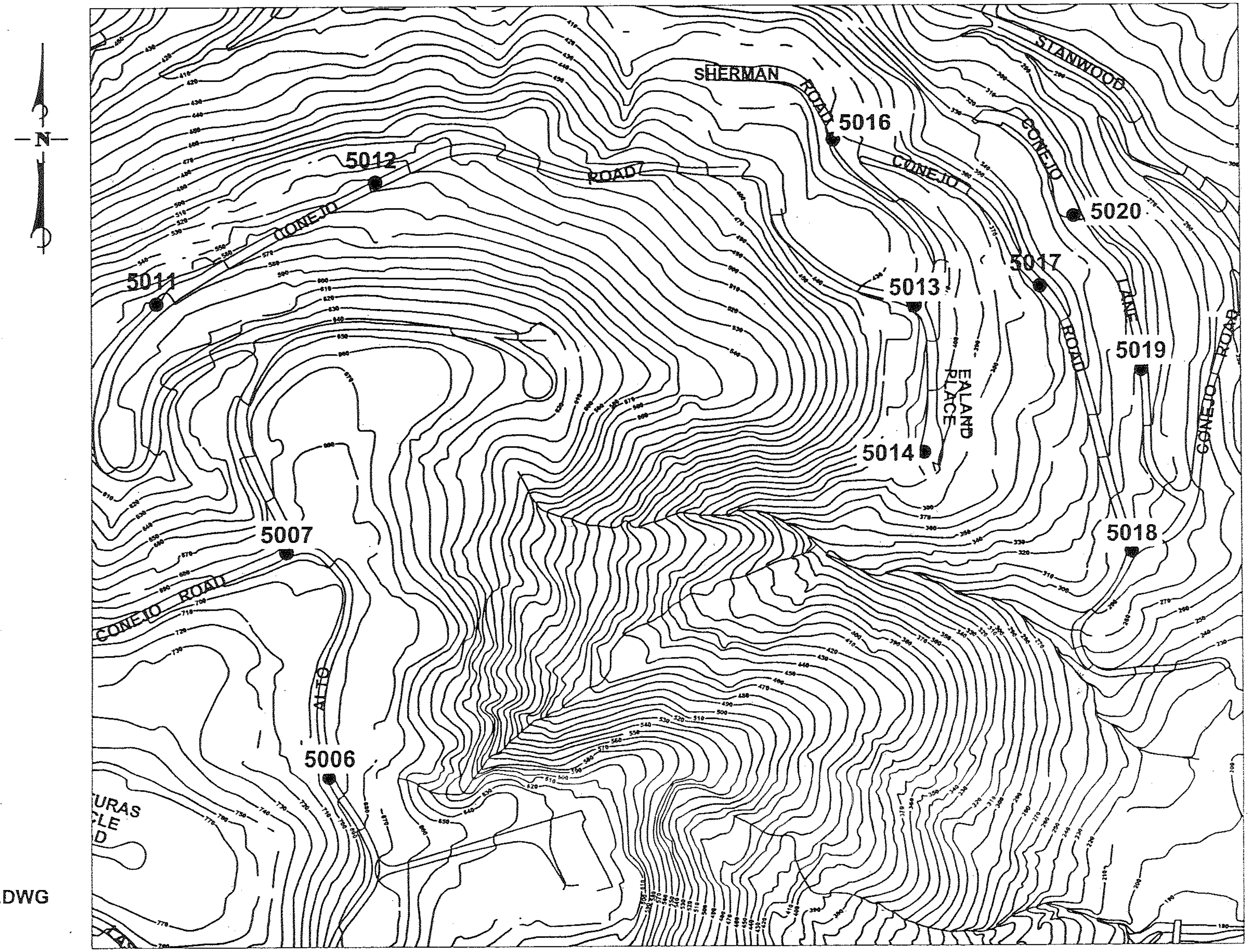
In summary, monitoring our points on Conejo Road indicates that the area remains unstable. The next monitoring campaign is scheduled for May, 2007.

CB/mm

Attachments:
1. Vicinity Map
2. Exhibit A – Conejo Road Horizontal Movement Table
3. Exhibit B – Conejo Road Vertical Movement Table

cc: George Estrella, Chief Building Official
Jon Peebles, Water Distribution Superintendent
Manuel Romero, Wastewater Collection System Superintendent
Homer F. Smith II, Principal Civil Engineer
Tully Clifford, Supervising Transportation Engineer
Public Works Front Desk Binder

SURVEY MONITORING POINTS
IN THE CONEJO ROAD VICINITY



SCALE: 1" = 300'

DRAWING: 33-00011.DWG
DATE: 7-20-2005

Exhibit A

Conejo Road Settlement Survey
Horizontal Movement
March 1998 - December 2006

Point No.	3/01/98 - 3/10/98		3/10/98 - 3/18/98		3/18/98 - 3/26/98		3/26/98 - 7/13/98		7/13/98 - 10/20/98	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5004	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5005	*	*	*	*	*	*	*	*	*	*
5006	*	*	*	*	*	*	*	*	*	*
5007	*	*	NM	NM	NM	NM	*	*	*	*
5008	*	*	*	*	*	*	*	*	*	*
5009	*	*	*	*	*	*	*	*	*	*
5010	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5011	*	*	*	*	*	*	*	*	*	*
5012	*	*	NM	NM	NM	NM	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*
5014	110	0.12'	100	0.11'	97	0.13'	102	2.50'	99	0.34'
5015	*	*	*	*	*	*	*	*	*	*
5016	*	*	NM	NM	NM	NM	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*
5018	101	0.24'	110	0.19'	100	0.23'	104	4.35'	101	0.41'
5019	*	*	NM	NM	NM	NM	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*
5023	*	*	*	*	*	*	*	*	*	*
5024	*	*	*	*	*	*	*	*	*	*
5025	*	*	*	*	*	*	*	*	*	*
5026	*	*	*	*	*	*	*	*	*	*
5027	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5030	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5031	*	*	*	*	*	*	*	*	*	*
5043	115	0.10'	93	0.14'	96	0.25'	Destroyed during road re-surfacing			- - -

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North
# =	Station is severely obstructed; accuracy is 0.2'.

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Exhibi. A

Conejo Road Set. nent Survey
Horizontal Movement
March 1998 - December 2006

Point No.	10/20/98 - 7/22/99		7/22/99 - 7/10/00		7/10/00 - 7/16/01		7/16/01 - 7/16/02		7/16/02 - 7/09/03	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5006	*	*	*	*	NM	NM	*	*	*	*
5007	*	*	*	*	*	*	*	*	*	*
5011	*	*	*	*	*	*	NM	NM	*	*
5012	*	*	*	*	*	*	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*
5014	102	0.20'	103	0.45'	102	1.47'	98	0.32'	104	0.16'
5016	*	*	*	*	*	*	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*
5018	104	0.26'	102	0.76'	104	2.45'	100	0.38'	106	0.25'
5019	*	*	*	*	*	*	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*

Point No.	7/09/03 - 7/16/04		7/16/04 - 1/13/05		1/13/05 - 6/23/05		6/23/05 - 12/07/05		12/07/05 - 05/24/06	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5006	*	*	*	*	*	*	*	*	*	*
5007	*	*	*	*	*	*	*	*	*	*
5011	*	*	*	*	*	*	*	*	*	*
5012	*	*	*	*	*	*	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*
5014	96	0.12'	110	0.10'	103	1.00'	102	0.22'	116	0.25'
5016	*	*	*	*	*	*	NM	NM	NM	NM
5017	#	#	#	#	#	#	#	#	NM	NM
5018	102	0.19'	111	0.15'	104	1.63'	104	0.27'	106	0.64'
5019	*	*	*	*	*	*	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North
# =	Station is severely obstructed; accuracy is 0.2'.

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

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Exhibit A

Conejo Road Settlement Survey
Horizontal Movement
March 1998 - December 2006

Point No.	05/24/06 - 12/06/06		Overall Movement 3/01/98 - 12/06/06	
	Direction	Distance in feet	Direction	Distance in feet
5006	*	*	253	0.06'
5007	*	*	118	0.10'
5011	*	*	307	0.16'
5012	*	*	141	0.12'
5013	*	*	93	0.05'
5014	95	0.35'	102	7.84'
5018	103	0.45'	104	12.88'
5019	*	*	67	0.07'
5020	*	*	10	0.07'

Note: Due to severe satellite obstructions and history of lack of movement, we no longer monitor points 5016 and 5017.

Comments: Only monitoring points 5014 and 5018 show significant movement.

The next monitoring compaign will be in May 2007.

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North
# =	Station is severely obstructed; accuracy is 0.2'.

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Exhib... B

Conejo Road Set... ...nent Survey
Vertical Movement
December 1984 - December 2006

GPS Point No.	Original Point No.	Elevation Measurements Taken Prior to Using GPS* - From December 1984 to February 1998:											
		Dec 1984	Nov 1985	Dec 1987	Mar 1988	May 1989	Jun 1990	Jul 1991	Jul 1992	Jan 1993	Aug 1995	Sep 1997	Feb 1998
5006	110	694.0	694.0	NM	NM	NM	693.9	693.9	693.9	693.9	693.9	693.9	NM
5007	109	681.2	681.2	NM	681.3	681.3	681.3	681.3	681.2	NM	681.2	681.3	NM
5011	Set in '98												
5012	Set in '98												
5013	107B				NM	417.9	417.8	417.7	417.8	417.7	418.0	418.0	418.0
5014	106B			395.0	395.0	395.0	395.1	395.0	395.1	395.0	394.9	394.8	394.6
5016	101	397.0	397.0	397.0	397.0	396.9	397.0	397.0	397.0	397.0	396.9	396.9	397.0
5017	Set in '98												
5018	105B			297.5	297.5	297.4	297.4	297.4	297.4	297.4	297.4	297.4	297.2
5019	103B											307.3	307.4
5020	102B											319.3	319.3
5010	108	594.5	594.5	NM	594.5	594.5	594.3	594.4	594.5	594.5	594.3	594.3	NM
	102	316.8	316.8	316.8	316.8	NM	316.7	316.7	613.9	316.8	316.8	Destroyed	
	103	312.6	312.6	312.5	312.6	NM	312.3	312.3	312.5	312.4	312.3	Destroyed	
	104	253.7	253.6	253.6	253.6	Destroyed							
	105	294.4	294.4	Destroyed									
	106	395.1	395.1	Destroyed									
	107	417.1	417.0	Destroyed									

Note: * Measurements from December 1984 to February 1998 have been adjusted by +2.43 feet to reconcile them to the NAVD 88 datum.

** Adjustments have been made to elevations on point #5013 from 1989 to 2001 to reflect its new elevation re-set in the same location in September 2001.

NM = Not Measured

Exhibit B

Conejo Road Settlement Survey
Vertical Movement
December 1984 - December 2006

GPS Point No.	Original Point No.	Elevation Measurements Taken Using GPS - starting March 1998: Mar 1998	Jul 1999	Jul 2000	Jul 2001	Jul 2002	Jul 2003	Jul 2004	Jan 2005	Jun 2005	Dec 2005	May 2006	Dec 2006	Overall Vertical Difference
5006	110	694.1	694.0	693.9	694.0	693.9	693.9	693.9	694.1	694.0	694.1	694.0	693.9	Insignificant
5007	109	681.3	681.3	681.4	681.4	681.6	681.6	681.6	681.7	681.6	681.6	681.7	681.6	+0.4'
5011	Set in '98	585.3	585.3	585.2	585.2	NM	585.2	585.1	585.2	585.2	585.1	585.2	585.1	-0.2'
5012	Set in '98	543.2	543.4	543.4	543.3	543.4	543.3	543.2	543.2	543.3	543.2	543.3	543.2	Insignificant
5013	107B	418.0	418.0	418.0	418.0	417.9**	417.9	417.9	418.0	418.1	418.0	418.1	417.9	Insignificant
5014	106B	394.4	393.2	393.0	392.5	392.3	392.3	392.2	392.2	391.8	391.7	391.7	391.5	-3.5'
5016	101	396.9	396.9	396.9	396.8	396.9	397.0	396.8	396.9	396.8	NM	NM	NM	-0.2'
5017	Set in '98	351.4	351.4	351.4	351.4	351.4	351.3	351.3	351.4	351.4	351.4	NM	NM	Insignificant
5018	105B	297.1	296.8	296.7	296.5	296.5	296.5	296.4	296.5	296.4	296.3	296.3	296.3	-1.2'
5019	103B	307.5	307.1	307.3	307.2	307.4	307.5	307.4	307.5	307.5	307.5	307.5	307.6	+0.3'
5020	102B	319.3	319.3	319.2	319.2	319.2	319.1	319.1	319.1	319.2	319.1	319.1	319.1	-0.2'
5010	108	594.4	NM	Determined to be out of slide area										

Note: * Measurements from December 1984 to February 1998 have been adjusted by +2.43 feet to reconcile them to the NAVD 88 datum.

** Adjustments have been made to elevations on point #5013 from 1989 to 2001 to reflect its new elevation re-set in the same location in September 2001.

NM = Not Measured

City of Santa Barbara
Public Works Department

Interoffice Memorandum

DATE: June 14, 2006

TO: Pat Kelly, Assistant Public Works Director/City Engineer

FROM: Charley Brown, Survey Party Chief CB

SUBJECT: CONEJO ROAD SETTLEMENT SURVEY REPORT – MAY 2006

This report is intended to update the history of movement of monitoring points on Conejo Road after our most recent GPS monitoring campaign on May 23 and 24, 2006.

SCHEDULING

Since the landslide in 1998 through 2004, we have monitored the movement on Conejo Road annually in July. However, in 2005 we started monitoring Conejo Road on a semi-annual basis, both before and after the rainy season, due to the closure of Sycamore Canyon Road in the fall of 2005 and the landslide at La Conchita in January, 2005.

HORIZONTAL MOVEMENT

Per Exhibit A, Monuments 5014 and 5018 continue to show the greatest horizontal movement. These two points moved more horizontally in the five-month period of January 13, 2005 through June 23, 2005, than in the previous three-and-a-half-year period of July 16, 2001 through January 13, 2005. During the six-month period of June 23, 2005 through December 8, 2005, the rate of movement diminished, but the rate of movement increased in the last six month period of December 8, 2005 through May 24, 2006.

	7/16/01 to 1/13/05	1/13/05 to 6/23/05	6/23/05 to 12/8/05	12/08/05 to 05/24/06	Overall 3/01/98 – 5/24/06
Point No. 5014	0.70'	1.00'	0.22'	0.25'	7.49'
Point No. 5018	0.97'	1.63'	0.27'	0.64'	12.42'

VERTICAL MOVEMENT

Per Exhibit B, Monuments 5014 and 5018 continue to show the greatest vertical movement. During the overall vertical measuring period of December 1987 through May 24, 2006, Monument 5014 has decreased in elevation by 3.35' and Monument 5018 has decreased in elevation by 1.21'. Other Monuments display vertical movement consistent with unstable slopes.

TERMINATION OF MONITORING POINTS 5016 and 5017

We did not measure Monitoring Points 5016 and 5017 during this monitoring campaign because they have shown no significant movement since monitoring began in 1984, and also because of the multiple obstructions to satellite observation that their locations present.

SUMMARY

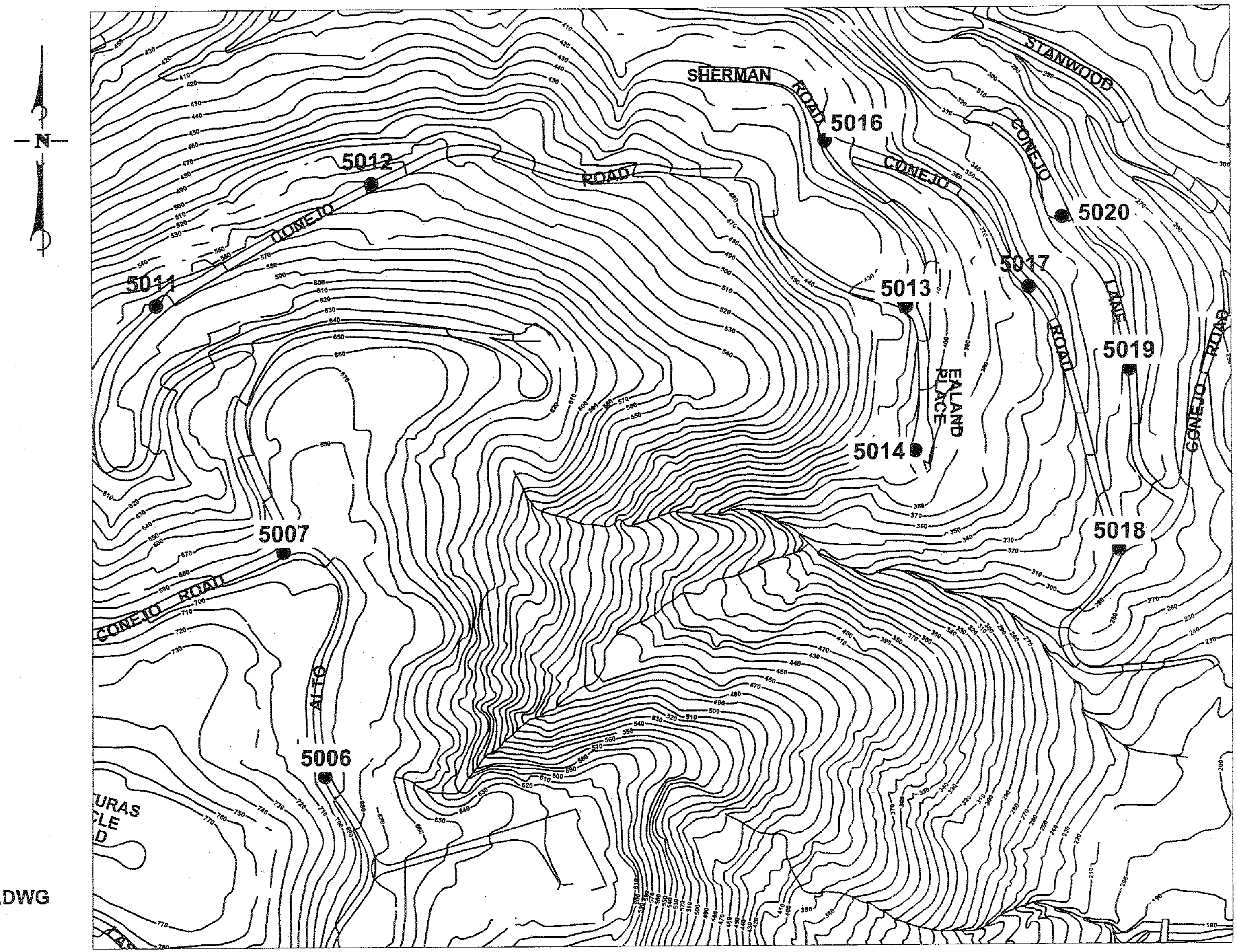
In summary, monitoring our points on Conejo Road indicates that the area remains unstable. The next monitoring campaign is scheduled for December, 2006.

CB/mm

Attachments:
1. Vicinity Map
2. Exhibit A – Conejo Road Horizontal Movement Table
3. Exhibit B – Conejo Road Vertical Movement Table

cc: George Estrella, Chief Building Official
Jon Peebles, Water Distribution Superintendent
Manuel Romero, Wastewater Collection System Superintendent
Homer Smith, Principal Civil Engineer
Tully Clifford, Supervising Transportation Engineer
Public Works Front Desk Binder

SURVEY MONITORING POINTS
IN THE CONEJO ROAD VICINITY



SCALE: 1" = 300'

DRAWING: 33-00011.DWG
DATE: 7-20-2005

Exhibit A

Conejo Road Settlement Survey
Horizontal Movement
March 1998 - May 2006

Point No.	3/01/98 - 3/10/98		3/10/98 - 3/18/98		3/18/98 - 3/26/98		3/26/98 - 7/13/98		7/13/98 - 10/20/98	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5004	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5005	*	*	*	*	*	*	*	*	*	*
5006	*	*	*	*	*	*	*	*	*	*
5007	*	*	NM	NM	NM	NM	*	*	*	*
5008	*	*	*	*	*	*	*	*	*	*
5009	*	*	*	*	*	*	*	*	*	*
5010	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5011	*	*	*	*	*	*	*	*	*	*
5012	*	*	NM	NM	NM	NM	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*
5014	110	0.12'	100	0.11'	97	0.13'	102	2.50'	99	0.34'
5015	*	*	*	*	*	*	*	*	*	*
5016	*	*	NM	NM	NM	NM	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*
5018	101	0.24'	110	0.19'	100	0.23'	104	4.35'	101	0.41'
5019	*	*	NM	NM	NM	NM	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*
5023	*	*	*	*	*	*	*	*	*	*
5024	*	*	*	*	*	*	*	*	*	*
5025	*	*	*	*	*	*	*	*	*	*
5026	*	*	*	*	*	*	*	*	*	*
5027	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5030	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5031	*	*	*	*	*	*	*	*	*	*
5043	115	0.10'	93	0.14'	96	0.25'	Destroyed during road re-surfacing			- - -

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North
# =	Station is severely obstructed; accuracy is 0.2'.

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Exhibit A

Conejo Road Settlement Survey
Horizontal Movement
March 1998 - May 2006

Point No.	10/20/98 - 7/22/99		7/22/99 - 7/10/00		7/10/00 - 7/16/01		7/16/01 - 7/16/02		7/16/02 - 7/09/03	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5006	*	*	*	*	NM	NM	*	*	*	*
5007	*	*	*	*	*	*	*	*	*	*
5011	*	*	*	*	*	*	NM	NM	*	*
5012	*	*	*	*	*	*	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*
5014	102	0.20'	103	0.45'	102	1.47'	98	0.32'	104	0.16'
5016	*	*	*	*	*	*	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*
5018	104	0.26'	102	0.76'	104	2.45'	100	0.38'	106	0.25'
5019	*	*	*	*	*	*	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*

Point No.	7/09/03 - 7/16/04		7/16/04 - 1/13/05		1/13/05 - 6/23/05		6/23/05 - 12/07/05		12/07/05 - 05/24/06	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5006	*	*	*	*	*	*	*	*	*	*
5007	*	*	*	*	*	*	*	*	*	*
5011	*	*	*	*	*	*	*	*	*	*
5012	*	*	*	*	*	*	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*
5014	96	0.12'	110	0.10'	103	1.00'	102	0.22'	116	0.25'
5016	*	*	*	*	*	*	NM	NM	NM	NM
5017	#	#	#	#	#	#	#	#	NM	NM
5018	102	0.19'	111	0.15'	104	1.63'	104	0.27'	106	0.64'
5019	*	*	*	*	*	*	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North
# =	Station is severely obstructed; accuracy is 0.2'.

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

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Ex bit A

Conejo Rc Settlement Survey
Horizontal Movement
March 1998 - May 2006

Point No.	Overall Movement 3/01/98 - 05/24/06	
	Direction	Distance in feet
5006	263	0.03'
5007	109	0.09'
5011	311	0.20'
5012	152	0.10'
5013	141	0.04'
5014	102	7.49'
5018	104	12.42'
5019	30	0.05'
5020	332	0.05'

Note: Due to severe satellite obstructions and history of lack of movement, we no longer monitor points 5016 and 5017.

Comments: Only monitoring points 5014 and 5018 show significant movement.

The next monitoring compaign will be in December 2006.

Exhi[illegible]t B

Conejo Road S[illegible]lement Survey
Vertical Movement
December 1984 - May 2006

GPS Point No.	Original Point No.	Dec 1984	Nov 1985	Dec 1987	Mar 1988	May 1989	Jun 1990	Jul 1991	Jul 1992	Jan 1993	Aug 1995	Sep 1997	Feb 1998
		Elevation Measurements Taken Prior to Using GPS*:											
5006	110	694.0	694.0	NM	NM	NM	693.9	693.9	693.9	693.9	693.9	693.9	NM
5007	109	681.2	681.2	NM	681.3	681.3	681.3	681.3	681.2	NM	681.2	681.3	NM
5011	Set in '98												
5012	Set in '98												
5013	107B				NM	417.9	417.8	417.7	417.8	417.7	418.0	418.0	418.0
5014	106B			395.0	395.0	395.0	695.1	395.0	395.1	395.0	394.9	394.8	394.6
5016	101	397.0	397.0	397.0	397.0	396.9	397.0	397.0	397.0	397.0	396.9	396.9	397.0
5017	Set in '98												
5018	105B			297.5	297.5	297.4	297.4	297.4	297.4	297.4	297.4	297.4	297.2
5019	103B											307.3	307.4
5020	102B											319.3	319.3
5010	108	594.5	594.5	NM	594.5	594.5	594.3	594.4	594.5	594.5	594.3	594.3	NM
	102	316.8	316.8	316.8	316.8	NM	316.7	316.7	613.9	316.8	316.8	Destroyed	
	103	312.6	312.6	312.5	312.6	NM	312.3	312.3	312.5	312.4	312.3	Destroyed	
	104	253.7	253.6	253.6	253.6	Destroyed							
	105	294.4	294.4	Destroyed									
	106	395.1	395.1	Destroyed									
	107	417.1	417.0	Destroyed									

Note: * Measurements from December 1984 to February 1998 have been adjusted by +2.43 feet to reconcile them to the NAVD 88 datum.
** Adjustments have been made to elevations on point #5013 from 1989 to 2001 to reflect its new elevation re-set in the same location in September 2001.
NM = Not Measured

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Exhibit B

Conejo Road Settlement Survey
Vertical Movement
December 1984 - May 2006

		Elevation Measurements Taken Using GPS:												
GPS Point No.	Original Point No.	Mar 1998	Jul 1999	Jul 2000	Jul 2001	Jul 2002	Jul 2003	Jul 2004	Jan 2005	Jun 2005	Dec 2005	May 2006		Overall Vertical Difference
5006	110	694.1	694.0	693.9	694.0	693.9	693.9	693.9	694.1	694.0	694.1	694.0		Insignificant
5007	109	681.3	681.3	681.4	681.4	681.6	681.6	681.6	681.7	681.6	681.6	681.7		+0.45'
5011	Set in '98	585.3	585.3	585.2	585.2	NM	585.2	585.1	585.2	585.2	585.1	585.2		-0.13'
5012	Set in '98	543.2	543.4	543.4	543.3	543.4	543.3	543.2	543.2	543.3	543.2	543.3		Insignificant
5013	107B	418.0	418.0	418.0	418.0	417.9**	417.9	417.9	418.0	418.1	418.0	418.1		+0.16'
5014	106B	394.4	393.2	393.0	392.5	392.3	392.3	392.2	392.2	391.8	391.7	391.7		-3.35'
5016	101	396.9	396.9	396.9	396.8	396.9	397.0	396.8	396.9	396.8	NM	NM		-0.20'
5017	Set in '98	351.4	351.4	351.4	351.4	351.4	351.3	351.3	351.4	351.4	351.4	NM		Insignificant
5018	105B	297.1	296.8	296.7	296.5	296.5	296.5	296.4	296.5	296.4	296.3	296.3		-1.21'
5019	103B	307.5	307.1	307.3	307.2	307.4	307.5	307.4	307.5	307.5	307.5	307.5		+0.22'
5020	102B	319.3	319.3	319.2	319.2	319.2	319.1	319.1	319.1	319.2	319.1	319.1		-0.20'
5010	108	594.4	NM	Determined to be out of slide area										

Note: * Measurements from December 1984 to February 1998 have been adjusted by +2.43 feet to reconcile them to the NAVD 88 datum.
** Adjustments have been made to elevations on point #5013 from 1989 to 2001 to reflect its new elevation re-set in the same location in September 2001.
NM = Not Measured

City of Santa Barbara
Public Works Department

Interoffice Memorandum

DATE: December 29, 2005

TO: Pat Kelly, Assistant Public Works Director/City Engineer

FROM: Charley Brown, Survey Party Chief CB

SUBJECT: CONEJO ROAD SETTLEMENT SURVEY REPORT – DECEMBER 2005

This report is intended to update the history of movement of monitoring points on Conejo Road after our most recent GPS monitoring campaign on December 7th and 8th of 2005.

SCHEDULING

Generally, since the landslide in 1998, we have been monitoring the movement on Conejo Road annually in July. However, with the recent closure of Sycamore Canyon Road and landslide at La Conchita, we have been requested to monitor Conejo Road on a semi-annual basis, both before and after the rainy season, in December and May.

HORIZONTAL MOVEMENT

Per Exhibit A, Monuments 5014 and 5018 continue to show the greatest movement. These two points moved more horizontally in the five month period of January 13, 2005 through June 23, 2005, than in the previous three-and-a-half year period of July 16, 2001 through January 13, 2005. However, during the last six month period of June 23, 2005 through December 8, 2005, the rate of movement has diminished.

	7/16/01 – 1/13/05	1/13/05 – 6/23/05	6/23/05 – 12/8/05	Overall 3/01/98 – 6/23/05
Point No. 5014	0.70'	1.00'	0.22'	7.25'
Point No. 5018	0.97'	1.63'	0.27'	11.79'

VERTICAL MOVEMENT

Per Exhibit B, Monuments 5014 and 5018 continue to show the greatest vertical movement. During the overall vertical measuring period of December 1987 through December 8, 2005, Monument 5014 has decreased in elevation by 3.3' and Monument 5018 has decreased in elevation by 1.2'. Other Monuments display vertical movement consistent with unstable slopes.

TERMINATION OF MONITORING POINTS 5016 and 5017

We did not measure Monitoring Point 5016 during this monitoring campaign because it has shown no significant movement since monitoring began in 1984, and also because of the multiple obstructions to satellite observation its location presents. We will also terminate measuring Monitoring Point 5017 in May, 2006 for the same reasons.

SUMMARY

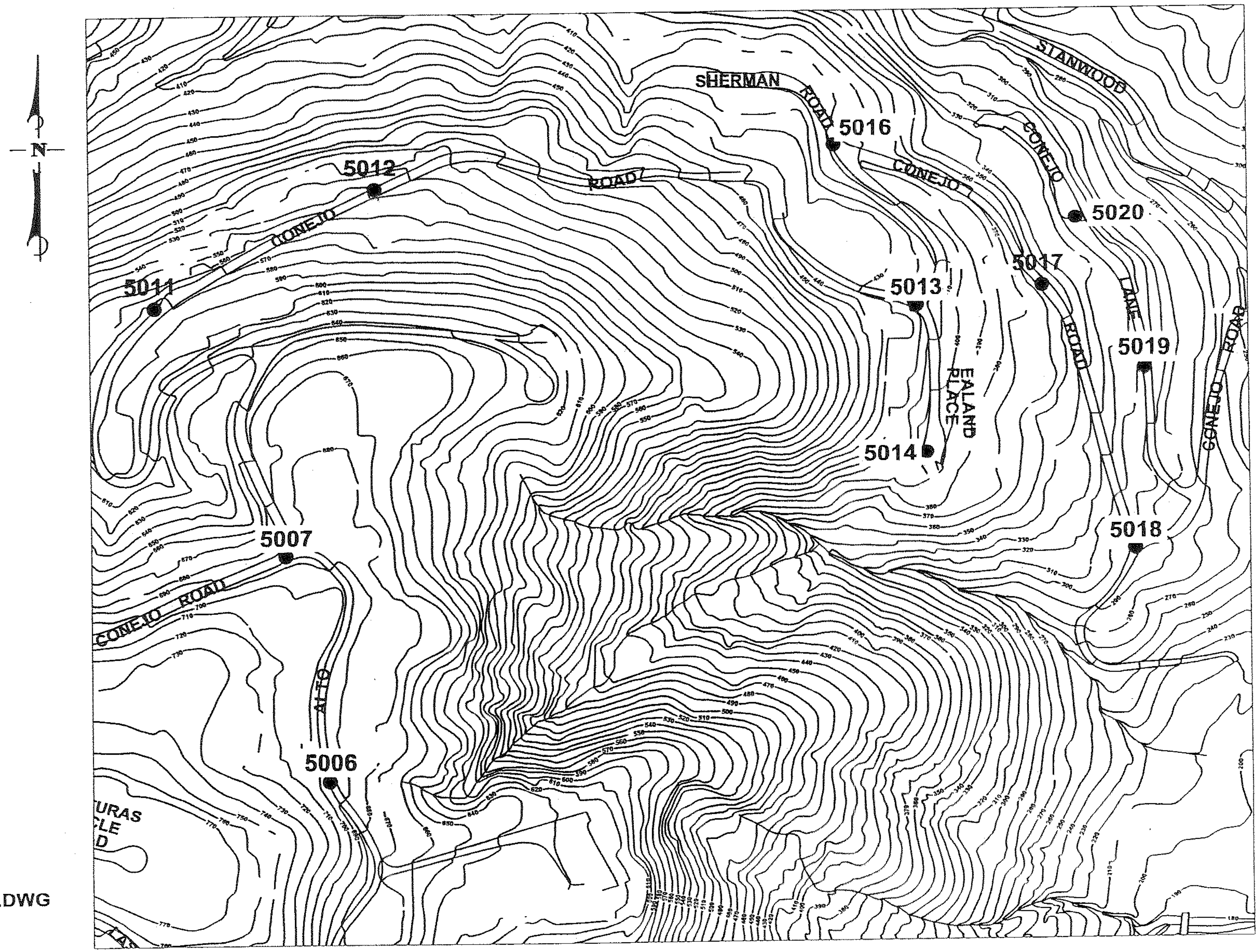
In summary, monitoring our points on Conejo Road indicates that the area remains unstable. The next monitoring campaign is scheduled for May 2006.

CB/mm/cw

Attachments:
1. Vicinity Map
2. Exhibit A – Conejo Road Horizontal Movement Table
3. Exhibit B – Conejo Road Vertical Movement Table

cc: George Estrella, Chief Building Official
Jon Peebles, Water Distribution Superintendent
Manuel Romero, Wastewater Collection System Superintendent
Homer Smith, Principal Civil Engineer
Tully Clifford, Supervising Transportation Engineer
Public Works Front Desk Binder

SURVEY MONITORING POINTS
IN THE CONEJO ROAD VICINITY



SCALE: 1" = 300'

DRAWING: 33-00011.DWG
DATE: 7-20-2005

Exhibit A

Conejo Road Settlement Survey
Horizontal Movement
March 1998 - December 2005

Point No.	3/01/98 - 3/10/98		3/10/98 - 3/18/98		3/18/98 - 3/26/98		3/26/98 - 7/13/98		7/13/98 - 10/20/98	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5004	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5005	*	*	*	*	*	*	*	*	*	*
5006	*	*	*	*	*	*	*	*	*	*
5007	*	*	NM	NM	NM	NM	*	*	*	*
5008	*	*	*	*	*	*	*	*	*	*
5009	*	*	*	*	*	*	*	*	*	*
5010	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5011	*	*	*	*	*	*	*	*	*	*
5012	*	*	NM	NM	NM	NM	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*
5014	110	0.12'	100	0.11'	97	0.13'	102	2.50'	99	0.34'
5015	*	*	*	*	*	*	*	*	*	*
5016	*	*	NM	NM	NM	NM	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*
5018	101	0.24'	110	0.19'	100	0.23'	104	4.35'	101	0.41'
5019	*	*	NM	NM	NM	NM	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*
5023	*	*	*	*	*	*	*	*	*	*
5024	*	*	*	*	*	*	*	*	*	*
5025	*	*	*	*	*	*	*	*	*	*
5026	*	*	*	*	*	*	*	*	*	*
5027	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5030	*	*	NM	NM	NM	NM	NM	NM	NM	NM
5031	*	*	*	*	*	*	*	*	*	*
5043	115	0.10'	93	0.14'	96	0.25'	Destroyed during road re-surfacing			- - -

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Exhibit A

Conejo Road Settlement Survey
Horizontal Movement
March 1998 - December 2005

Point No.	10/20/98 - 7/22/99		7/22/99 - 7/10/00		7/10/00 - 7/16/01		7/16/01 - 7/16/02		7/16/02 - 7/09/03	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5006	*	*	*	*	NM	NM	*	*	*	*
5007	*	*	*	*	*	*	*	*	*	*
5011	*	*	*	*	*	*	NM	NM	*	*
5012	*	*	*	*	*	*	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*
5014	102	0.20'	103	0.45'	102	1.47'	98	0.32'	104	0.16'
5016	*	*	*	*	*	*	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*
5018	104	0.26'	102	0.76'	104	2.45'	100	0.38'	106	0.25'
5019	*	*	*	*	*	*	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Exhibit A

Conejo Road Settlement Survey
Horizontal Movement
March 1998 - December 2005

Point No.	7/09/03 - 7/16/04		7/16/04 - 1/13/05		1/13/05 - 6/23/05		6/23/05 - 12/07/05		Overall Movement 3/01/98 - 12/07/05	
	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet	Direction	Distance in feet
5006	*	*	*	*	*	*	*	*	257	0.03'
5007	*	*	*	*	*	*	*	*	119	0.10'
5011	*	*	*	*	*	*	*	*	313	0.14'
5012	*	*	*	*	*	*	*	*	138	0.11'
5013	*	*	*	*	*	*	*	*	27	0.05'
5014	96	0.12'	110	0.10'	103	1.00'	102	0.22'	102	7.25'
5016	*	*	*	*	*	*	NM	NM	325	0.02'
5017	#	#	#	#	#	#	#	#	20	0.11'
5018	102	0.19'	111	0.15'	104	1.63'	104	0.27'	104	11.79'
5019	*	*	*	*	*	*	*	*	47	0.08'
5020	*	*	*	*	*	*	*	*	13	0.09'

= Station is severely obstructed; accuracy is 0.2'; not able to detect significant movement.

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Comments: Only monitoring points 5014 and 5018 show significant movement.
The next monitoring compaign will be in May 2006.

Exhibit B

Conejo Road Settlement Survey
Vertical Movement
December 1984 - December 2005

		Elevation Measurements Taken Prior to Using GPS*:											
GPS Point No.	Original Point No.	Dec 1984	Nov 1985	Dec 1987	Mar 1988	May 1989	Jun 1990	Jul 1991	Jul 1992	Jan 1993	Aug 1995	Sep 1997	Feb 1998
5006	110	694.0	694.0	NM	NM	NM	693.9	693.9	693.9	693.9	693.9	693.9	NM
5007	109	681.2	681.2	NM	681.3	681.3	681.3	681.3	681.2	NM	681.2	681.3	NM
5011	Set in '98												
5012	Set in '98												
5013	107B				NM	417.9	417.8	417.7	417.8	417.7	418.0	418.0	418.0
5014	106B			395.0	395.0	395.0	695.1	395.0	395.1	395.0	394.9	394.8	394.6
5016	101	397.0	397.0	397.0	397.0	396.9	397.0	397.0	397.0	397.0	396.9	396.9	397.0
5017	Set in '98												
5018	105B			297.5	297.5	297.4	297.4	297.4	297.4	297.4	297.4	297.4	297.2
5019	103B											307.3	307.4
5020	102B											319.3	319.3
5010	108	594.5	594.5	NM	594.5	594.5	594.3	594.4	594.5	594.5	594.3	594.3	NM
	102	316.8	316.8	316.8	316.8	NM	316.7	316.7	613.9	316.8	316.8	Destroyed	
	103	312.6	312.6	312.5	312.6	NM	312.3	312.3	312.5	312.4	312.3	Destroyed	
	104	253.7	253.6	253.6	253.6	Destroyed							
	105	294.4	294.4	Destroyed									
	106	395.1	395.1	Destroyed									
	107	417.1	417.0	Destroyed									

Note: * Measurements from December 1984 to February 1998 have been adjusted by +2.43 feet to reconcile them to the NAVD 88 datum.

** Adjustments have been made to elevations on point #5013 from 1989 to 2001 to reflect its new elevation re-set in the same location in September 2001.

NM = Not Measured

Exhibit B

Conejo Road Settlement Survey
Vertical Movement
December 1984 - December 2005

Elevation Measurements Taken Using GPS:

GPS Point No.	Original Point No.	Mar 1998	Jul 1999	Jul 2000	Jul 2001	Jul 2002	Jul 2003	Jul 2004	Jan 2005	Jun 2005	Dec 2005			Overall Vertical Difference
5006	110	694.1	694.0	693.9	694.0	693.9	693.9	693.9	694.1	694.0	694.1			Insignificant
5007	109	681.3	681.3	681.4	681.4	681.6	681.6	681.6	681.7	681.6	681.6			+0.4'
5011	Set in '98	585.3	585.3	585.2	585.2	NM	585.2	585.1	585.2	585.2	585.1			-0.2'
5012	Set in '98	543.2	543.4	543.4	543.3	543.4	543.3	543.2	543.2	543.3	543.2			Insignificant
5013	107B	418.0	418.0	418.0	418.0	417.9**	417.9	417.9	418.0	418.1	418.0			Insignificant
5014	106B	394.4	393.2	393.0	392.5	392.3	392.3	392.2	392.2	391.8	391.7			-3.3'
5016	101	396.9	396.9	396.9	396.8	396.9	397.0	396.8	396.9	396.8	NM			-0.2'
5017	Set in '98	351.4	351.4	351.4	351.4	351.4	351.3	351.3	351.4	351.4	351.4			Insignificant
5018	105B	297.1	296.8	296.7	296.5	296.5	296.5	296.4	296.5	296.4	296.3			-1.2'
5019	103B	307.5	307.1	307.3	307.2	307.4	307.5	307.4	307.5	307.5	307.5			+0.2'
5020	102B	319.3	319.3	319.2	319.2	319.2	319.1	319.1	319.1	319.2	319.1			-0.2'
5010	108	594.4	NM	Determined to be out of slide area										

Note: * Measurements from December 1984 to February 1998 have been adjusted by +2.43 feet to reconcile them to the NAVD 88 datum.

** Adjustments have been made to elevations on point #5013 from 1989 to 2001 to reflect its new elevation re-set in the same location in September 2001.

NM = Not Measured

F:\Group Folders\ENGR\wp\Brown\conejo\ConejoVertical05Dec.xls

Conejo Road Settlement Survey
Horizontal Movement 1998 - 2005

Point No.	3/01/98 - 3/10/98		Average	3/10/98 - 3/18/98		Average	3/18/98 - 3/26/98		Average	3/26/98 - 7/13/98		Average	7/13/98 - 10/20/98		Average
	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day
5004	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5005	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5006	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5007	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*
5008	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5009	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5010	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5011	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5012	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5014	110	0.12'	0.013'	100	0.11'	0.014'	97	0.13'	0.016'	102	2.50'	0.023'	99	0.34'	0.003'
5015	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5016	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5018	101	0.24'	0.027'	110	0.19'	0.024'	100	0.23'	0.029'	104	4.35'	0.040'	101	0.41'	0.004'
5019	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5023	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5024	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5025	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5026	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5027	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5030	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5031	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5043	115	0.10'	0.011'	93	0.14'	0.018'	96	0.25'	0.030'	Destroyed during paving of road			- - -	- - -	- - -

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Comments: Only monitoring points 5014 and 5018 show significant movement. The next monitoring compaign will be in July 2006.

Exhibit A

F:\Group Folders\ENGR\wp\Brown\conejo\ConejoHorizontal04.xls

Conejo Road Settlement Survey
Horizontal Movement 1998 - 2005

Point No.	10/20/98 - 7/22/99		Average	7/22/99 - 7/10/00		Average	7/10/00 - 7/16/01		Average	7/16/01 - 7/16/02		Average	7/16/02 - 7/09/03		Average
	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day
5006	*	*	*	*	*	*	NM	NM	NM	*	*	*	*	*	*
5007	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5011	*	*	*	*	*	*	*	*	*	NM	NM	NM	*	*	*
5012	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5014	102	0.20'	0.0007'	103	0.45'	0.0012'	102	1.47'	0.004'	98	0.32'	0.001'	104	0.16'	0.0004'
5016	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5018	104	0.26'	0.0009'	102	0.76'	0.0021'	104	2.45'	0.007'	100	0.38'	0.001'	106	0.25'	0.0007'
5019	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Comments: Only monitoring points 5014 and 5018 show significant movement. The next monitoring compaign will be in July 2006.

Exhibit A

Conejo Road Settlement Survey
Horizontal Movement 1998 - 2005

Point No.	7/09/03 - 7/16/04		Average	7/16/04 - 1/13/05		Average	1/13/05 - 6/23/05		Average	Overall Movement 3/01/98 - 6/23/05		Average
	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day
5006	*	*	*	*	*	*	*	*	*	288	0.05'	*
5007	*	*	*	*	*	*	*	*	*	115	0.08'	*
5011	*	*	*	*	*	*	*	*	*	307	0.12'	*
5012	*	*	*	*	*	*	*	*	*	155	0.11'	*
5013	*	*	*	*	*	*	*	*	*	112	0.04'	*
5014	96	0.12'	0.0003'	110	0.10'	0.0006'	103	1.00'	0.0062'	102	7.05'	0.00264'
5016	*	*	*	*	*	*	*	*	*	325	0.02'	*
5017	#	#	#	#	#	#	#	#	#	5	0.07'	#
5018	102	0.19'	0.0005'	111	0.15'	0.0008'	104	1.63'	0.0101'	104	11.51'	0.00431'
5019	*	*	*	*	*	*	*	*	*	19	0.07'	*
5020	*	*	*	*	*	*	*	*	*	353	0.05'	*

= Station is severely obstructed; accuracy is 0.2'; not able to detect significant movement.

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Comments: Only monitoring points 5014 and 5018 show significant movement.
The next monitoring compaign will be in July 2006.

Exhibit A

F:\Group Folders\ENGR\wp\Brown\conejo\ConejoHorizontal04.xls

Conejo Road Settlement Survey
Vertical Movement 1984 - 2005

		Elevation Measurements Taken Prior to Using GPS*:												Elevation Measurements Taken With GPS:								
GPS Point No.	Original Point No.	Dec 1984	Nov 1985	Dec 1987	Mar 1988	May 1989	Jun 1990	Jul 1991	Jul 1992	Jan 1993	Aug 1995	Sep 1997	Feb 1998	Mar 1998	Jul 1999	Jul 2000	Jul 2001	Jul 2002	Jul 2003	Jul 2004	Jun 2005	Overal Vertical Difference
5006	110	694.0	694.0	NM	NM	NM	693.9	693.9	693.9	693.9	693.9	693.9	NM	694.1	694.0	693.9	694.0	693.9	693.9	693.9	694.0	Insignificant
5007	109	681.2	681.2	NM	681.3	681.3	681.3	681.3	681.2	NM	681.2	681.3	NM	681.3	681.3	681.4	681.4	681.6	681.6	681.6	681.6	+0.40'
5011	Set in '98													585.3	585.3	585.2	585.2	NM	585.2	585.1	585.2	Insignificant
5012	Set in '98													543.2	543.4	543.4	543.3	543.4	543.3	543.2	543.3	Insignificant
5013	107B				NM	417.9	417.8	417.7	417.8	417.7	418.0	418.0	418.0	418.0	418.0	418.0	418.0	417.9**	417.9	417.9	418.1	Insignificant
5014	106B			395.0	395.0	395.0	695.1	395.0	395.1	395.0	694.9	394.8	394.6	394.4	393.2	393.0	392.5	392.3	392.3	392.2	391.8	-3.16'
5016	101	397.0	397.0	397.0	397.0	396.9	397.0	397.0	397.0	397.0	396.9	396.9	397.0	396.9	396.9	396.9	396.8	396.9	397.0	396.8	396.8	-0.20'
5017	Set in '98													351.4	351.4	351.4	351.4	351.4	351.3	351.3	351.4	Insignificant
5018	105B			297.5	297.5	297.4	297.4	297.4	297.4	297.4	297.4	297.4	297.2	297.1	296.8	296.7	296.5	296.5	296.5	296.4	296.4	-1.14'
5019	103B											307.3	307.4	307.5	307.1	307.3	307.2	307.4	307.5	307.4	307.5	+0.23'
5020	102B											319.3	319.3	319.3	319.3	319.2	319.2	319.2	319.1	319.1	319.2	Insignificant
5010	108	594.5	594.5	NM	594.5	594.5	594.3	594.4	594.5	594.5	594.3	594.3	NM	594.4	NM	Determined to be out of slide area						
	102	316.8	316.8	316.8	316.8	NM	316.7	316.7	613.9	316.8	316.8	Destroyed										
	103	312.6	312.6	312.5	312.6	NM	312.3	312.3	312.5	312.4	312.3	Destroyed										
	104	253.7	253.6	253.6	253.6	Destroyed																
	105	294.4	294.4	Destroyed																		
	106	395.1	395.1	Destroyed																		
	107	417.1	417.0	Destroyed																		

Note: * Measurements from December 1984 to February 1998 have been adjusted by +2.43 feet to reconcile them to the NAVD 88 datum.

** Adjustments have been made to elevations on point #5013 from 1989 to 2001 to reflect its new elevation re-set in the same location in September 2001.

NM = Not Measured

Exhibit B

F:\Group Folders\ENGR\wp\Brown\conejo\ConejoVertical05.xls

City of Santa Barbara
Public Works Department

Interoffice Memorandum

DATE: July 20, 2005

TO: Pat Kelly, Assistant Public Works Director/City Engineer

FROM: Charley Brown, Survey Party Chief CB (mm)

SUBJECT: CONEJO ROAD SETTLEMENT SURVEY REPORT – 2005

This report is intended to update the history of movement of monitoring points on Conejo Road after our most recent GPS monitoring campaign on June 23, 2005.

HORIZONTAL MOVEMENT

Per Exhibit A, Monuments 5014 and 5018 continue to show the greatest movement. It should be noted that these two points moved horizontally more in the most recent five-month period of January 13, 2005 through June 23, 2005, than in the previous three-and-a-half-year period of July 16, 2001 through January 13, 2005.

	7/16/01 – 1/13/05	1/13/05 – 6/23/05	Overall 3/01/98 – 6/23/05
Point No. 5014	0.70'	1.00'	7.05'
Point No. 5018	0.98'	1.63'	11.51'

VERTICAL MOVEMENT

Per Exhibit B, Monuments 5014 and 5018 continue to show the greatest vertical movement. Monument 5014 lost about 0.40' in elevation in the most recent five-month period, while Monument 5018 remained stable vertically (but not horizontally). During the overall vertical measuring period of December 1984 through June 23, 2005, Monument 5014 has decreased in elevation by 3.2' and Monument 5018 has decreased in elevation by 1.1'. Other Monuments display vertical movement consistent with unstable slopes.

In summary, monitoring our points on Conejo Road indicates that the area remains unstable. The next monitoring campaign is scheduled for July 2006.

CB/mm

Attachments:
1. Vicinity Map
2. Exhibit A – Conejo Road Horizontal Movement Table
3. Exhibit B – Conejo Road Vertical Movement Table

cc: George Estrella, Chief Building Official
Jon Peebles, Water Distribution Superintendent
Manuel Romero, Wastewater Collection System Superintendent
Tully Clifford, Supervising Transportation Engineer
Homer Smith, Principal Engineer

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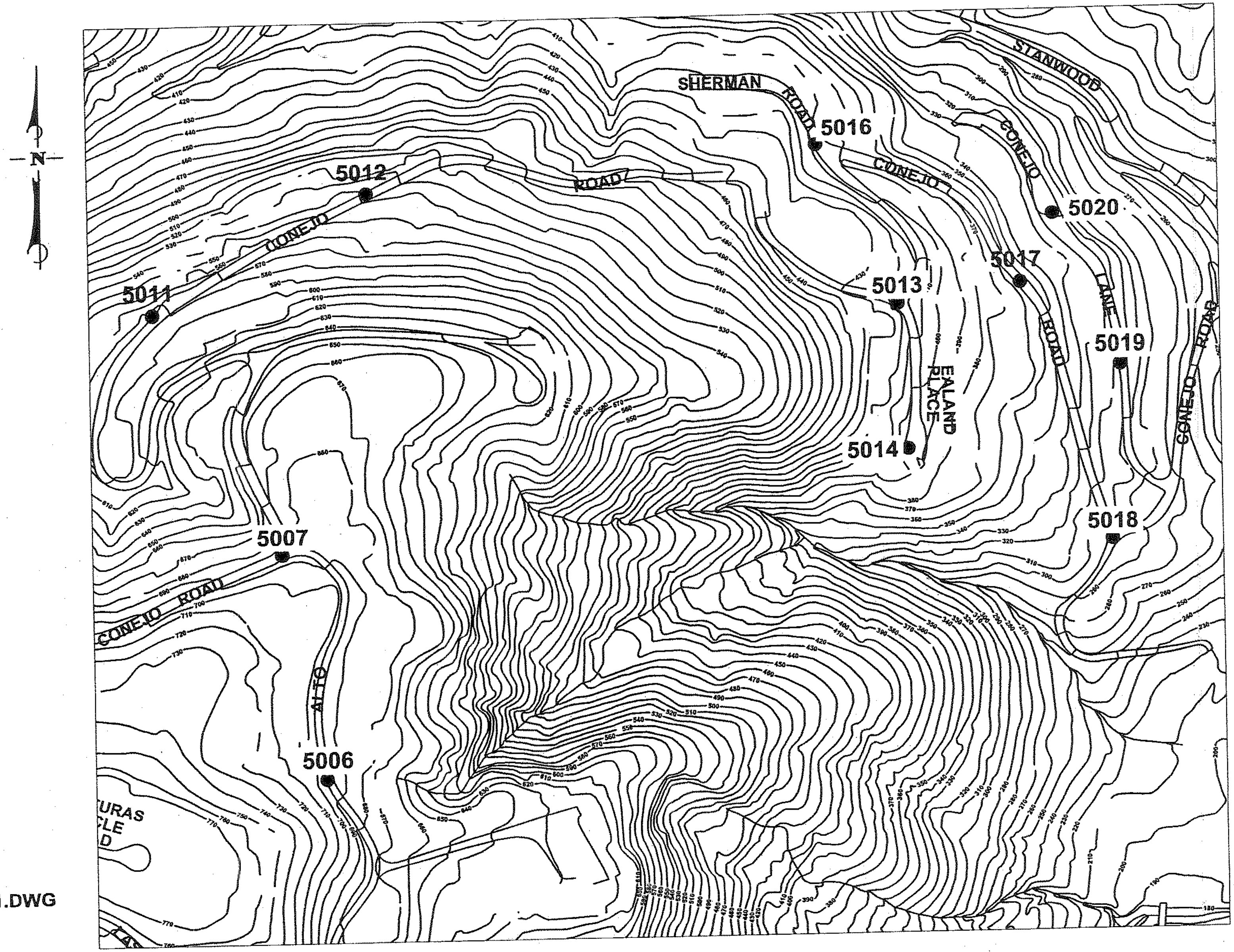
SURVEY MONITORING POINTS
IN THE CONEJO ROAD VICINITY



SCALE: 1" = 300'

DRAWING: 33-00011.DWG
DATE: 7-20-2005

Conejo Road Settlement Survey
Horizontal Movement 1998 - 2005

Point No.	3/01/98 - 3/10/98		Average	3/10/98 - 3/18/98		Average	3/18/98 - 3/26/98		Average	3/26/98 - 7/13/98		Average	7/13/98 - 10/20/98		Average
	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day
5004	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5005	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5006	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5007	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*
5008	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5009	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5010	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5011	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5012	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5014	110	0.12'	0.013'	100	0.11'	0.014'	97	0.13'	0.016'	102	2.50'	0.023'	99	0.34'	0.003'
5015	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5016	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5018	101	0.24'	0.027'	110	0.19'	0.024'	100	0.23'	0.029'	104	4.35'	0.040'	101	0.41'	0.004'
5019	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5023	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5024	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5025	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5026	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5027	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5030	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5031	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5043	115	0.10'	0.011'	93	0.14'	0.018'	96	0.25'	0.030'	Destroyed during paving of road			---	---	---

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Comments: Only monitoring points 5014 and 5018 show significant movement. The next monitoring compaign will be in July 2006.

Exhibit A

Conejo Road Settlement Survey
Horizontal Movement 1998 - 2005

Point No.	10/20/98 - 7/22/99		Average	7/22/99 - 7/10/00		Average	7/10/00 - 7/16/01		Average	7/16/01 - 7/16/02		Average	7/16/02 - 7/09/03		Average
	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day
5006	*	*	*	*	*	*	NM	NM	NM	*	*	*	*	*	*
5007	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5011	*	*	*	*	*	*	*	*	*	NM	NM	NM	*	*	*
5012	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5014	102	0.20'	0.0007'	103	0.45'	0.0012'	102	1.47'	0.004'	98	0.32'	0.001'	104	0.16'	0.0004'
5016	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5018	104	0.26'	0.0009'	102	0.76'	0.0021'	104	2.45'	0.007'	100	0.38'	0.001'	106	0.25'	0.0007'
5019	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Comments: Only monitoring points 5014 and 5018 show significant movement. The next monitoring compaign will be in July 2006.

Exhibit A

Conejo Road Settlement Survey
Horizontal Movement 1998 - 2005

Point No.	7/09/03 - 7/16/04		Average	7/16/04 - 1/13/05		Average	1/13/05 - 6/23/05		Average	Overall Movement 3/01/98 - 6/23/05		Average
	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day
5006	*	*	*	*	*	*	*	*	*	288	0.05'	*
5007	*	*	*	*	*	*	*	*	*	115	0.08'	*
5011	*	*	*	*	*	*	*	*	*	307	0.12'	*
5012	*	*	*	*	*	*	*	*	*	155	0.11'	*
5013	*	*	*	*	*	*	*	*	*	112	0.04'	*
5014	96	0.12'	0.0003'	110	0.10'	0.0006'	103	1.00'	0.0062'	102	7.05'	0.00264'
5016	*	*	*	*	*	*	*	*	*	325	0.02'	*
5017	#	#	#	#	#	#	#	#	#	5	0.07'	#
5018	102	0.19'	0.0005'	111	0.15'	0.0008'	104	1.63'	0.0101'	104	11.51'	0.00431'
5019	*	*	*	*	*	*	*	*	*	19	0.07'	*
5020	*	*	*	*	*	*	*	*	*	353	0.05'	*

= Station is severely obstructed; accuracy is 0.2'; not able to detect significant movement.

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Comments: Only monitoring points 5014 and 5018 show significant movement.
The next monitoring compaign will be in July 2006.

Exhibit A

Conejo Road Settlement Survey
Vertical Movement 1984 - 2005

GPS Point No.	Original Point No.	Elevation Measurements Taken Prior to Using GPS*: Dec 1984	Nov 1985	Dec 1987	Mar 1988	May 1989	Jun 1990	Jul 1991	Jul 1992	Jan 1993	Aug 1995	Sep 1997	Feb 1998	Elevation Measurements Taken With GPS: Mar 1998	Jul 1999	Jul 2000	Jul 2001	Jul 2002	Jul 2003	Jul 2004	Jun 2005	Overal Vertical Difference
5006	110	694.0	694.0	NM	NM	NM	693.9	693.9	693.9	693.9	693.9	693.9	NM	694.1	694.0	693.9	694.0	693.9	693.9	693.9	694.0	Insignificant
5007	109	681.2	681.2	NM	681.3	681.3	681.3	681.3	681.2	NM	681.2	681.3	NM	681.3	681.3	681.4	681.4	681.6	681.6	681.6	681.6	+0.40'
5011	Set in '98													585.3	585.3	585.2	585.2	NM	585.2	585.1	585.2	Insignificant
5012	Set in '98													543.2	543.4	543.4	543.3	543.4	543.3	543.2	543.3	Insignificant
5013	107B				NM	417.9	417.8	417.7	417.8	417.7	418.0	418.0	418.0	418.0	418.0	418.0	418.0	417.9**	417.9	417.9	418.1	Insignificant
5014	106B			395.0	395.0	395.0	695.1	395.0	395.1	395.0	694.9	394.8	394.6	394.4	393.2	393.0	392.5	392.3	392.3	392.2	391.8	-3.16'
5016	101	397.0	397.0	397.0	397.0	396.9	397.0	397.0	397.0	397.0	396.9	396.9	397.0	396.9	396.9	396.9	396.8	396.9	397.0	396.8	396.8	-0.20'
5017	Set in '98													351.4	351.4	351.4	351.4	351.4	351.3	351.3	351.4	Insignificant
5018	105B			297.5	297.5	297.4	297.4	297.4	297.4	297.4	297.4	297.4	297.2	297.1	296.8	296.7	296.5	296.5	296.5	296.4	296.4	-1.14'
5019	103B											307.3	307.4	307.5	307.1	307.3	307.2	307.4	307.5	307.4	307.5	+0.23'
5020	102B											319.3	319.3	319.3	319.3	319.2	319.2	319.2	319.1	319.1	319.2	Insignificant
5010	108	594.5	594.5	NM	594.5	594.5	594.3	594.4	594.5	594.5	594.3	594.3	NM	594.4	NM	Determined to be out of slide area						
	102	316.8	316.8	316.8	316.8	NM	316.7	316.7	613.9	316.8	316.8	Destroyed										
	103	312.6	312.6	312.5	312.6	NM	312.3	312.3	312.5	312.4	312.3	Destroyed										
	104	253.7	253.6	253.6	253.6	Destroyed																
	105	294.4	294.4	Destroyed																		
	106	395.1	395.1	Destroyed																		
	107	417.1	417.0	Destroyed																		

Note: * Measurements from December 1984 to February 1998 have been adjusted by +2.43 feet to reconcile them to the NAVD 88 datum.

** Adjustments have been made to elevations on point #5013 from 1989 to 2001 to reflect its new elevation re-set in the same location in September 2001.

NM = Not Measured

F:\Group Folders\ENGR\wp\Brown\conejo\ConejoVertical05.xls

Exhibit B

City of Santa Barbara
Public Works Department

Interoffice Memorandum

DATE: January 19, 2005

TO: Tony Nisich, Public Works Director

FROM: Pat Kelly, Assistant Public Works Director/City Engineer

SUBJECT: MONITORING ON SYCAMORE CANYON AND CONEJO ROAD AREAS

Recently there has been interest expressed regarding the soil stability in the Sycamore Canyon and Conejo Road areas. The City of Santa Barbara's (City's) Survey Crew performs periodic monitoring of points in the street right-of-way on Sycamore Canyon and Conejo Roads. These points were monitored within the last two weeks. The City's Survey Crew does not perform any monitoring on private property, or directly on identified landslides.

Sycamore Canyon Road

The Survey Crew has collected monitoring data for two areas on Sycamore Canyon Road: the "Caltrans – Borrow Pit" (Caltrans) landslide area, and the Ranchito Vista landslide area. The monitoring points for both areas are set in the street right-of-way to monitor movement that could potentially cause a water or sewer main failure. Please see attached exhibit of the Caltrans and Ranchito Vista Landslides.

The Survey Crew has been monitoring movement of the points in the Caltrans area since September 2001. Until this month, the monitoring points have shown very little horizontal movement in the past three years (less than 0.050' or approximately 0.6"). The points have risen over the same period of time by as much as 0.175' (approximately 2.1"). Between December 2, 2004 and January 4, 2005, these points moved horizontally by as much as 0.060' (0.72"), and lowered by as much as 0.030' (0.36"). While these distances are relatively insignificant, they do indicate a slight change in the movement pattern.

The Survey Crew has been monitoring points at the base of the Ranchito Vista landslide area since May 2003. The horizontal and vertical movements for these points have been inconsistent and insignificant. This suggests that Sycamore Canyon Road is experiencing very little movement at the base of the Ranchito Vista landslide.

The Survey Crew will continue their monthly monitoring schedule for these points to confirm any significant movement of the roadway that could potentially impact the City's buried water and wastewater mains.

Conejo Road

Since March 1998, the Survey Crew has monitored points located in the street right-of-way on Conejo Road for the Streets Division, as this area historically has experienced significant land movement. Please see the attached exhibits of the Survey Monitoring Points in the Conejo Road Vicinity and the Conejo Road Vicinity Survey Data. The data for a few of these points is rather significant.

Point No. 5007 is located on Conejo Road at Camino Alto. Between March 1998 and July 2004, this point moved upward 0.31' (3.72"). From July 2004 to January 2005, this point rose an additional 0.13' (1.56") for a total vertical increase of 0.44' (5.28") since 1998. This point has not experienced any noticeable horizontal movement.

Point No. 5014 is located at the end of Ealand Place. Between March 1998 and July 2004, this point moved 5.94' (5' – 11.28") horizontally and lowered 2.21' (2' – 2.52"). Between July 2004 and January 2005, this point showed no vertical change, but moved horizontally 0.10' (1.2"). For the period from March 1998 to January 2005, this equates to a total vertical drop of 2.21' (2' – 2.52"), and a horizontal shift of 6.04' (6' – 0.48") in a south-east direction.

Point No. 5018 is located on lower Conejo Road. Between March 1998 and July 2004, this point moved 9.74' (9' – 8.88") horizontally and lowered 0.66' (7.92"). Between July 2004 and January 2005, this point showed no vertical change, but moved horizontally 0.15' (1.8"). For the period from March 1998 to January 2005, this equates to a total vertical drop of 0.66' (7.92"), and a horizontal shift of 9.89' (9' – 10.68") in a south-east direction.

In summary, over the past six years the Ealand Place and lower Conejo Road areas have experienced significant land movement. However, over the last six months, the movement for the surveyed points has been less that 2" in any direction. It has been observed that there usually is a time lag between rain events and land movement. Because of this delayed movement, the Survey Crew will continue to monitor these points on a monthly basis. The Streets and Water Resources Divisions will consider the survey data as a part of their operations and maintenance work for the area.

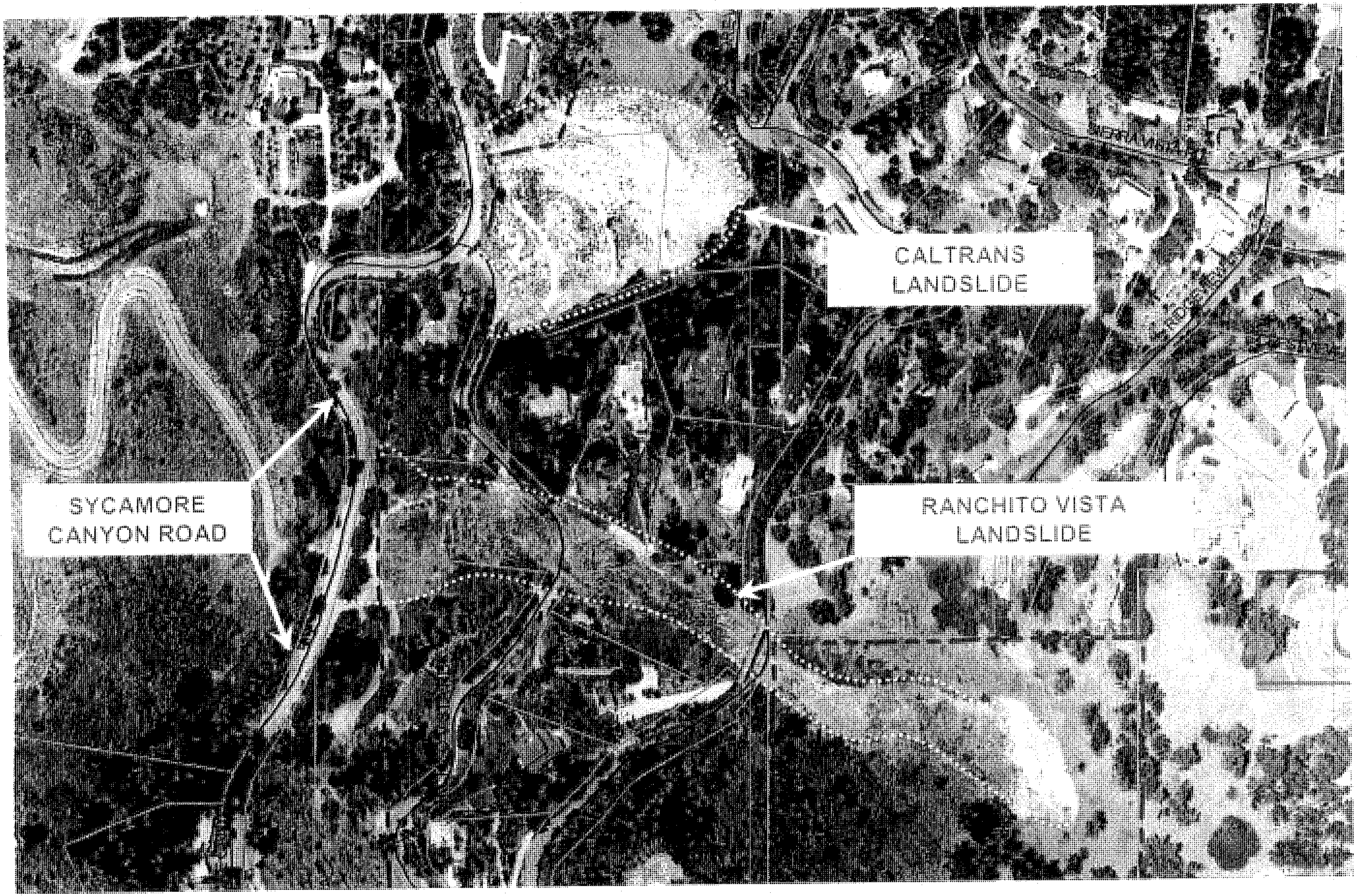
I will keep you apprised of any changes in the Sycamore Canyon and Conejo Road areas. If you would like to discuss this further, I am available, as is my staff.

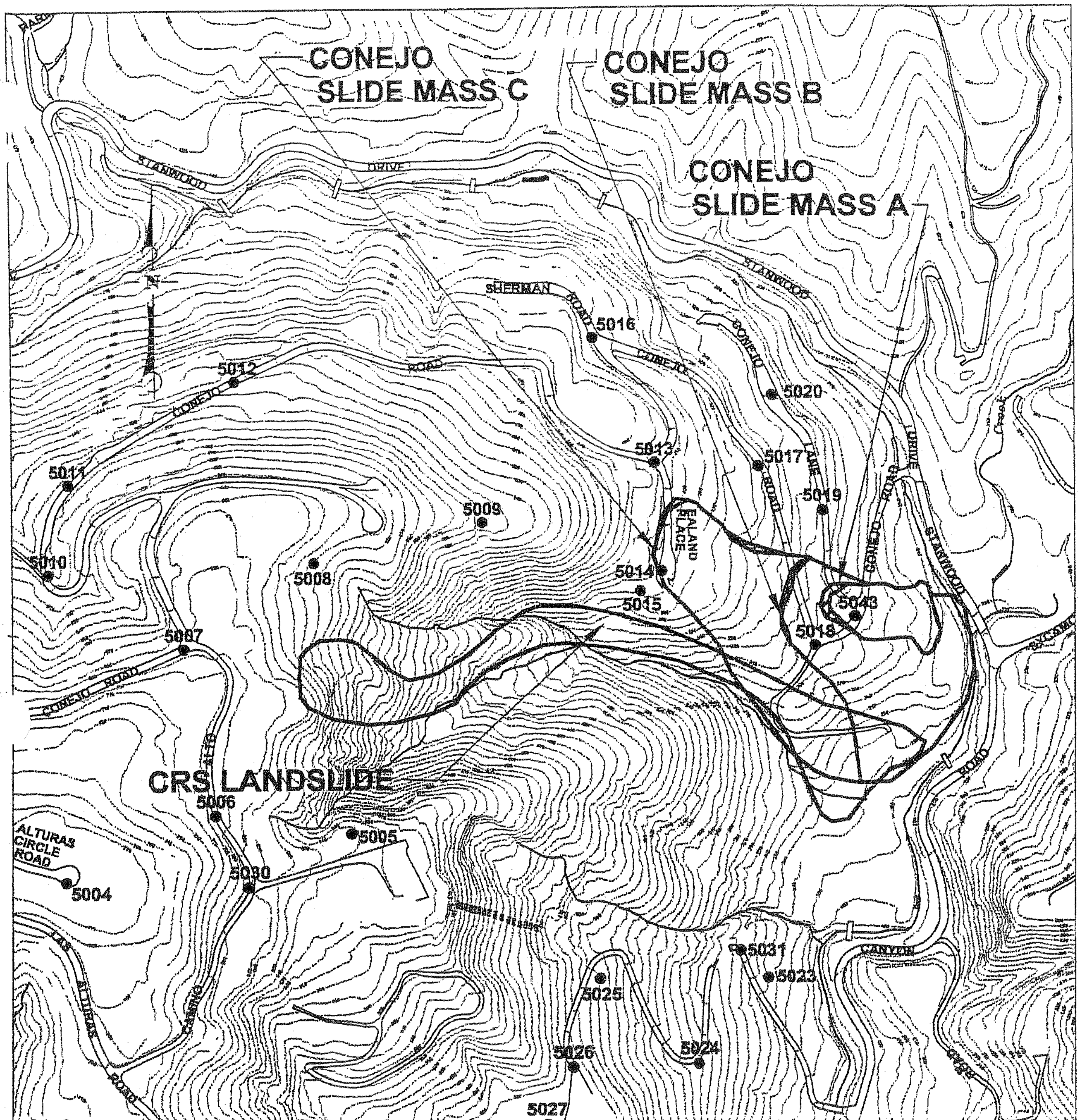
CT/pb

Attachments:

1. Caltrans and Ranchito Vista Landslides
2. Survey Monitoring Points in the Conejo Road Vicinity
3. Conejo Road Vicinity Survey Data

Caltrans and Ranchito Vista Landslides





SURVEY MONITORING POINTS IN THE CONEJO ROAD VICINITY

1" = 400'

● GPS POINTS

AWING:CRSMONPT.DWG
AWN BY: PE/MMC
TE: 7/6/98

CONEJO ROAD VICINITY SURVEY DATA

Movement from July 2004 to January 2005

Point Number	Direction	Distance	Vertical
5006	*	*	+0.16'
5007	*	*	+0.13'
5011	*	*	+0.10'
5012	*	*	*
5013	*	*	*
5014	S70-06-53E	0.10'	*
5016	S27-15-19E	0.11'	*
5017	S05-48-24E	0.12'	+0.14'
5018	S69-07-42E	0.15'	*
5019	*	*	*
5020	*	*	*

Movement from March 1998 to January 2005

Point Number	Direction	Distance	Vertical
5006	*	*	*
5007	*	*	+0.44'
5011	N67-08-28W	0.11'	-0.11'
5012	S07-43-19E	0.12'	*
5013	*	*	*
5014	S77-33-35E	6.04'	-2.21'
5016	*	*	*
5017	N28-36-38E	0.11'	*
5018	S75-32-11E	9.89'	-0.66'
5019	*	*	*
5020	*	*	-0.13'

* = less than 0.10' of movement

City of Santa Barbara
Public Works Department

Interoffice Memorandum

DATE: October 11, 2004

TO: Pat Kelly, Assistant Public Works Director/City Engineer

FROM: Charley Brown, Survey Party Chief CB

SUBJECT: CONEJO ROAD SETTLEMENT SURVEY REPORT – 2004

This report is intended to update the history of movement of monitoring points on Conejo Road after our most recent GPS monitoring campaign on July 16, 2004.

HORIZONTAL MOVEMENT

Per Exhibit A, Monuments 5014 and 5018 continue to show the greatest movement. During the measuring period of July 9, 2003 to July 16, 2004, Monument 5014 has moved 0.12' horizontally, and Monument 5018 has moved 0.19' horizontally. The direction of movement of both Monuments was consistent with past campaigns. During the overall measuring period of March 1, 1998 to July 16, 2004, Monument 5014 has moved 5.94' horizontally, and Monument 5018 has moved 9.74' horizontally.

VERTICAL MOVEMENT

Per Exhibit B, Monuments 5014 and 5018 continue to show the greatest vertical movement, but their loss of elevation has slowed down somewhat in recent years. Both Monuments 5014 and 5018 lost about 0.10' in elevation during the measuring period of July 9, 2003 to July 16, 2004. During the overall vertical measuring period of December 1984 to July 16, 2004, Monument 5014 has decreased in elevation by 2.8' and Monument 5018 has decreased in elevation by 1.1'. Other Monuments display vertical movements consistent with unstable slopes.

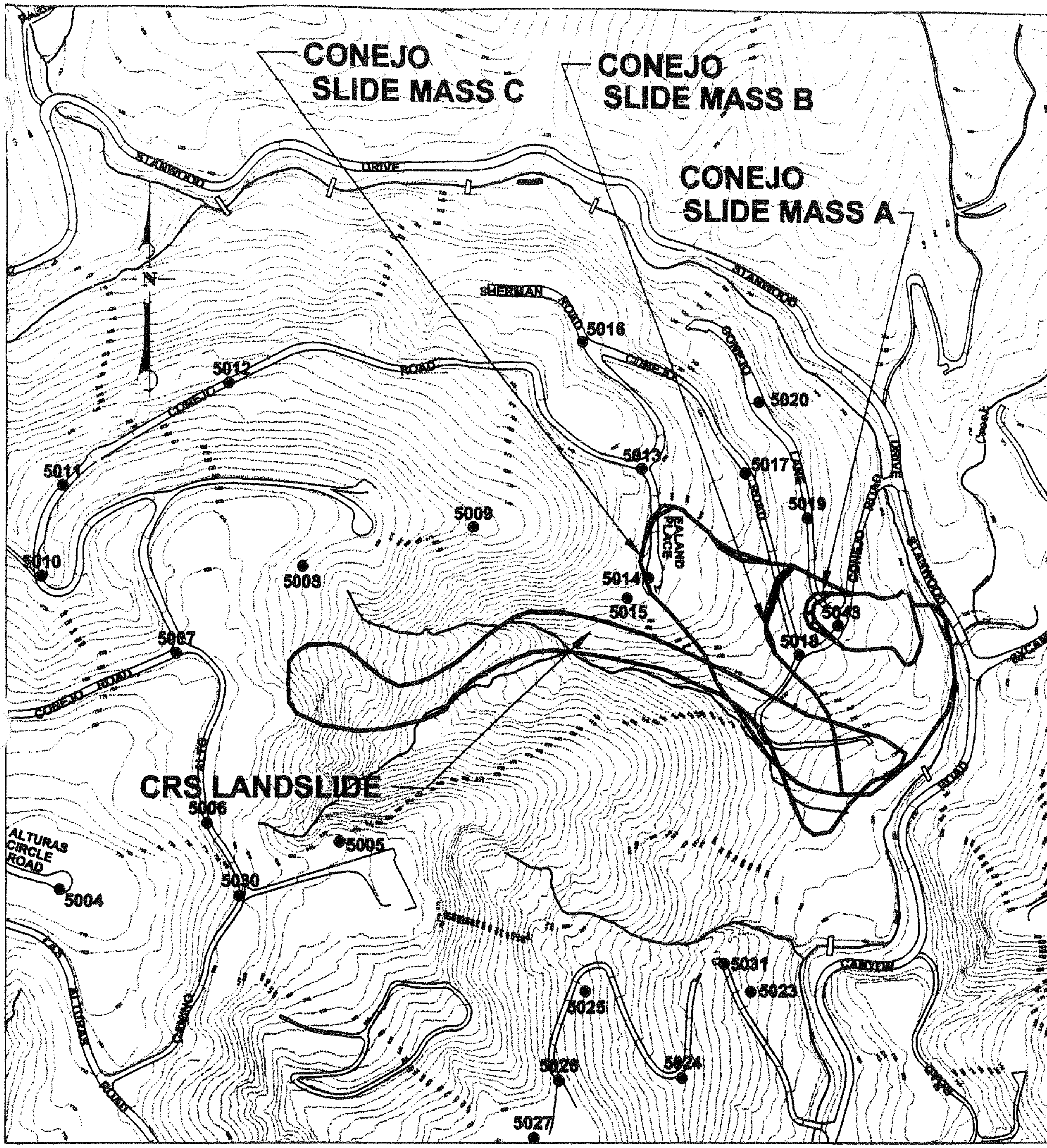
In summary, monitoring our points on Conejo Road indicates that the area remains unstable. The next monitoring campaign is scheduled for July 2005.

CB/mm

Attachments:
1. Vicinity Map
2. Exhibit A – Conejo Road Horizontal Movement Table
3. Exhibit B – Conejo Road Vertical Movement Table

cc: George Estrella, Chief Building Official
Jon Peebles, Water Distribution Superintendent
Manuel Romero, Wastewater Collection System Superintendent
Homer Smith, Principal Civil Engineer
Tully Clifford, Supervising Transportation Engineer

cc: Tony Nisich
Rick Fulmer
Dave Pastrado – Cacute Vele
} FYI



SURVEY MONITORING POINTS IN THE CONEJO ROAD VICINITY

1" = 400'

● GPS POINTS

DRAWING:CRSMONPT.DWG
DRAWN BY: PE/MMC
DATE: 7/6/98

City of Santa Barbara
Public Works Department

Interoffice Memorandum

DATE: December 23, 2003

TO: Pat Kelly, Assistant Public Works Director/City Engineer

FROM: Charley Brown, Survey Party Chief CB

SUBJECT: CONEJO ROAD SETTLEMENT SURVEY REPORT – 2003

This report is intended to update the history of movement of monitoring points on Conejo Road after our most recent GPS monitoring campaign on July 9, 2003.

HORIZONTAL MOVEMENT

Per Exhibit A, Monuments 5014 and 5018 continue to show the greatest movement. During the measuring period of July 16, 2002 to July 9, 2003, Monument 5014 has moved 0.16' and Monument 5018 has moved 0.25'. The direction of movement of both Monuments was consistent with past campaigns.

VERTICAL MOVEMENT

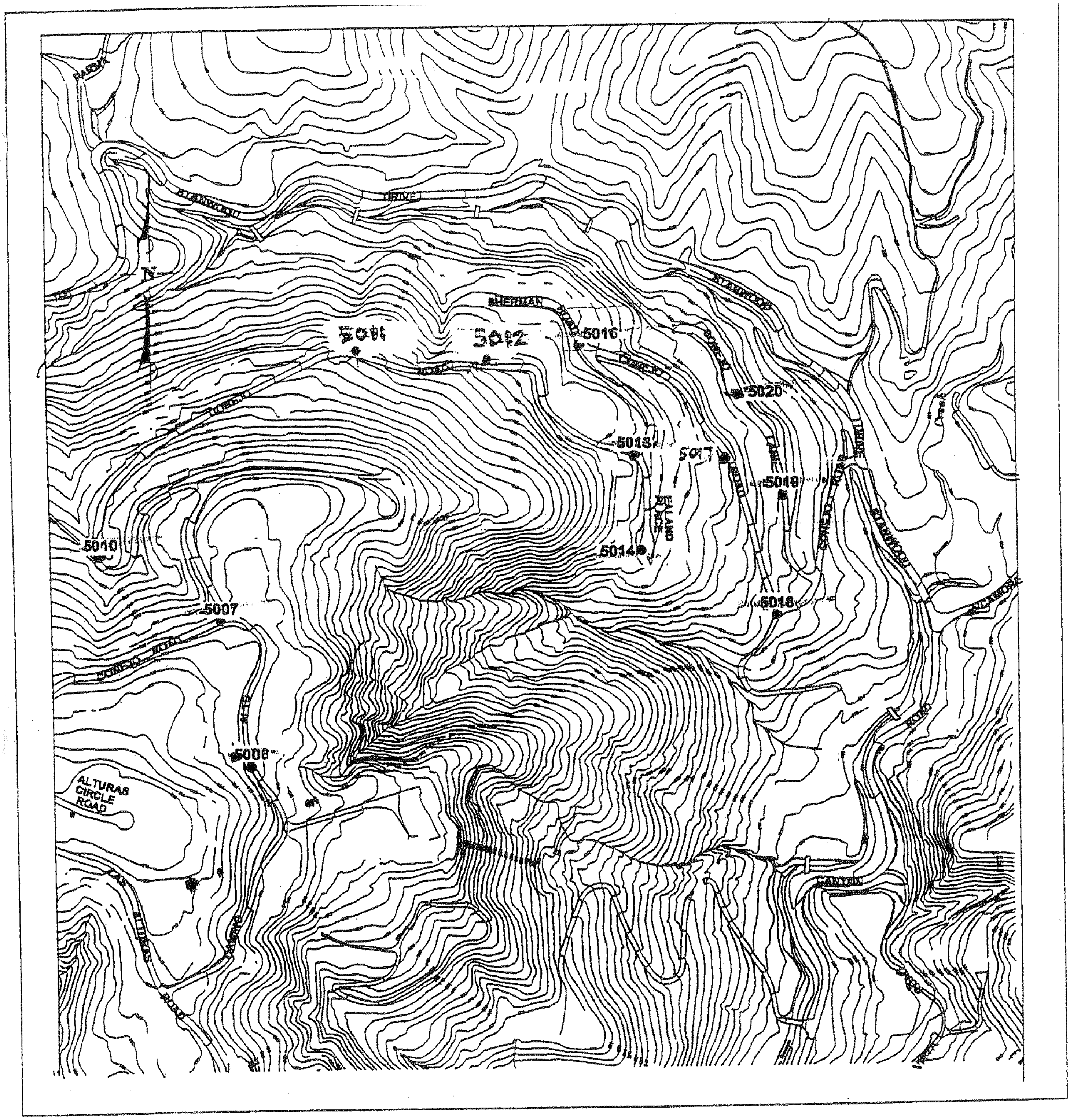
Per Exhibit B, Monuments 5014 and 5018 seem to have stabilized vertically for now. Other Monuments display vertical movements consistent with unstable slopes.

In summary, monitoring our points on Conejo Road indicates that the area remains unstable. The next monitoring campaign is scheduled for July of 2004.

CB/mm

Attachments:
1. Vicinity Map
2. Exhibit A – Conejo Road Horizontal Movement Table
3. Exhibit B – Conejo Road Vertical Movement Table

cc: George Estrella, Chief Building Official
Homer Smith, Principal Civil Engineer
Jon Peebles, Water Distribution Superintendent
Manuel Romero, Wastewater Collection System Superintendent
Tully Clifford, Supervising Transportation Engineer



SURVEY MONITORING POINTS IN THE CONEJO ROAD VICINITY

1" = 400'

DRAWING:33-00011.DWG
ORIG:DRAWING:CRSMONPT.DWG
DRAWN BY: PE/MMC EDITED: RW
DATE: 3/11/98 EDIT DATE: 2/8/00

Conejo Road Settlement Survey
Horizontal Movement 1998 - 2004

Point No.	3/01/98 - 3/10/98		Average	3/10/98 - 3/18/98		Average	3/18/98 - 3/26/98		Average	3/26/98 - 7/13/98		Average	7/13/98 - 10/20/98		Average
	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day
5004	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5005	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5006	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5007	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*
5008	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5009	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5010	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5011	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5012	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5014	110	0.12'	0.013'	100	0.11'	0.014'	97	0.13'	0.016'	102	2.50'	0.023'	99	0.34'	0.003'
5015	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5016	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5018	101	0.24'	0.027'	110	0.19'	0.024'	100	0.23'	0.029'	104	4.35'	0.040'	101	0.41'	0.004'
5019	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5023	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5024	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5025	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5026	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5027	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5030	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5031	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5043	115	0.10'	0.011'	93	0.14'	0.018'	96	0.25'	0.030'	Destroyed during paving of road			---	---	---

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Comments: Only monitoring points 5014 and 5018 show significant movement. The next monitoring compaign will be in July 2005.

Exhibit A

Conejo Road Settlement Survey
Horizontal Movement 1998 - 2004

Point No.	10/20/98 - 7/22/99		Average	7/22/99 - 7/10/00		Average	7/10/00 - 7/16/01		Average	7/16/01 - 7/16/02		Average	7/16/02 - 7/09/03		Average
	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day	Direction	Distance in feet	Horizontal per Day
5006	*	*	*	*	*	*	NM	NM	NM	*	*	*	*	*	*
5007	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5011	*	*	*	*	*	*	*	*	*	NM	NM	NM	*	*	*
5012	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5013	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5014	102	0.20'	0.0007'	103	0.45'	0.0012'	102	1.47'	0.004'	98	0.32'	0.001'	104	0.16'	0.0004'
5016	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5017	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5018	104	0.26'	0.0009'	102	0.76'	0.0021'	104	2.45'	0.007'	100	0.38'	0.001'	106	0.25'	0.0007'
5019	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
5020	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Comments: Only monitoring points 5014 and 5018 show significant movement. The next monitoring compaign will be in July 2005.

Exhibit A

Conejo Road Settlement Survey
Vertical Movement 1984 - 2004

		Elevation Measurements Taken Prior to Using GPS*:												Elevation Measurements Taken With GPS:							
GPS Point No.	Original Point No.	Dec 1984	Nov 1985	Dec 1987	Mar 1988	May 1989	Jun 1990	Jul 1991	Jul 1992	Jan 1993	Aug 1995	Sep 1997	Feb 1998	Mar 1998	Jul 1999	Jul 2000	Jul 2001	Jul 2002	Jul 2003	Jul 2004	Vertical Difference
5006	110	694.0	694.0	NM	NM	NM	693.9	693.9	693.9	693.9	693.9	693.9	NM	694.1	694.0	693.9	694.0	693.9	693.9	693.9	Insignificant
5007	109	681.2	681.2	NM	681.3	681.3	681.3	681.3	681.2	NM	681.2	681.3	NM	681.3	681.3	681.4	681.4	681.6	681.6	681.6	+0.4'
5011	Set in '98													585.3	585.3	585.2	585.2	NM	585.2	585.1	-0.2'
5012	Set in '98													543.2	543.4	543.4	543.3	543.4	543.3	543.2	Insignificant
5013	107B				NM	417.9	417.8	417.7	417.8	417.7	418.0	418.0	418.0	418.0	418.0	418.0	418.0	417.9**	417.9	417.9	Insignificant
5014	106B			395.0	395.0	395.0	695.1	395.0	395.1	395.0	694.9	394.8	394.6	394.4	393.2	393.0	392.5	392.3	392.3	392.2	-2.8'
5016	101	397.0	397.0	397.0	397.0	396.9	397.0	397.0	397.0	397.0	396.9	396.9	397.0	396.9	396.9	396.9	396.8	396.9	397.0	396.8	-0.2'
5017	Set in '98													351.4	351.4	351.4	351.4	351.4	351.3	351.3	Insignificant
5018	105B			297.5	297.5	297.4	297.4	297.4	297.4	297.4	297.4	297.4	297.2	297.1	296.8	296.7	296.5	296.5	296.5	296.4	-1.1'
5019	103B											307.3	307.4	307.5	307.1	307.3	307.2	307.4	307.5	307.4	Insignificant
5020	102B											319.3	319.3	319.3	319.3	319.2	319.2	319.2	319.1	319.1	-0.2'
5010	108	594.5	594.5	NM	594.5	594.5	594.3	594.4	594.5	594.5	594.3	594.3	NM	594.4	NM	Determined to be out of slide area					
	102	316.8	316.8	316.8	316.8	NM	316.7	316.7	613.9	316.8	316.8	Destroyed									
	103	312.6	312.6	312.5	312.6	NM	312.3	312.3	312.5	312.4	312.3	Destroyed									
	104	253.7	253.6	253.6	253.6	Destroyed															
	105	294.4	294.4	Destroyed																	
	106	395.1	395.1	Destroyed																	
	107	417.1	417.0	Destroyed																	

Note: * Measurements from December 1984 to February 1998 have been adjusted by +2.43 feet to reconcile them to the NAVD 88 datum.

** Adjustments have been made to elevations on point #5013 from 1989 to 2001 to reflect its new elevation re-set in the same location in September 2001.

NM = Not Measured

Exhibit B

F:\Group Folders\ENGR\wp\Brown\conejo\ConejoVertica04.xls

Conejo Road Settlement Survey
Horizontal Movement 1998 - 2004

Point No.	7/09/03 - 7/16/04 Direction	7/09/03 - 7/16/04 Distance in feet	Average Horizontal per Day	Overall Movement 3/01/98 - 7/16/04 Direction	Overall Movement 3/01/98 - 7/16/04 Distance in feet	Average Horizontal per Day
5006	*	*	*	251	0.03'	*
5007	*	*	*	135	0.08'	*
5011	*	*	*	317	0.14'	*
5012	*	*	*	186	0.08'	*
5013	*	*	*	95	0.04'	*
5014	96	0.12'	0.0003'	102	5.94'	0.00255'
5016	*	*	*	349	0.10'	*
5017	#	#	#	11	0.22'	#
5018	102	0.19'	0.0005'	104	9.74'	0.00418'
5019	*	*	*	301	0.09'	*
5020	*	*	*	347	0.07'	*

= Station is severely obstructed; accuracy is 0.2'; not able to detect significant movement.

* =	Insignificant Movement
NM =	Not Measured
Direction =	Direction of movement in degrees from North

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Comments: Only monitoring points 5014 and 5018 show significant movement.
The next monitoring compaign will be in July 2005.

Exhibit A

F:\Group Folders\ENGR\wp\Brown\conejo\ConejoHorizontal04.xls

CITY OF SANTA BARBARA

Public Works Department

Interoffice Memorandum

DATE: October 16, 2002

TO: Pat Kelly, Assistant Public Works Director/City Engineer

FROM: Charley Brown, Survey Party Chief CB

SUBJECT: CONEJO ROAD SETTLEMENT SURVEY REPORT, 2001 AND 2002

This report is intended to update the history of movement of monitoring points on Conejo Road since September 20, 2000, and is inclusive of both the 2001 and 2002 GPS monitoring campaigns.

HORIZONTAL MOVEMENT

Per Exhibit A, monuments 5018 and 5014 have shown the greatest movement since 2000. Monument 5018 moved 2.45' in 2001 and 0.38' in 2002. Monument 5014 moved 1.47' in 2001 and 0.32' in 2002. The direction of movement of both monuments was consistent with past campaigns.

VERTICAL MOVEMENT

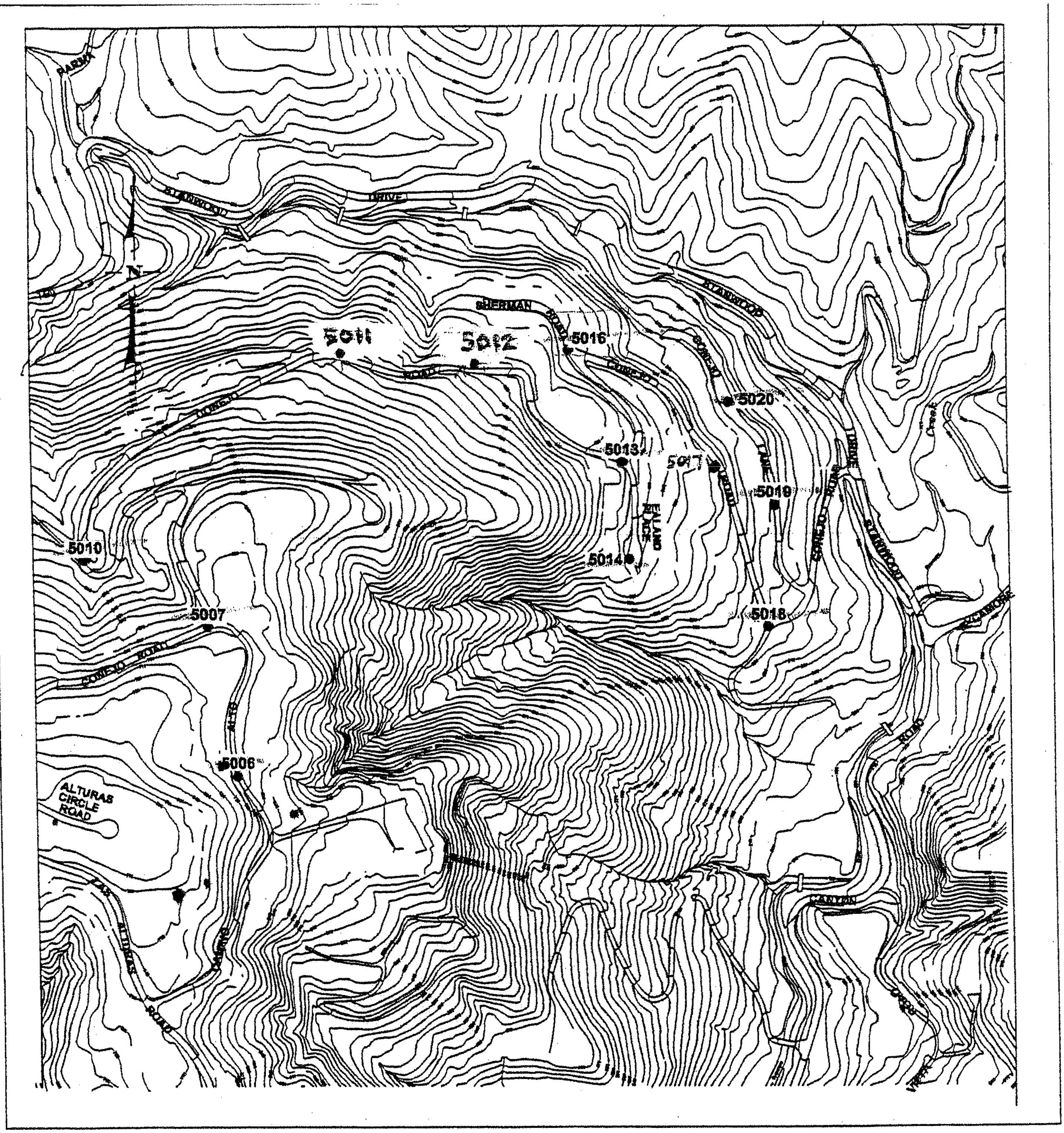
Per Exhibit C, monument 5014 has continued its trend to drop in elevation over time while 5018 seems to have stabilized vertically for now. Other monuments display vertical movements consistent with unstable slopes.

In summary, monitoring our points on Conejo Road indicates that the area remains unstable. The next monitoring campaign is scheduled for July of 2003.

CB:cmc

Attachments: 1. Vicinity Map
2. Exhibit A (Conejo Landslide Recent Monitoring)
3. Exhibit B (Horizontal Movement)
4. Exhibit C (Vertical Movement)

cc: George Estrella, Chief Building Official
Homer F. Smith II, Principal Civil Engineer
George Gerth, Streets, Parking, Transportation & Operations Manager
Bill Thomas, Wastewater System Manager
Jon Peebles, Water Distribution Superintendent



SURVEY MONITORING POINTS IN THE CONEJO ROAD VICINITY

1" = 400'

DRAWING:33-00011.DWG
ORIG:DRAWING:CRSMONPT.DWG
DRAWN BY: PE/MMC EDITED: RW
DATE: 3/11/98 EDIT DATE: 2/8/00

Conejo Landslide
Recent Monitoring

Point No.	3/1/98 – 3/10/98		Average Horiz./Day	3/10/98 – 3/18/98		Average Horiz./Day	3/18/98 – 3/26/98		Average Horiz./Day	3/26/98 – 7/13/98		Average Horiz./Day	7/13/98 – 10/20/98		Average Horiz./Day	Point No.
	Direction	Distance in feet		Direction	Distance in feet		Direction	Distance in feet		Direction	Distance in feet		Direction	Distance in feet		
5004	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	5004
5005	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5005
5006	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5006
5007	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	5007
5008	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5008
5009	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5009
5010	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	5010
5011	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5011
5012	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	5012
5013	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5013
5014	110	0.12'	0.013'	100	0.11'	0.014'	97	0.13'	0.016'	102	2.50'	0.023'	99	0.34'	0.003'	5014
5015	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5015
5016	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	5016
5017	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5017
5018	101	0.24'	0.027'	110	0.19'	0.024'	100	0.23'	0.029'	104	4.35'	0.040'	101	0.41'	0.004'	5018
5019	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	5019
5020	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5020
5023	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5023
5024	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5024
5025	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5025
5026	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5026
5027	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	5027
5030	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	5030
5031	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5031
5043	115	0.10'	0.011'	93	0.14'	0.018'	96	0.25'	0.030'	Destroyed during paving of road			-	-	-	-

*	= Insignificant
NM	= Not Measured
Direction	= The Direction of movement in degrees from the North.

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Comments: Only monitoring points 5014 and 5018 show significant movement. Next monitoring campaign will be in July 2003.

Continued….

Exhibit A

Conejo Landslide
Recent Monitoring

Point No.	10/20/98 – 7/22/99		Average Horiz./Day	7/22/99 – 7/10/00		Average Horiz./Day	7/10/00 – 7/16/01		Average Horiz./Day	7/16/01 – 7/16/02		Average Horiz./Day	3/1/98 – 7/16/02		Average Horiz./Day	Point No.
	Direction	Distance in feet		Direction	Distance in Feet		Direction	Distance in feet		Direction	Distance in feet		Direction	Distance in feet		
5006	*	*	*	*	*	*	NM	NM	NM	*	*	*	*	*	*	5006
5007	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5007
5011	*	*	*	*	*	*	*	*	*	NM	NM	NM	*	*	*	5011
5012	*	*	*	*	*	*	*	*	*	*	*	*	168	0.13'	*	5012
5013	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5013
5014	102	0.20'	0.0007'	103	0.45'	0.0012'	102	1.47'	0.004'	98	0.32'	0.001'	103	5.65'	0.0035'	5014
5016	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5016
5017	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5017
5018	104	0.26'	0.0009'	102	0.76'	0.0021'	104	2.45'	0.007'	100	0.38'	0.001'	105	9.28'	0.0058'	5018
5019	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5019
5020	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5020

*	= Insignificant
NM	= Not Measured
Direction	= The Direction of movement in degrees from the North.

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Comments: Only monitoring points 5014 and 5018 show significant movement. Next monitoring campaign will be in July 2003.

Exhibit A

Conejo Road Settlement Survey
Horizontal Movement
1984 – 2002

RECONCILIATION OF CONVENTIONAL & GPS SURVEYS
MOVEMENT FROM DECEMBER 1984 TO JULY 2002

GPS PT #	Orig. PT #	Direction (degrees measured from North)	Distance (measured in feet)
5006	110	*	*
5007	109	164	0.4
** 5010	108	313	1.1
5013	107B	*	*
5014	106B	103	6.8
5016	101	*	*
5018	105B	106	12.5

Note: * Denotes insignificant measurements
** Denotes point 5010 was not monitored since 1998 – movement reflects 1984-1998-only
Monitoring points 5006, 5007, 5010, and 5016 are original points set in 1984.
Points 5014 and 5018 were set in 1987.
Point 5013 was set in 1988.
All original points were renumbered in 1998 with the GPS point numbers indicated above.

Exhibit B

Conejo Road Settlement Survey
Vertical Movement 1984 – 2002

		Elevation Measurements Taken Prior to GPS *:												Elevation Measurements Taken With GPS:					
GPS PT #	*Original PT#*	*Dec 1984*	*Nov 1985*	*Dec 1987*	*Mar 1988*	*May 1989*	*Jun 1990*	*Jul 1991*	*Jul 1992*	*Jan 1993*	*Aug 1995*	*Sep 1997*	*Feb 1998*	*Mar 1998*	*Jul 1999*	*Jul 2000*	*Jul 2001*	*Jul 2002*	*Vertical Difference*
5006	110	694.0	694.0	Not Measured	Not Measured	Not Measured	693.9	693.9	693.9	693.9	693.9	693.9	Not Measured	694.1	694.0	693.9	694.0	693.9	Insignificant
5007	109	681.2	681.2	Not Measured	681.3	681.3	681.3	681.3	681.2	Not Measured	681.2	681.3	Not Measured	681.3	681.3	681.4	681.4	681.6	+0.4'
5013	107B				Not Measured	417.9	417.8	417.7	417.8	417.7	418.0	418.0	418.0	418.0	418.0	418.0	418.0	417.9**	Insignificant
5014	106B			395.0	395.0	395.0	395.1	395.0	395.1	395.0	394.9	394.8	394.6	394.4	393.2	393.0	392.5	392.3	-2.7'
5016	101	397.0	397.0	397.0	397.0	396.9	397.0	397.0	397.0	397.0	396.9	396.9	397.0	396.9	396.9	396.9	396.8	396.9	Insignificant
5018	105B			297.5	297.5	297.4	297.4	297.4	297.4	297.4	297.4	297.4	297.2	297.1	296.8	296.7	296.5	296.5	-1.0'
5019	103B											307.3	307.4	307.5	307.1	307.3	307.2	307.4	Insignificant
5020	102B											319.3	319.3	319.3	319.3	319.2	319.2	319.2	Insignificant
5010	108	594.5	594.5	Not Measured	594.5	594.5	594.3	594.4	594.5	594.5	594.3	594.3	Not Measured	594.4	Not Measured	Not Measured	Not Measured	Not Measured	
	102	316.8	316.8	316.8	316.8	Not Measured	316.7	316.7	316.9	316.8	316.8	Destroyed							
	103	312.6	312.6	312.5	312.6	Not Measured	312.3	312.3	312.5	312.4	312.3	Destroyed							
	104	253.7	253.6	253.6	253.6	Destroyed													
	105	294.4	294.4	Destroyed															
	106	395.1	395.1	Destroyed															
	107	417.1	417.0	Destroyed															

Note: * Measurements from December 1984 to February 1998 have been adjusted by +2.43 feet to reconcile them to the NAVD 88 datum.
** Adjustments have been made to elevations on point #5013 from 1989 to 2001 to reflect the new elevation on point #5013 re-set in the same location in September 2001.

Exhibit C

CITY OF SANTA BARBARA

Public Works Department

Interoffice Memorandum

DATE: September 20, 2000

TO: Pat Kelly, Assistant Public Works Director/City Engineer

FROM: Charley Brown, Survey Party Chief CB

SUBJECT: CONEJO ROAD SETTLEMENT SURVEY REPORT 1984 TO 2000

This report is intended to give an understanding of the ground movement that has occurred in the Conejo Road area recently and since 1984. Historically, ground movement has been a characteristic of the upper portion of Sycamore Canyon. The City Public Works Department staff has been monitoring the landslide masses in the Conejo Road area intermittently since 1984. This report also documents how the current 1988 vertical datum has been reconciled with the old vertical datum.

Horizontal Movement:

The Pre-Global Positioning System measurements were taken from survey control points outside of the slide area. One point, No. 5029, is located in Parma Park to the north of the Conejo Road slide area, and a second point, No. 5001, is located on a hillside south of the slide area. Unfortunately, these survey control points are outside of the map attached. After the March 1998 survey, using global positioning equipment, I was able to adjust the measurements from previous surveys to the new coordinate system. Having made this adjustment, I can now publish estimates of movement of nine monitoring points, some of which have been measured since 1984. Please refer to Exhibit B, "Horizontal Movement 1984-2000", for my evaluation.

Summary

Per Exhibit A, monuments 5018 and 5014 have shown the greatest movement since 1998. For example, point 5018 has moved 0.76 feet horizontally from July 1999 to July 2000. Per Exhibit B, monuments 5018 and 5014 have shown the most movement during the extended monitoring period.

Vertical Movement:

Measurements taken from December 1984 to September 1997 were performed with leveling instruments and rods. These measurements began at a fixed benchmark on Stanwood Drive. In March of 1998, global positioning equipment was used which has the advantage of being fast and accurate if there are no obstructions to satellite observations directly over the monitoring points. Unfortunately, the benchmark on Stanwood Drive has obstructions, so global positioning equipment could not be placed on the benchmark. I chose to reconcile the older measurements to the new measurements at monitoring point number 5013 which has been in use since May 1989. It has a stable history and is quite open to satellite observation. Please refer to Exhibit C, "Vertical Movement 1984-2000", for my evaluation.

<u>Summary</u>

Per Exhibit C, points showing the most vertical movements from 1987 to 2000 are monuments 5014 and 5018. However, from July 1999 to July 2000, point 5014 dropped 0.20 feet, and point 5019 raised 0.20 feet.

If you have any questions or comments, please call me at extension 5403.

CB/avb

Attachments

cc: George Estrella, Chief Building Official
Diane Gabriel, Principal Civil Engineer
George Gerth, Streets, Parking & Transportation Operations Manager
Bill Thomas, Distribution and Collection Manager

CONEJO ROAD SETTLEMENT SURVEY
Horizontal Movement 1984-2000

RECONCILIATION OF CONVENTIONAL & GPS SURVEYS
MOVEMENT FROM DECEMBER 1984 to JULY 2000

Orig. PT#	GPS PT#	Direction (degrees measured from North)	Distance (measured in feet)
101	5016	*	*
105B	5018	106	9.7
106B	5014	103	5.0
107B	5013	*	*
108	5010	313	1.1**
109	5007	164	0.4
110	5006	*	*

Note: * denotes insignificant measurements.
** denotes the point 108 was not monitored in 2000 due to lack of satellite coverage (movement reflects 1984-1998 only)

Notes: Monitoring points 101, 108, 109 and 110 are original points set in 1984.
Points 105B and 106B were set in 1987.
Point 107B was set in 1988.
Point 108 was last monitored in 1998.
All points 101-110 were renumbered in 1998 with the GPS point numbers indicated above.

EXHIBIT B

CONEJO ROAD SETTLEMENT SURVEY
Vertical Movement 1984-2000

		ELEVATION MEASUREMENTS TAKEN PRIOR TO GPS*:												ELEVATION MEASUREMENTS TAKEN WITH GPS		
Orig. PT#	GPS PT#	Dec. 1984	Nov. 1985	Dec. 1987	Mar. 1988	May 1989	Jun. 1990	Jul. 1991	Jul. 1992	Jan. 1993	Aug. 1995	Sep. 1997	Feb. 1998	Mar. 1998	July 1999	July 2000
101	5016	397.0	397.0	397.0	397.0	396.9	397.0	397.0	397.0	397.0	396.9	396.9	397.0	396.9	396.9	396.9
102		316.8	316.8	316.8	316.8	Not Measured	316.7	316.7	316.9	316.8	316.8	Destroyed				
102B	5020											319.3	319.3	319.3	319.3	319.2
103		312.6	312.6	312.5	312.6	Not Measured	312.3	312.3	312.5	312.4	312.3	Destroyed				
103B	5019											307.3	307.4	307.5	307.1	307.3
104		253.7	253.6	253.6	253.6	Destroyed										
105		294.4	294.4	Destroyed												
105B	5018			297.5	297.5	297.4	297.4	297.4	297.4	297.4	297.4	297.4	297.2	297.1	296.8	296.7
106		395.1	395.1	Destroyed												
106B	5014			395.0	395.0	395.0	395.1	395.0	395.1	395.0	394.9	394.8	394.6	394.4	393.2	393.0
107		417.1	417.0	Destroyed												
107B	5013				Not Measured	418.1	418.0	417.9	418.0	417.9	418.2	418.2	418.2	418.2	418.2	418.2
108	5010	594.5	594.5	Not Measured	594.5	594.5	594.3	594.4	594.5	594.5	594.3	594.3	Not Measured	594.4	Not Measured	
109	5007	681.2	681.2	Not Measured	681.3	681.3	681.3	681.3	681.2	Not Measured	681.2	681.3	Not Measured	681.3	681.3	681.4
110	5006	694.0	694.0	Not Measured	Not Measured	Not Measured	693.9	693.9	693.9	693.9	693.9	693.9	Not Measured	694.1	694.0	693.9

Note: *Measurements December 84 to February 1998 have been adjusted by +2.43 feet to reconcile them to the GPS datum.

See Exhibit "A" for a summary.

EXHIBIT C

CONEJO LANDSLIDE
RECENT MONITORING

	3/1/98 - 3/10/98			3/10/98 - 3/18/98			3/18/98 - 3/26/98			3/26/98 - 7/13/98			7/13/98 - 10/20/98			10/20/98-7/22/99			7/22/99-7/10/2000			3/1/98-7/10/2000			
	Direction	Distance in feet	Average horiz./day	Direction	Distance in feet	Average horiz./day	Direction	Distance in feet	Average horiz./day	Direction	Distance in feet	Average horiz./day	Direction	Distance in feet	Average horiz./day	Direction	Distance in feet	Average horiz./day	Direction	Distance in feet	Average horiz./day	Direction	Distance in feet	Average horiz./day	Point No.
5004	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	5004
5005	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	5005
5006	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5006
5007	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5007
5008	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	5008
5009	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	5009
5010	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	5010
5011	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5011
5012	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	*	*	*	*	*	*	149	0.16	0.0002	5012
5013	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5013
5014	110	0.12'	0.014'	100	0.11'	0.014'	97	0.13'	0.016'	102	2.50'	0.023'	99	0.34'	0.003'	102	0.20'	0.0007'	103	0.45	0.0012	103	3.93	0.0005	5014
5015	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	5015
5016	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5016
5017	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5017
5018	101	0.24'	0.028'	110	0.19'	0.024'	100	0.23'	0.029'	104	4.35'	0.040'	101	0.41'	0.004'	104	0.26'	0.0009'	102	0.76	0.0021	104	6.53	0.0090	5018
5019	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5019
5020	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5020
5023	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM							5023
5024	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM							5024
5025	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM							5025
5026	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM							5026
5027	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM							5027
5030	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM							5030
5031	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM							5031
5043	115	0.10'	0.012'	93	0.14'	0.018'	96	0.24'	0.030'	Destroyed during paving of road			-	-	-	-	-	-							5043

* = Insignificant
NM = Not Measured
Direction = The Direction of movement in degrees from the north.

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Next monitoring scheduled for July 2001

SUMMARY OF VERTICAL MOVEMENT FROM EXHIBIT "C"

Vertical movement:	3/26/98 - 7/10/00	7/22/99 - 7/10/00
Point No. 5014	-1.4	-0.20
Point No. 5018	-0.4	-0.10
Point No. 5019	-0.2	+0.20

There has been no significant vertical movement of the other monitored points.

Comments:

Movement seems to have slowed; appears to be back to the movements that were occurring before the land movement that was experienced in February 1998.
Point No. 5019 has been tentatively added to the summary of vertical movement.

EXHIBIT A

CITY OF SANTA BARBARA

Public Works Department

Interoffice Memorandum

DATE: September 15, 1999

TO: Sandra E. Tripp-Jones, City Administrator

FROM: David H. Johnson, Public Works Director

SUBJECT: CONEJO ROAD AREA MONITORING UPDATE

This is to provide updated information regarding the monitoring of land movement that Public Works Staff is performing in the Conejo Road area.

The attached table identifies the points being monitored. The Survey Monitoring Points are identified by number on the attached map.

The Public Works staff has established a network of points in the Conejo Road area that have been measured using the Global Positioning System (GPS).

Public Works staff performed field measurements of the monitoring points in the Conejo area on July 22, 1999. The data from this monitoring is shown on the attached table titled "Conejo Landslide Monitoring".

The Conejo Road South (CRS) and P/P Landslide field measurements were discontinued in August of 1998. Only the monitoring points in the City's right of way, and on Conejo Way were measured on July 22, 1999. Public Works Staff will continue to monitor these points on an annual basis. The results of the annual monitoring will no longer be distributed to you unless there is accelerated movement experienced.

If you have any questions, please contact Diane Gabriel, Principal Civil Engineer, at extension 5372.

DG/pv/klg

Attachments

cc: Peter K. Wilson, Deputy City Administrator
Richard Breza, Chief of Police
Warner McGrew, Fire Chief
David D. Davis, Community Development Director
Don Olson, Assistant Director/City Planner
Pat Kelly, Assistant Public Works Director/City Engineer
Brad Landreth, Risk Manager
John Schoof, Principal Civil Engineer
Bob Roebuck, Water Resources Manager
George Gerth, Streets, Parking & Transportation Operations Manager
George Estrella, Chief Building Official
Daniel J. Wallace, City Attorney
Janet K. McGinnis, Assistant City Attorney

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CONEJO LANDSLIDE MONITORING

Point No.	3/1/98 - 3/10/98		Average horiz./day	3/10/98 - 3/18/98		Average horiz./day	3/18/98 - 3/26/98		Average horiz./day	3/26/98 - 7/13/98		Average horiz./day	7/13/98 - 10/20/98		Average horiz./day	10/20/98-7/22/99		Average horiz./day	Point No.
	Direction	Distance in feet		Direction	Distance in feet		Direction	Distance in feet		Direction	Distance in feet		Direction	Distance in feet		Direction	Distance in feet		
5004	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	5004
5005	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	5005
5006	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5006
5007	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	*	*	*	5007
5008	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	5008
5009	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	5009
5010	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	5010
5011	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5011
5012	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	*	*	*	5012
5013	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5013
5014	110	0.12'	0.014'	100	0.11'	0.014'	97	0.13'	0.016'	102	2.50'	0.023'	99	0.34'	0.003'	102	0.20'	0.0007'	5014
5015	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	5015
5016	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	*	*	*	5016
5017	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5017
5018	101	0.24'	0.028'	110	0.19'	0.024'	100	0.23'	0.029'	104	4.35'	0.040'	101	0.41'	0.004'	104	0.26'	0.0009'	5018
5019	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	*	*	*	5019
5020	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5020
5023	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	5023
5024	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	5024
5025	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	5025
5026	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	5026
5027	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	5027
5030	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	5030
5031	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	5031
5043	115	0.10'	0.012'	93	0.14'	0.018'	96	0.24'	0.030'	Destroyed during paving of road			-	-	-	-	-	-	5043

* = Insignificant
NM = Not Measured
Direction = The Direction of movement in degrees from the north.

Note: Shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Next monitoring scheduled for July 2000

Vertical movement:	3/26/98 - 7/13/98	7/13/98 - 10/20/98	10/20/98 - 07/22/99
Point No. 5014	- 0.99'	- 0.12'	Insignificant
Point No. 5018	- 0.25'	Insignificant	Insignificant

There has been no significant vertical movement of the other monitored points.

Comments:

Movement seems to have slowed; appears to be back to the movements that were occurring before the land movement that was experienced in February 1998.

Table of Contents

City Documents - Conejo Drive, Conejo Place and Ealand Drive

TYPE	FROM	SUBJECT	SECTION
Transmittal	Public Works (Engr)	Conejo Landslide Management Transmittal - June, 1999	1
Memorandum	Public Works (Engr)	Sycamore Canyon Landslide Monitoring Update - August 7, 1998	2
Report	Public Works (Engr)	Summary Report of Conditions in the Sycamore Canyon Area - March 13, 1998	3
City Advisory #2	Public Works (PIO)	Landslide Threat of Blockage to Sycamore Creek Diminishes with Dry Weather - February 24, 1998	4
City News Release to Media	Public Works (PIO)	Landslides Destroy and Threaten Property in Conejo Road/Sycamore Canyon Area - February 24, 1998	5
City Advisory to Property Owners	Public Works (PIO)	Landslides may Threaten Property in Sycamore Canyon - Residents should Remain on Alert - February 24, 1998	6
Council Agenda Report	City Administrator	Ordinance to Provide Protection from Geologic Hazard of the Conejo Slide Area - November 14, 1997	7
Map	Public Works	Composite Topo of Conejo Slide Area - April 1997	8
Letter, Ordinance, Council Agenda Report	Public Works, City Administrator	Conejo Slide Ordinance - July 9, 1991	9
Memorandum	City Administrator	Conejo Road #067 - June 10, 1985	10
Council Agenda Report	City Administrator	Notice of Completion Conejo Road Drainage Improvements - October 31, 1986	11
Council Agenda Report	City Administrator	Conejo Road Drainage, Award of Contract - January 27, 1986	12
Council Agenda Report	City Administrator	Surface Drainage Structures for Conejo Road - Time Extension - November 27, 1985	13
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Booklet	Leighton and Associates	Final Phase I Report of Engineering Design Services for Improvements to Surface and Subsurface Drainage in the Vicinity of the Conejo Road Landslide, City of Santa Barbara, California - January 1, 1985	15
Booklet	Leighton and Associates	Preliminary Findings in Phase I of Engineering Design Services for Improvements to Surface and Subsurface Drainage in the Vicinity of the Conejo Road Landslide, City of Santa Barbara, CA - October 15, 1984	16
Council Agenda Report	City Administrator	Selection of Leighton and Associates for Engineering Services for the Design of Drainage Improvements to the Conejo Road Landslide Area - August 3, 1984	17
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Memorandum	City Administrator	Conejo Road - Status Report - January 3, 1984	22

CITY OF SANTA BARBARA

Public Works Department

Interoffice Memorandum

DATE: June 10, 1999

TO: George Estrella, Chief Building Official

FROM: Pat Kelly, Assistant Public Works Director/City Engineer

SUBJECT: CONEJO LANDSLIDE MANAGEMENT

This memorandum is to simply document that the Engineering Division will continue to annually monitor, plus send copies to your office of, the Conejo Slide survey points and that the Building Division will manage any future revisions to the "Conejo Slide Ordinance".

For your information, attached is a compendium from our files of information that, for the most part, was given to the public during last year's slide activity.

If I can be of any further assistance, please call me at extension 5366, or drop by.

PK/pav

Attachment

cc: (w/Table of Contents only)
Dave Davis, Community Development Director
David H. Johnson, Public Works Director
Diane Gabriel, Principal Civil Engineer
Charlie Brown, Survey Party Chief

F:\USERS\ENGR\wp\Kelly\conejo landslide mgmt.doc

12/C

CITY OF SANTA BARBARA

Public Works Department

Interoffice Memorandum

COUNTER COPY
(make copies as needed)

DATE: August 7, 1998

TO: Sandra E. Tripp-Jones, City Administrator

FROM: David H. Johnson, Public Works Director

SUBJECT: SYCAMORE CANYON LANDSLIDE MONITORING UPDATE

This is to provide updated information regarding the monitoring that Public Works Staff is performing of landslide activity in the Sycamore Canyon/Conejo Road area.

The attached exhibit "A" identifies the points being monitored. The Monitoring Points are identified by number on the exhibit.

Conejo Landslide

The Public Works staff has established a network of points on the Conejo Landslide that have been measured using GPS (Global Positioning System).

Public Works staff has taken field measurements of the monitoring points in the Conejo Landslide area on July 13, 1998. The data from the GPS monitoring of this area is shown on the attached table titled "Conejo Landslide Monitoring".

The CRS and P/P Landslide field measurements have been discontinued until the start of the 1998-1999 rainy season, at which time the City will determine the extent of monitoring appropriate for conditions at that time.

If you have any questions, please contact Diane Gabriel, Principal Civil Engineer, at extension 5372.

DG/pv

Attachments

cc: (w/attachments)
Peter K. Wilson, Deputy City Administrator
Richard Breza, Chief of Police
Jacque McCoy, Deputy Chief of Police
Warner McGrew, Fire Chief
Keith McGrew, Assistant Fire Chief
David D. Davis, Community Development Director
Don Olson, Assistant Director/City Planner
Pat Kelly, Assistant Public Works Director/City Engineer
John Schoof, Principal Civil Engineer
Bob Roebuck, Water Resources Manager
George Gerth, Transportation & Parking Manager
George Estrella, Chief Building Official
Daniel J. Wallace, City Attorney
Janet K. McGinnis, Assistant City Attorney

F:\USERS\ENGR\wp\Gabriel\Syc. Canyon Landslide Monitor update mem.doc

CONEJO LANDS[illegible]E MONITORING

Point Number	3/1/98 - 3/10/98 Direction	3/1/98 - 3/10/98 Distance in feet	Average horiz./day	3/10/98 - 3/18/98 Direction	3/10/98 - 3/18/98 Distance in feet	Average horiz./day	3/18/98 - 3/26/98 Direction	3/18/98 - 3/26/98 Distance in feet	Average horiz./day	3/26/98 - 7/13/98 Direction	3/26/98 - 7/13/98 Distance in feet	Average horiz./day
5004	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM
5005	*	*	*	*	*	*	*	*	*	*	*	*
5006	*	*	*	*	*	*	*	*	*	*	*	*
5007	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*
5008	*	*	*	*	*	*	*	*	*	*	*	*
5009	*	*	*	*	*	*	*	*	*	*	*	*
5010	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM
5011	*	*	*	*	*	*	*	*	*	*	*	*
5012	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*
5013	*	*	*	*	*	*	*	*	*	*	*	*
5014	110	0.12'	0.014'	100	0.11'	0.014'	97	0.13'	0.016'	102	2.50'	0.023'
5015	*	*	*	*	*	*	*	*	*	*	*	*
5016	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*
5017	*	*	*	*	*	*	*	*	*	*	*	*
5018	101	0.24'	0.028'	110	0.19'	0.024'	100	0.23'	0.029'	104	4.35'	0.040'
5019	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*
5020	*	*	*	*	*	*	*	*	*	*	*	*
5023	*	*	*	*	*	*	*	*	*	*	*	*
5024	*	*	*	*	*	*	*	*	*	*	*	*
5025	*	*	*	*	*	*	*	*	*	*	*	*
5026	*	*	*	*	*	*	*	*	*	*	*	*
5027	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM
5030	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM
5031	*	*	*	*	*	*	*	*	*	*	*	*
5043	115	0.10'	0.012'	93	0.14'	0.018'	96	0.24'	0.030'	Destroyed during paving of road		

Note: Vertical movement from 3/26/98 to 7/13/98 has been measured as follows:

Point No. - 5014 (0.99')

Point No. - 5018 (0.25')

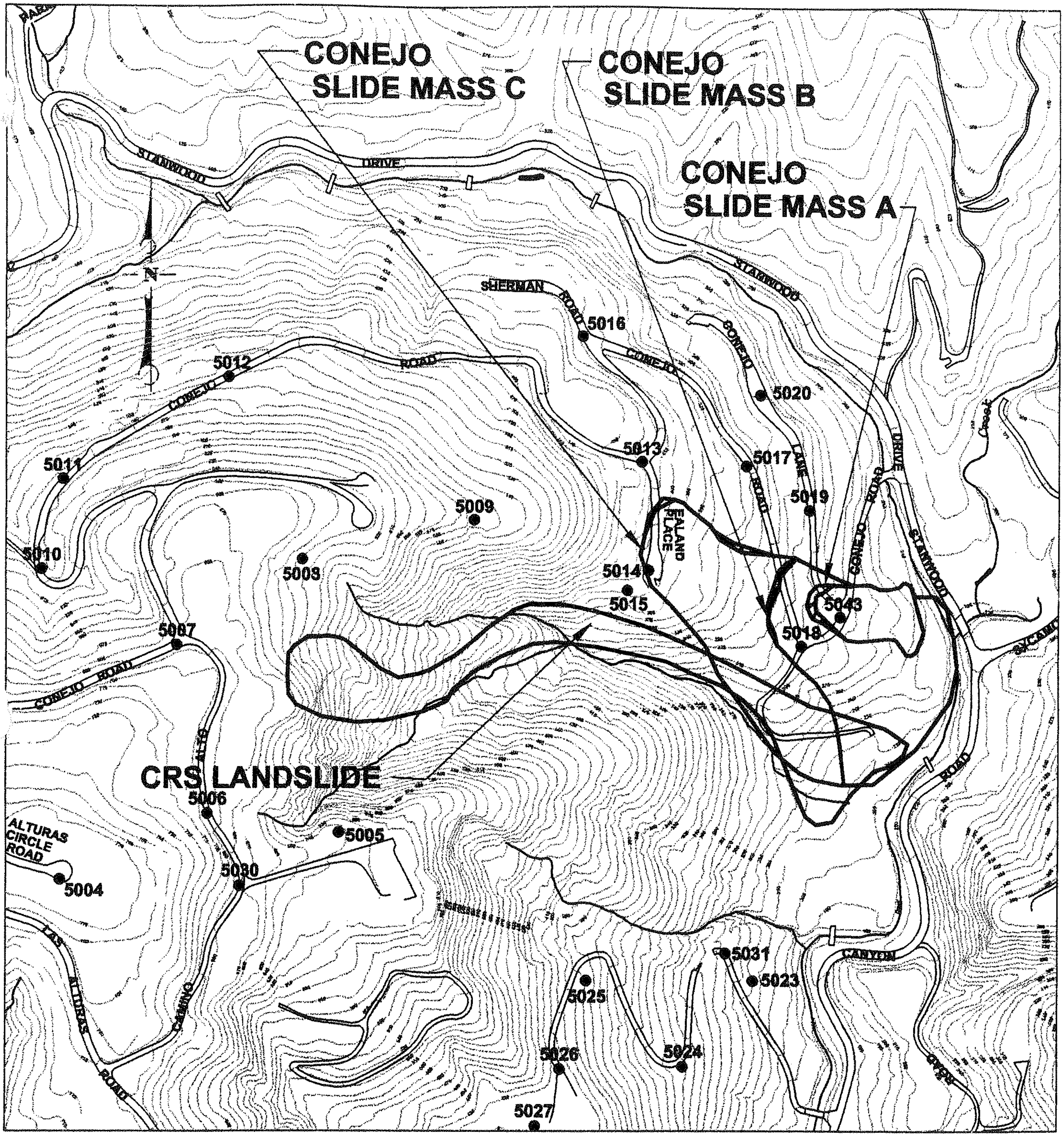
There has been no significant vertical movement of the other monitored points.

* = Insignificant

NM = Not measured

Direction = The Direction of movement in degrees from the north.

Note: Shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.



SURVEY MONITORING POINTS IN THE CONEJO ROAD VICINITY

1" = 400'

● GPS POINTS

DRAWING:CRSMONPT.DWG
DRAWN BY: PE/MMC
DATE: 7/6/98

CITY OF SANTA BARBARA

Public Works Department

Interoffice Memorandum

DATE: June 10, 1999

TO: George Estrella, Chief Building Official

FROM: Pat Kelly, Assistant Public Works Director/City Engineer

SUBJECT: CONEJO LANDSLIDE MANAGEMENT

This memorandum is to simply document that the Engineering Division will continue to annually monitor, plus send copies to your office of, the Conejo Slide survey points and that the Building Division will manage any future revisions to the "Conejo Slide Ordinance".

For your information, attached is a compendium from our files of information that, for the most part, was given to the public during last year's slide activity.

If I can be of any further assistance, please call me at extension 5366, or drop by.

PK/pav

Attachment

cc: (w/Table of Contents only)
Dave Davis, Community Development Director
David H. Johnson, Public Works Director
Diane Gabriel, Principal Civil Engineer
Charlie Brown, Survey Party Chief

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CITY NEWS RELEASE

FOR IMMEDIATE RELEASE TO MEDIA
2/24/98 2:54 PM

SUBJECT: LANDSLIDES DESTROY AND THREATEN PROPERTY IN CONEJO ROAD/SYCAMORE CANYON AREA

Issued by the City of Santa Barbara

The unusually heavy rains have triggered landslides on private property in the hillside below Conejo Road on the west side of Sycamore Canyon near the intersection of Stanwood Drive and extending down Sycamore Canyon approximately one-quarter mile. City emergency personnel have identified three large individual slides, although there may be more, and are investigating the extent of the situation at this time. One slide is approximately 1,500 feet long.

Residents on the west side of Sycamore Canyon between the five points intersection and Stanwood Drive have been advised of the potential for flooding or mud flows in the canyon should renewed sliding block or obstruct Sycamore Creek. Emergency personnel are stationed in the area and are monitoring conditions at this time. City Public Works Engineering and Surveying Staff are investigating the area to determine the potential for additional land movement. Geologists are also analyzing the situation. The present danger diminishes over time as the hillside dries and drains.

The slides have destroyed property and the Chief of Building and Safety has Red Tagged (unsafe to enter) structures at 494, 498 Conejo Road and 1709 Sycamore Canyon. Four other properties have been identified as having limited entry only. Additional properties are being inspected at this time. No damage costs are identified at this time.

(More)

For Media Inquiries, Please Contact:
George Gerth, Lead PIO
(805) 564-5394
Cellular (805) 680-5336
For Spanish Language contact Marcelo Lopez
(805) 564-5304
Cellular (805) 451-4590

CITY ADVISORY

FOR IMMEDIATE RELEASE → Property Owners

2/24/98 11:04 AM

SUBJECT: LANDSLIDES MAY THREATEN PROPERTY IN SYCAMORE CANYON – RESIDENTS SHOULD REMAIN ON ALERT

Issued by the City of Santa Barbara

Unusually heavy rains yesterday have triggered landslides on private property in the hills below Conejo Road on the west side of Sycamore Canyon near the intersection of Stanwood Drive and extending down Sycamore Canyon approximately one-quarter mile. City emergency personnel have identified three large individual slides, although there may be more, and are investigating the extent of the situation at this time.

Residents living in the area along the west side of Sycamore Canyon between Stanwood Drive and Five Points Intersection should be aware that there is the potential for damage to property due to slides or debris flows from these slides, other pre-existing slides, or new slides.

There is also the potential for damage to property if additional land movement associated with these slides or new slides spills into Sycamore Creek and block it. This could result in flooding or mud flows downstream of the blockage when the creek breaks through the obstruction.

City Public Works Engineering and Surveying Staff are investigating the area to determine the potential for additional land movement. Geologists are also analyzing the situation. The present danger diminishes over time as the hillside dries and drains. Residents will be advised as soon as more information in available.

City emergency personnel are stationed in the area to be prepared to warn residents if additional sliding occurs. If it does, residents should evacuate the area, following the directions given by emergency personnel. All residents in this area should be prepared for an evacuation and be watchful of conditions surrounding your property.

Access to the area is restricted to residents only. The restriction applies to the following Streets:

- Sycamore Canyon — from Salinas to Stanwood Drive
- Stanwood Drive — from Sycamore Canyon to Conejo Road
- Conejo Rd — from Stanwood Drive to Camino Alto
- Camino Alto — from Conejo Road to Las Altruras Road
- Ealand Place — from Conejo Road to end

Residents who have questions regarding damage to homes or other structures should contact the Chief of Building and Safety at 564-5485. Questions regarding the slides should be directed to the City Engineer at 564-5363. For emergency situations call 911.

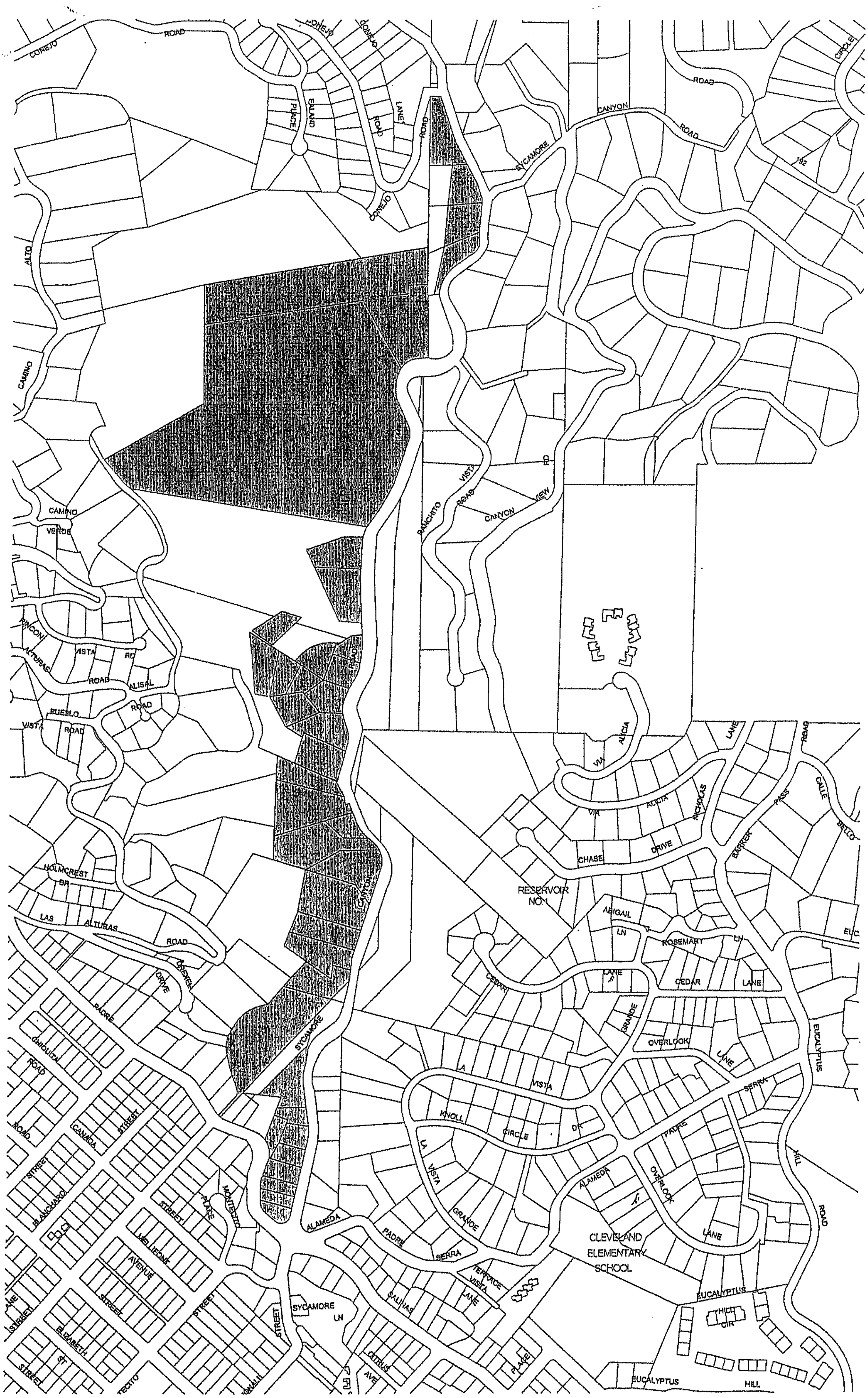
\\PW\SYS\USERS\TRANS\Gerth\2-24-98_CONEJO_SLIDES_REL.doc

Identified "Minor Area" - Sycamore Canyon
02/24/98, 13:01:06

APN	ADDRESS	
19-340-26	324 ALAMEDA PADRE SERRA	
21-143-01	536 CONEJO	RD
21-143-05	1801 STANWOOD	DR
21-143-05	1809 STANWOOD	DR
21-143-07	1815 STANWOOD	DR
21-143-01	1825 STANWOOD	DR
19-340-38	1353 SYCAMORE CANYON	RD
19-340-40	1359 SYCAMORE CANYON	RD
19-340-08	1363 SYCAMORE CANYON	RD
19-340-36	1371 SYCAMORE CANYON	RD
19-340-37	1375 SYCAMORE CANYON	RD
19-340-46	1383 SYCAMORE CANYON	RD
19-340-47	1387 SYCAMORE CANYON	RD
19-340-48	1399 SYCAMORE CANYON	RD
19-340-34	1421 SYCAMORE CANYON	RD
19-320-38	1431 SYCAMORE CANYON	RD
19-320-19	1435 SYCAMORE CANYON	RD
19-320-18	1465 SYCAMORE CANYON	RD
19-320-17	1469 SYCAMORE CANYON	RD
19-320-16	1485 SYCAMORE CANYON	RD
19-320-40	1487 SYCAMORE CANYON	RD
19-320-41	1491 SYCAMORE CANYON	RD
19-320-14	1493 SYCAMORE CANYON	RD
19-320-13	1499 SYCAMORE CANYON	RD
19-320-12	1549 SYCAMORE CANYON	RD
19-320-34	1551 SYCAMORE CANYON	RD
19-320-35	1553 SYCAMORE CANYON	RD
19-320-09	1559 SYCAMORE CANYON	RD
19-320-10	1563 SYCAMORE CANYON	RD
19-320-05	1565 SYCAMORE CANYON	RD
19-320-09	1565 SYCAMORE CANYON	RD
19-320-06	1567 SYCAMORE CANYON	RD
19-320-04	1569 SYCAMORE CANYON	RD
19-320-03	1571 SYCAMORE CANYON	RD
19-320-08	1579 SYCAMORE CANYON	RD
19-320-07	1581 SYCAMORE CANYON	RD
19-320-02	1589 SYCAMORE CANYON	RD
21-143-05	1601 SYCAMORE CANYON	RD
19-290-05	1615 SYCAMORE CANYON	RD
19-290-04	1625 SYCAMORE CANYON	RD
19-290-01	1651 SYCAMORE CANYON	RD
19-150-10	1705 SYCAMORE CANYON	RD
19-150-05	1709 SYCAMORE CANYON	RD
13-161-04	1761 SYCAMORE CANYON	RD

***** END OF REPORT *****

Identified "Minor Area" - Sycamore Canyon



CITY OF SANTA BARBARA

COUNCIL AGENDA REPORT

Blum/Lange introduced W/O

REPORT DATE: November 14, 1997

TO: Mayor and Councilmembers

FROM: Sandra Tripp-Jones, City Administrator SETJ

SUBJECT: ORDINANCE TO PROVIDE PROTECTION FROM GEOLOGIC HAZARD OF THE CONEJO SLIDE AREA

RECOMMENDATION:

That Council introduce and subsequently adopt, by reading of title only, An Ordinance of the Council of the City of Santa Barbara Adding Chapter 22.90 to the Municipal Code to Provide Protection from Geologic Hazard of the Conejo Slide Area.

DISCUSSION: See Page 2.

ATTACHMENTS:
1. Ordinance Committee Report dated October 24, 1997
2. Letter to Conejo Road Landslide Area Residents
3. Letter from Karl Ebehard dated November 3, 1997
4. Letter from Lois Brown dated October 24, 1997

PREPARED BY: Pat Kelly, Assistant Public Works Director/City Engineer/PK/apm

APPROVED BY: David H. Johnson, Public Works Director

REVIEWED BY: ________ Finance ________ Attorney RS&O ________ Community Development

STAFF USE ONLY

TO: Dave Johnson, Public Works Director

FROM: City Administrator

ACTION TAKEN:

Introduced ordinance as BillNo. 5050

DIRECTIONS: 11/25/97: **Adopted ordinance no. 5030**

Meeting Date: NOV 18 1997

Agenda Item No. 20

DISCUSSION

On September 23, 1997 and October 28, 1997, the Ordinance Committee received reports including a proposed new ordinance, from staff that recommended combining several existing uncodified ordinances into one ordinance regarding building and septic tank prohibitions in the Conejo landslide area. The uncodified ordinances are not included in the Santa Barbara Municipal Code but are available at the City Clerk's office. Property owners in the Conejo area were notified by mail for the September 23, 1997 Ordinance Committee meeting. At the September 23, 1997 meeting, the Committee directed staff to return with options for dealing with properties which only have small portions of parcels within Slide Mass C, which is the area that has new construction restrictions.

On October 28, 1997, staff returned with a report discussing options (Attachment 1). The report described development review practices of the City's Building Division for most new construction in the vicinity of the landslide area and the results of several years of monitoring landslide movement in the vicinity.

A property owner near Slide Mass C, Mr. Karl Ebehard, commented at both committee meetings. Attached (Attachment 3) is his November 3, 1997 letter which in general, summarizes the comments he made at the Ordinance Committee meetings. The October 24, 1997 staff report devotes substantial discussion to these comments. Ms. Lois Brown commented at the October 28, 1997 meeting and submitted a letter (Attachment 4) to the Committee. The Committee elected not to include the wording proposed in her letter, into the Ordinance.

At the conclusion of this meeting, the Ordinance Committee voted to forward to Council for introduction and subsequent adoption the new ordinance with corrections as noted by staff to the lists of parcels and a revision increasing the size of building additions allowed to existing buildings within Slide Mass C from 50 square feet to 150 square feet.

The property owners in the Conejo Road landslide area have been notified by letter (Attachment 2) of the results of the review by the Ordinance Committee and that it is recommended that Council adopt this Ordinance to Provide Protection from Geologic Hazard of the Conejo Slide Area.

In summary, it is prudent and reasonable that new construction as described in the Ordinance, continue to be prohibited in Slide Mass C and that new construction be required to hook up to sewers within the Conejo Slide Drainage Area rather than use septic systems.

ORDINANCE NO.__________

AN ORDINANCE OF THE COUNCIL OF THE CITY OF SANTA BARBARA ADDING CHAPTER 22.90 TO THE MUNICIPAL CODE TO PROVIDE PROTECTION FROM GEOLOGIC HAZARD OF THE CONEJO SLIDE AREA

THE CITY COUNCIL OF THE CITY OF SANTA BARBARA DOES ORDAIN AS FOLLOWS:

SECTION 1. Chapter 22.90 is added to Title 22 of the Santa Barbara Municipal Code, to read as follows:

Chapter 22.90

CONSTRUCTION PROHIBITED IN THE VICINITY OF THE CONEJO ROAD LANDSLIDE

22.90.010 Purpose.

22.90.020 Definitions.

22.90.030 New Construction Prohibited; Exceptions.

22.90.040 Exception: Designs by Engineering Geologist.

22.90.045 Map of the Conejo Slide Area.

22.90.050 Parcels Within Slide Mass C.

22.90.060 Septic Tanks Prohibited.

22.90.065 Map of Conejo Slide Drainage Area.

22.90.070 Parcels Within Conejo Slide Drainage Area.

22.90.010 **Purpose.**

By reason of special geologic hazard, unstable soils condition, and lack of suitable support, new construction must be prohibited within the area known as the "Conejo Slide." A landslide that occurred in the vicinity of Conejo Road within the City of Santa Barbara revealed unstable conditions in the area depicted on the Map of the Conejo Slide Area adopted as part of this Chapter. The area was the subject of a report (dated April, 1984) by Geotechnical Consultants, Inc. and has been under observation since. Three separate landslide masses were identified as being subject to special geologic hazard, designated as Slide Mass A, Slide Mass B, and Slide Mass C, all located within Slide Mass C on the Map of the Conejo Slide Area adopted as part of this Chapter. The earth within the boundary of Slide Mass C is unstable; structures and other property on Slide Mass A, Slide Mass B, and Slide Mass C have been damaged because of that instability; and further damage to structures and property within the boundary of Slide Mass C is highly probable. Excessive groundwater has been identified as a major cause of instability. Septic tanks have contributed sewage effluent to that excessive groundwater. The provisions of this Chapter are necessary to maintain the public safety and welfare and to protect against hazardous local geologic and soils conditions.

22.90.020 Definitions.

For the purposes of this title, the following words and phrases shall have the meanings indicated, unless the context or usage clearly requires a different meaning:

A. "CESSPOOL" means an excavation in the ground which receives discharge from any sanitation plumbing facilities.

B. "CONEJO SLIDE DRAINAGE AREA" means the area within the boundary depicted on the map identified as the Map of the Conejo Slide Drainage Area adopted by Section 22.90.065 of this Chapter.

C. "NEW CONSTRUCTION" means any man-made change to improved or unimproved real property after June 11, 1991, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, which requires a building permit.

D. "SEPTIC TANK" means a structure for private treatment of sewage before disposal into a cesspool, seepage hole or leaching system.

E. "SLIDE MASS C" means the landslide mass so described in the report by Geotechnical Consultants, Inc. (dated April, 1984) concerning geotechnical investigations of the Conejo Road Landslide, the boundary to which is depicted on the Map of the Conejo Slide Area adopted by Section 22.90.045 of this Chapter.

22.90.030 New Construction Prohibited; Exceptions.

A. All new construction is prohibited on the parcels which are located entirely or partially within the boundary of Slide Mass C, except as provided in this Chapter 22.90. The existing parcels located entirely or partially within Slide Mass C are identified in Section 22.90.050, Parcels Within Slide Mass C.

B. It shall be unlawful to erect, produce, permit, maintain or keep any new construction on a parcel which is located entirely or partially within the boundary of Slide Mass C, in violation of the provisions of this Chapter.

C. The following new construction is excepted from the prohibitions of this section:

(i) routine repairs and maintenance to residential structures and to road, drive, and utilities improvements,

(ii) remodeling of the interior of an existing residential structure, and,

(iii) additions to an existing building which do not exceed ~~fifty (50)~~ <u>one hundred and fifty (150)</u> square feet of enclosed area during any twenty four (24) month period.

22.90.040 Exception: Designs by Engineering Geologist.

A. The Chief of Building and Safety may approve, or approve with conditions, new construction on any portion of such affected parcels which is located at least 25 feet outside of the boundary of Slide Mass C, upon plans that incorporate the accepted findings and recommendations of a licensed engineering geologist, based upon adequate site investigations, borings, soil samples, laboratory tests and a review of all record data for the parcel and slide area, to the satisfaction of the Chief of

Building and Safety and in compliance with all other applicable codes and regulations.

B. A preliminary evaluation of the engineering geologist for the suitability of improvements on such area shall be submitted for review by the Chief of Building and Safety before the preparation of plans pursuant to this section. The Chief of Building and Safety may employ expert peer review in reaching a decision as to whether to accept or reject the findings of the evaluation.

C. The decision of the Chief of Building and Safety may be appealed to the Building and Fire Code Board of Appeals, whose decisions shall be final.

D. Such approval may require submission and/or recording of a release and agreement, approved by the City Attorney, to indemnify the City, its officers and employees, from liability related to such new construction.

E. New construction in accordance with such approved plans shall not be unlawful under the provisions of this Chapter.

22.90.045 Map of the Conejo Slide Area.

The Map of the Conejo Slide Area, dated May 15, 1997 and depicting the parcels of real property that are located entirely or partially within the boundary of Slide Mass C of the Conejo Slide Area is hereby adopted. The City Clerk and the Chief of Building and Safety shall each keep a copy of the Map of the Conejo Slide Area on file as adopted. An example of such map shall be reproduced and codified with this section.

INSERT MAP

11/6/97

MAP OF THE CONEJO SLIDE DRAINAGE AREA

22.90.050 Parcels Within Slide Mass C.

The parcels of real property that are entirely or partially within the Conejo Slide Area, Slide Mass C, are as follows:

Assessor's Parcel No.	Address	Assessor's Parcel No.	Address
19-061-34	11 Ealand Place	19-061-25	530 Conejo Road
19-061-27	16 Ealand Place	19-062-06	481 Conejo Road
19-061-35	17 Ealand Place	19-062-07	529 Conejo Road
19-061-07	21 Ealand Place	19-062-04	525 Conejo Road
19-061-03	22 Ealand Place	19-062-05	535 Conejo Road
19-061-33	27 Ealand Place	21-143-05	1761 Sycamore Canyon Road
19-061-06	29 Ealand Place	21-143-07	1815 Stanwood Drive
19-061-17	468 Conejo Road	21-143-01	1825 Stanwood Drive
19-061-18	474 Conejo Road	13-161-04	1761 Sycamore Canyon Road
19-061-19	478 Conejo Road	21-143-06	(Edison property)
19-061-20	486 Conejo Road	21-143-04 & 13-161-03	1761 Sycamore Canyon Road
19-061-21	494 Conejo Road	19-150-05	1709 Sycamore Canyon Road
19-150-03	498 Conejo Road	19-150-10	1705 Sycamore Canyon Road
19-061-23	502 Conejo Road		
19-061-24	508 Conejo Road		

22.90.060 Septic Tanks Prohibited.

No person shall construct or install a septic tank or increase the use of a septic tank on any parcel located entirely or partially within the Conejo Slide Drainage Area. Such parcels are identified in the listing of parcels adopted as Section 22.90.070 of this Chapter, entitled "Parcels Within Conejo Slide Drainage Area".

22.90.065 Map of Conejo Slide Drainage Area.

The Map of the Conejo Slide Drainage Area, dated May 15, 1997 and depicting the limits of the Conejo Slide Drainage Area and the parcels located entirely or partially within the Conejo Slide Drainage Area, is hereby adopted. The City Clerk and the Chief of Building and Safety shall each keep a copy of the Map of the Conejo Slide Drainage Area on file as adopted. An example of such map shall be reproduced and codified with this section.

INSERT MAP

MAP OF THE
CONEJO SLIDE AREA

11/6/97

22.90.070 Parcels Within Conejo Slide Drainage Area.

The parcels of real property that are either entirely or partially within the Conejo Slide Drainage Area are as follows:

Assessor's Parcel No.	Address
19-061-26	10 Ealand Place
19-061-34	11 Ealand Place
19-061-27	16 Ealand Place
19-061-35	17 Ealand Place
19-061-07	21 Ealand Place
19-061-03	22 Ealand Place
19-061-32	24 Ealand Place
19-061-33	27 Ealand Place
19-061-06	29 Ealand Place
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19-050-31	331 Conejo Road
19-050-30	333 Conejo Road
19-050-28	345 Conejo Road
19-061-30	352 Conejo Road
19-061-01	350 Conejo Road
19-050-29	357 Conejo Road
19-050-10	413 Conejo Road
19-061-10	418 Conejo Road
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19-050-19	435 Conejo Road
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19-050-18	441 Conejo Road
19-061-29	444 Conejo Road
19-050-17	447 Conejo Road
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19-061-36	456 Conejo Road
19-061-16	462 Conejo Road
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19-061-18	474 Conejo Road
19-061-19	478 Conejo Road
19-062-06	481 Conejo Road
19-061-20	486 Conejo Road
19-061-21	494 Conejo Road
19-061-31	3512 Conejo Road
19-150-03	498 Conejo Road
19-062-11	501 Conejo Road
19-061-23	502 Conejo Road
19-062-10	507 Conejo Road
19-061-24	508 Conejo Road
19-062-09	515 Conejo Road
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21-143-06	(Edison property)
21-143-05 & 13-161-03	1761 Sycamore Canyon Road
19-150-05	1709 Sycamore Canyon Road
19-150-10	1705 Sycamore Canyon Road
21-143-04	1761 Sycamore Canyon Road

Assessor's Parcel No.	Address	Assessor's Parcel No.	Address
19-130-10	1048 Las Alturas Road	19-130-32	1050 Las Alturas Road
19-150-15	46 Camino Alto	19-130-31	1052 Las Alturas Road
19-130-25	100 Camino Alto	19-121-06	33 Las Alturas Circle
19-130-26	110 Camino Alto	19-031-14	45 Las Alturas Circle
19-150-13	120 Camino Alto	19-050-05	318 Sherman Road
19-121-09	121 Camino Alto	19-042-13	124 Conejo Road
19-050-13	430 Conejo	19-042-12	140 Conejo Road
19-042-05	140 Camino Alto	19-042-14	140 Conejo Road
19-042-09	150 Camino Alto	19-050-15	6547 Coronita Street, Carlsbad, CA 92009 (OWNER)
19-044-02	155 Camino Alto		
19-130-10	1048 Las Alturas Road		

SECTION 2. Upon the date of taking effect, this ordinance repeals Ordinance 4698, Ordinance 4344, and Ordinance 4293.

CITY OF SANTA BARBARA

COUNCIL AGENDA REPORT

REPORT DATE: October 24, 1997

TO: Ordinance Committee

FROM: Sandra E. Tripp-Jones, City Administrator

SUBJECT: REVIEW OF CONEJO ROAD LANDSLIDE ORDINANCE

RECOMMENDATION:

That the Ordinance Committee review and forward to Council for introduction and subsequent adoption an Ordinance to Provide Protection from Geologic Hazard of the Conejo Slide Area.

DISCUSSION: See attached page.

ATTACHMENTS:
1 (Ordinance Committee Agenda Report dated September 19, 1997)
2. Memorandum from Charlie Brown, Survey Party Chief, dated October 17, 1997)
3. Conejo Slide Area - Horizontal Movement Map
4. Conejo Slide Area - Horizontal Movement Chart
5. Conejo Slide Area - Vertical Movement Map
6. Conejo Slide Area - Vertical Movement Chart
7. Conejo Regional Geologic Map

PREPARED BY: Pat Kelly, Assistant Public Works Director/City Engineer/PK/apm

APPROVED BY: David H. Johnson, Public Works Director

REVIEWED BY: ________ Finance ________ Attorney

STAFF USE ONLY

TO:

FROM: City Administrator

ACTION TAKEN:

DIRECTIONS:

Meeting Date October 28, 1997

Agenda Item No. 18

Attachment 1

DISCUSSION:

Background

On September 23, 1997, the Ordinance Committee received a report including a proposed new ordinance, from staff (Attachment 1) that recommended combining several existing uncodified ordinances into one ordinance regarding building and septic tank prohibitions in the Conejo landslide area. The uncodified ordinances are not included in the Santa Barbara Municipal Code, but are available from the City Clerk.

One property owner who has a small portion of land within the area designated as "Slide Mass C", contacted staff just prior to the meeting to request that his property be moved outside the boundary of Slide Mass C, because only a small portion of his relatively large lot is inside the boundary. It was also noted that there are several other properties that only have small portions within the boundary of Slide Mass C. In addition, an owner of property on Conejo Road, outside but only several parcels away from the boundary, Karl Ebehard, spoke to the Committee asking that the area of Slide Mass C be reduced in size, and its boundary moved further away from his property line. Mr. Ebehard also noted that the Geotechnical Investigation that the ordinance is based upon, is dated in 1984, and is therefore over 13 years old. He said that property owners are required to submit to the City Building Division soils or geotechnical reports that are less than one year old. He questioned if this was fair. He also said he had heard that the area did not have any recent movement.

The Committee directed staff to return in approximately one month with options for dealing with five properties which have small portions of land in Slide Mass C.

Conejo Slide Settlement Monitoring

As noted in the September 23, 1997 report to the Committee, there have been observations of continued movement of the area. However, written documentation was not included in the report to the Committee. Attached is a memorandum from the City's Survey Party Chief, Charlie Brown, (Attachment 2) documenting both the horizontal and vertical movement for the Conejo Road area that includes Slide Mass C and the Conejo Slide Watershed Area. Also attached (Attachments 3, 4, 5 and 6), are graphical summaries of those horizontal and vertical movements. The information shows that there has been over a foot and a half movement of Slide Mass C at one location (survey point 105B) since 1990, with almost one half of that movement (0.76 feet) over the last two years. There has also been movement outside of Slide Mass C. At the survey point on Conejo Road at Orizaba Road (point 108), there has been movement of about one foot since 1990.

DISCUSSION: (continued)

Even though the Geotechnical Report was written in 1984, the geology for properties in the vicinity of the Conejo Landslide Drainage Area and Slide Mass C has not changed. Most of the area in the vicinity of Slide Mass C and the Conejo Slide Drainage Area has a geological designation of "Landslide Debris". A geologic map of the area (Attachment 7) shows what has been described as several large and small well-defined landslides. Surveys since 1984 have confirmed continued movement confirming this designation.

The Building Division does request Soils and Geologic Reports be less than a year old for local building as determined on a case by case basis. Due to ongoing changes it is appropriate that soils and geologic studies not be over (1) one year old. A new Area Geotechnical Report would not change the need for localized reports that would assist the Building Division to make informed decisions regarding a construction project in the area. An updated Geotechnical Report is not expected to provide any new information than that already reported. Therefore, staff is not recommending at this time to update the 1984 Geotechnical Report.

Options

Of the five parcels where only a small portion is within the Slide Mass C boundary, four are of average size for the neighborhood, and one is relatively large with the dwelling a substantial distance away from the boundary. Staff will present a map to the Committee showing these circumstances.

The key prohibitions of the Ordinance regarding Slide Mass C is that there shall be no new construction on parcels that are entirely within, or partially within the Slide Mass C boundary excepting:

- new construction 25 feet outside the boundary approved by the Chief of Building and Safety where a licensed Engineering Geologist Report has been accepted,
- additions less than fifty square feet (over a two-year period); and
- various repairs and interior remodeling.

OCT 2 8 1997 #1 8

DISCUSSION: (continued)

Here are some options to consider:

a) Change the boundary to exclude from consideration those parcels barely within the boundary. There are five parcels that have been identified in this category.

- This would allow those removed parcels to build new construction greater than 50 square feet over two years whether it is within 25 feet of the boundary or not.

b) Change the exemption setback dimension to less than 25 feet for those parcels touched by the boundary.

- This would theoretically allow building closer to the boundary, excepting other restrictions such as zoning, which may restrict it.

c) Increase above 50 square feet the allowable additions to existing construction, for parcels within or partially within the boundary.

- Additions of less than 100 square feet are described in some portions of the Unified Building Code as "minor". If the allowance was increased, it might encourage property owners in the area who are considering small additions to seek a building permit rather than simply building without a permit.

d) Continue with the proposed ordinance unchanged.

- This option is preferred over changing the boundary location and setbacks because it provides for the most protection of the public.

Staff will present to the Committee maps, showing how existing structures relate to the boundary, and review any additional options identified by the Committee.

<u>Consideration of Options</u>

Options (a) and (b) would relieve some property owners of paying for engineering geology studies. Considering that the area is "landslide debris", and survey monitoring since 1984 has shown continuing movement, especially since 1995, it is not recommended to stop requiring the Engineering Geology Report. Therefore, options (a) and (b) are not recommended. The relative cost of an Engineering Geology Report is small compared to the risk of damaged construction and especially to any risk to inhabitants.

Bob to speak to Council

OCT 28 1997 #1 B

CITY OF SANTA BARBARA

COUNCIL AGENDA REPORT

REPORT DATE: September 19, 1997

TO: Ordinance Committee

FROM: Sandra Tripp-Jones, City Administrator

SUBJECT: REVIEW OF CONEJO ROAD LANDSLIDE ORDINANCE

RECOMMENDATION:

Recommendation that the Ordinance Committee review and forward to Council for introduction and subsequent adoption an Ordinance to Provide Protection from Geologic Hazard of the Conejo Slide Area.

DISCUSSION: See page 2.

ATTACHMENT: Letter to Conejo Road Landslide Area Residents

PREPARED BY: Pat Kelly, Assistant Public Works Director/ City Engineer/PK/dw

APPROVED BY: David H. Johnson, Public Works Director

REVIEWED BY: ________ Finance ________ Attorney ________ Community Development

STAFF USE ONLY

TO:

FROM: City Administrator

ACTION TAKEN:

DIRECTIONS:

Meeting Date SEP 23 1997

Agenda Item No. 30

ATTACHMENT I

OCT 28 1997 #18

DISCUSSION:

The proposed ordinance will combine several existing uncodified ordinances regarding the Conejo landslide area into one ordinance.

A landslide that occurred in the vicinity of Conejo Road in the early 1980s revealed unstable land conditions in the area. Since the slide, the area has been the subject of close geotechnical study and observation. The proposed ordinance includes maps of the general slide area where new septic systems are prohibited and, in particular, Slide Mass C (see attached "Map of the Conejo Slide Area" from the new Ordinance) shown as an area where new construction is prohibited.

Groundwater has been identified as a major cause of the instability. Septic tank effluent has been identified as contributing to the groundwater. Ordinance No. 4344, adopted in 1984, and Ordinance No. 4293, adopted in 1985, prohibited using septic systems in the general slide area (see attached "Map of the Conejo Slide Area" from the new Ordinance).

The earth within the boundary of what is described as Slide Mass C is considered unstable. Structures and other property, including roadways, in that area have been damaged because of that instability and further damage to structures and property within the boundary of Slide Mass C is probable. Starting in 1984, ordinances have been adopted to maintain public health, safety and welfare regarding local geologic and soil conditions that prohibit new construction in there. The ordinances that halted new construction on the slide included provisions to require review and renewal every five years. During more than 10 years of observation and review, evidence continues to exist that the land mass is moving. It is prudent and reasonable that new construction continues to be prohibited.

At the latest review last year, Council directed Staff to re-evaluate the justification to report back every five years, per the existing ordinance.

The proposed ordinance is intended to place existing City ordinances affecting the Conejo slide area into the Municipal Code so that they are more accessible and receive more public exposure. No substantive change to existing provisions is included or intended. This ordinance will eliminate periodic review so that, unless amended by usual City process, these limitations will be extended indefinitely.

The property owners in the Conejo Road land slide area have been notified by letter (attached) of Council's review of this ordinance. To date there have been no verbal or written protests.

SEP 23 1997 #30
OCT 28 1997 # 1 B

"BLIC WORKS DEPARTMENT
630 GARDEN STREET
POST OFFICE BOX 1990
SANTA BARBARA, CA 93102-1990
TELEPHONE: (805) 564-5377
FAX NUMBER: (805) 564-5467

WATER
WASTEWATER
WATER SUPPLY DEVEL.
TRANSPORTATION & PA
ENGINEERING
STREETS
SHOPS

August 26, 1997

«FirstName» «LastName»
«Address1»
«City», «State» «PostalCode»

SUBJECT: PROPOSED EXTENSION OF BUILDING PROHIBITION IN THE CONEJO ROAD LANDSLIDE AREA - RE: APN «APN»

Dear «Title» «LastName»:

Records indicate that you own the above-referenced property in the vicinity of Conejo Road, which has experienced unstable soil conditions in the past that restrict construction of certain improvements under Ordinance No. 4698.

For your information, at the meeting on September 23, 1997, City Council will be considering an extension of the existing ordinances affecting your property indefinitely. Staff has determined that there has been no abatement of movement in the Conejo Road landslide area and is recommending that City Council extend the prohibition of buildings and septic system extensions for existing ordinances indefinitely, unless amended by the usual City process.

Should you desire to obtain a copy of the final Council Agenda Report, copies will be available from the City Clerk's office after 3:00 p.m., on Friday, September 19, 1997. The City Clerk's telephone number is (805) 564-5309.

Sincerely,

Pat Kelly
Assistant Public Works Director/City Engineer

PK/apm

cc: George Estrella, Chief of Building and Safety
David H. Johnson, Public Works Director

[H:\USERS\ENGR\WP\WORD\PKCONEJO.LTR.DOC]

DRAFT

ORDINANCE NO.________

AN ORDINANCE OF THE COUNCIL OF THE CITY OF SANTA BARBARA ADDING CHAPTER 22.90 TO THE MUNICIPAL CODE TO PROVIDE PROTECTION FROM GEOLOGIC HAZARD OF THE CONEJO SLIDE AREA

THE CITY COUNCIL OF THE CITY OF SANTA BARBARA DOES ORDAIN AS FOLLOWS:

SECTION 1. Chapter 22.90 is added to Title 22 of the Santa Barbara Municipal Code, to read as follows:

Chapter 22.90

CONSTRUCTION PROHIBITED IN THE VICINITY OF THE CONEJO ROAD LANDSLIDE

22.90.010 Purpose.

22.90.020 Definitions.

22.90.030 New Construction Prohibited; Exceptions.

22.90.040 Exception: Designs by Engineering Geologist.

22.90.045 Map of the Conejo Slide Area.

22.90.050 Parcels Within Slide Mass C.

22.90.060 Septic Tanks Prohibited.

22.90.065 Map of Conejo Slide Drainage Area.

22.90.070 Parcels Within Conejo Slide Drainage Area.

22.90.010 **Purpose.**

By reason of special geologic hazard, unstable soils condition, and lack of suitable support, new construction must be prohibited within the area known as the "Conejo Slide." A landslide that occurred in the vicinity of Conejo Road within the City of Santa Barbara revealed unstable conditions in the area depicted on the Map of the Conejo Slide Area adopted as part of this Chapter. The area was the subject of a report (dated April, 1984) by Geotechnical Consultants, Inc. and has been under observation since. Three separate landslide masses were

SEP 23 1997 #30
OCT 28 1997 #18

identified as being subject to special geologic hazard, designated as Slide Mass A, Slide Mass B, and Slide Mass C, all located within Slide Mass C on the Map of the Conejo Slide Area adopted as part of this Chapter. The earth within the boundary of Slide Mass C is unstable; structures and other property on Slide Mass A, Slide Mass B, and Slide Mass C have been damaged because of that instability; and further damage to structures and property within the boundary of Slide Mass C is highly probable. Excessive groundwater has been identified as a major cause of instability. Septic tanks have contributed sewage effluent to that excessive groundwater. The provisions of this Chapter are necessary to maintain the public safety and welfare and to protect against hazardous local geologic and soils conditions.

22.90.020 **Definitions.**

For the purposes of this title, the following words and phrases shall have the meanings indicated, unless the context or usage clearly requires a different meaning:

A. "CESSPOOL" means an excavation in the ground which receives discharge from any sanitation plumbing facilities.

B. "CONEJO SLIDE DRAINAGE AREA" means the area within the boundary depicted on the map identified as the Map of the Conejo Slide Drainage Area adopted by Section 22.90.065 of this Chapter.

C. "NEW CONSTRUCTION" means any man-made change to improved or unimproved real property after June 11, 1991, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, which requires a building permit.

D. "SEPTIC TANK" means a structure for private treatment of sewage before disposal into a cesspool, seepage hole or leaching system.

E. "SLIDE MASS C" means the landslide mass so described in the report by Geotechnical Consultants, Inc. (dated April, 1984) concerning geotechnical investigations of the Conejo Road Landslide, the boundary to which is depicted on the Map of the Conejo Slide Area adopted by Section 22.90.045 of this Chapter.

22.90.030 New Construction Prohibited; Exceptions.

A. All new construction is prohibited on the parcels which are located entirely or partially within the boundary of Slide Mass C, except as provided in this Chapter 22.90. The existing parcels located entirely or partially within Slide Mass C are identified in Section 22.90.050, Parcels Within Slide Mass C. ?

B. It shall be unlawful to erect, produce, permit, maintain or keep any new construction on a parcel which is located entirely or partially within the boundary of Slide Mass C, in violation of the provisions of this Chapter.

C. The following new construction is excepted from the prohibitions of this section:

(i) routine repairs and maintenance to residential structures and to road, drive, and utilities improvements,

(ii) remodeling of the interior of an existing residential structure, and,

(iii) additions to an existing building which do not exceed fifty (50) square feet of enclosed area during any twenty four (24) month period.

22.90.040 Exception: Designs by Engineering Geologist.

A. The Chief of Building and Safety may approve, or approve with conditions, new construction on any portion of such affected parcels which is located at least 25 feet outside of the boundary of Slide Mass C, upon plans that incorporate the accepted findings and recommendations of a licensed engineering geologist, based upon adequate site investigations, borings, soil samples, laboratory tests and a review of all record data for the parcel and slide area, to the satisfaction of the Chief of

SEP 23 1997 #30
OCT 28 1997 #18

Building and Safety and in compliance with all other applicable codes and regulations.

B. A preliminary evaluation of the engineering geologist for the suitability of improvements on such area shall be submitted for review by the Chief of Building and Safety before the preparation of plans pursuant to this section. The Chief of Building and Safety may employ expert peer review in reaching a decision as to whether to accept or reject the findings of the evaluation.

C. The decision of the Chief of Building and Safety may be appealed to the Building and Fire Code Board of Appeals, whose decisions shall be final.

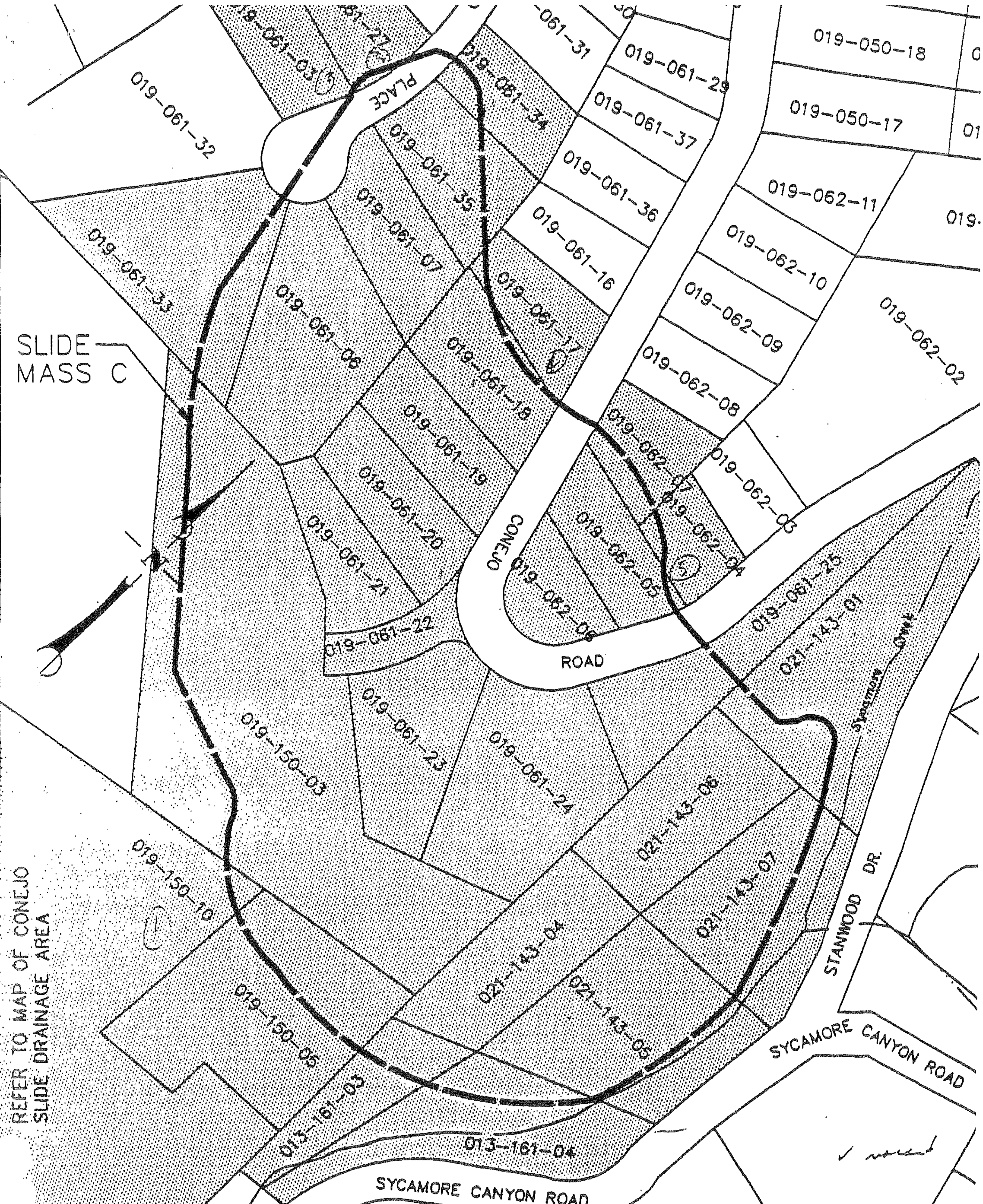
D. Such approval may require submission and/or recording of a release and agreement, approved by the City Attorney, to indemnify the City, its officers and employees, from liability related to such new construction.

E. New construction in accordance with such approved plans shall not be unlawful under the provisions of this Chapter.

22.90.045 Map of the Conejo Slide Area.

The Map of the Conejo Slide Area, dated May 15, 1997 and depicting the parcels of real property that are located entirely or partially within the boundary of Slide Mass C of the Conejo Slide Area is hereby adopted. The City Clerk and the Chief of Building and Safety shall each keep a copy of the Map of the Conejo Slide Area on file as adopted. An example of such map shall be reproduced and codified with this section.

INSERT MAP



MAP OF THE
CONEJO SLIDE AREA

OCT 2 8 1997

SEP 2 3 1997

22.90.050 **Parcels Within Slide Mass C.**

The parcels of real property that are entirely or partially within the Conejo Slide Area, Slide Mass C, are as follows:

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19-061-24	508 Conejo Road		

22.90.060 **Septic Tanks Prohibited.**

No person shall construct or install a septic tank or increase the use of a septic tank on any parcel located entirely or partially within the Conejo Slide Drainage Area. Such parcels are identified in the listing of parcels adopted as Section 22.90.070 of this Chapter, entitled "Parcels Within Conejo Slide Drainage Area".

22.90.065 **Map of Conejo Slide Drainage Area.**

The Map of the Conejo Slide Drainage Area, dated May 15, 1997 and depicting the limits of the Conejo Slide Drainage Area and the parcels located entirely or partially within the Conejo Slide Drainage Area, is hereby adopted. The City Clerk and the Chief of Building and Safety shall each keep a copy of the Map of the Conejo Slide Drainage Area on file as adopted. An example of such map shall be reproduced and codified with this section.

INSERT MAP

MAP OF THE
CONEJO SLIDE DRAINAGE AREA

5/15/97
OCT 28 1997 #18
SEP 23 1997 #30

22.90.070 Parcels Within Conejo Slide Drainage Area.

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19-061-13	438 Conejo Road	21-143-05 & 13-161-03	Sycamore Canyon Road
19-050-18	441 Conejo Road	19-150-05	1709 Sycamore Canyon Road
19-061-29	444 Conejo Road	19-150-10	1705 Sycamore Canyon Road
19-050-17	447 Conejo Road	21-143-04	Sycamore Canyon Road
19-061-37	450 Conejo Road	21-143-07	Sycamore Canyon Road
19-061-36	456 Conejo Road		
19-061-16	462 Conejo Road		

OCT 28 1997 #18

SEP 23 1997 #30

Assessor's Parcel No.	Address
19-130-10	40 Camino Alto
19-050-15	46 Camino Alto
19-130-17	60 Camino Alto
19-130-25	100 Camino Alto
19-130-26	110 Camino Alto
19-150-13	120 Camino Alto
19-121-09	121 Camino Alto
19-050-13	130 Camino Alto
19-042-05	140 Camino Alto
19-042-09	150 Camino Alto
19-044-02	155 Camino Alto
19-130-10	1048 Las Alturas Road

Assessor's Parcel No.	Address
19-130-32	1050 Las Alturas Road
19-130-31	1054 Las Alturas Road
19-121-06	33 Las Alturas Circle
19-031-14	45 Las Alturas Circle
19-050-05	vacant Gilbert Graham
19-042-13	vacant Lloyd Pozzato
19-042-12	vacant Royce Dunham
19-042-14	vacant

SECTION 2. Upon the date of taking effect, this ordinance repeals Ordinance 4698, Ordinance 4344, and Ordinance 4293.

OCT 2 8 1997 #1 8

RWP\Ord\Conejo.J17

SEP 2 3 1997 #30

CITY OF SANTA BARBARA

Public Works Department

Interoffice Memorandum

DATE: October 17, 1997

TO: Pat Kelly, Assistant Public Works Director/City Engineer

FROM: Charley Brown, Survey Party Chief CB

SUBJECT: CONEJO ROAD SETTLEMENT MONITORING

Attached you will find tables showing the horizontal movement and elevation changes of certain points on Conejo Road. You will also find a map showing the location of these points.

Personal observations: I have been monitoring this area for twelve years. This year shows the movement at points (105B) and (106B) doubled since 1995.

I saw evidence of unstable soils, leaning walls and pavement cracks. However, I didn't see any physical evidence to indicate such movement. Conejo Lane, which isn't a City street, has had a great deal of construction including repaving and the monitoring points. Numbers 102 & 103 have been replaced.

What I have seen this year is consistent with conditions in the past. Those portions of retaining walls that have toppled were leaning further and further each year and have just now failed. The cracked and alligatored pavement conditions are consistent with past years.

We will schedule another settlement monitoring survey in September 1998. We will send you an update of these tables and our observations at that time. If you have any questions, you may reach me at extension 5403.

CB/dmn

Attachments

Cc: (w/attachments)
George Estrella, Chief Building Official
Diane Gabriel, Principal Civil Engineer
John Schoof, Principal Civil Engineer

CITY OF SANTA BARBARA

OCT

PUBLIC WORKS DEPARTMENT

ATTACHMENT 2

O:\USERS\ENGR\WP\cbmcmconnejoo.mem.doc

OCT 2 8 1997 #1 8

CONEJO ROAD SETTLEMENT SURVEY
Horizontal Movement 1990-1997

PT#	Movement Direction	Movement Distance
101	S6-35-03 W	0.11
102	Point	Destroyed
103	Point	Destroyed
105B	S44-46-06 E	1.55
106B	S54-59-13 E	0.72
107B	S48-58-54 W	0.16
108	N15-48-37 W	1.00
109	S5-31-24 W	0.36
110	N84-42-21 E	0.16

CONEJO ROAD SETTLEMENT SURVEY
Horizontal Movement 1995-1997

PT#	Movement Direction	Movement Distance
101	S89-33-01 E	0.09
105B	S49-24-15 E	0.76
106B	S49-27-15 E	0.38
107B	S27-32-36 W	0.13
108	S70-54-57 E	0.11
109	S39-08-09 E	0.22
110	S85-51 E	0.09

CONEJO ROAD SETTLEMENT SURVEY
Horizontal Movement 1984-1990

PT#	Movement Direction	Movement Distance
101	S5-00-00 E	0.03
102	N59-00-00 E	0.10
103	N89-59-39 E	0.04
108	N83-00-00 E	0.13
109	S28-00-00 E	0.24

CONEJO ROAD SETTLEMENT SURVEY
Horizontal Movement 1984-1997

PT#	Movement Direction	Movement Distance
101	S4-05-01-W	0.14
108	N8-18-37W	0.98
109	S7-45-46E	0.58

coneji2 exl

OCT 2 8 1997 #1 8

CONEJO RC SETTLEMENT SURVEY

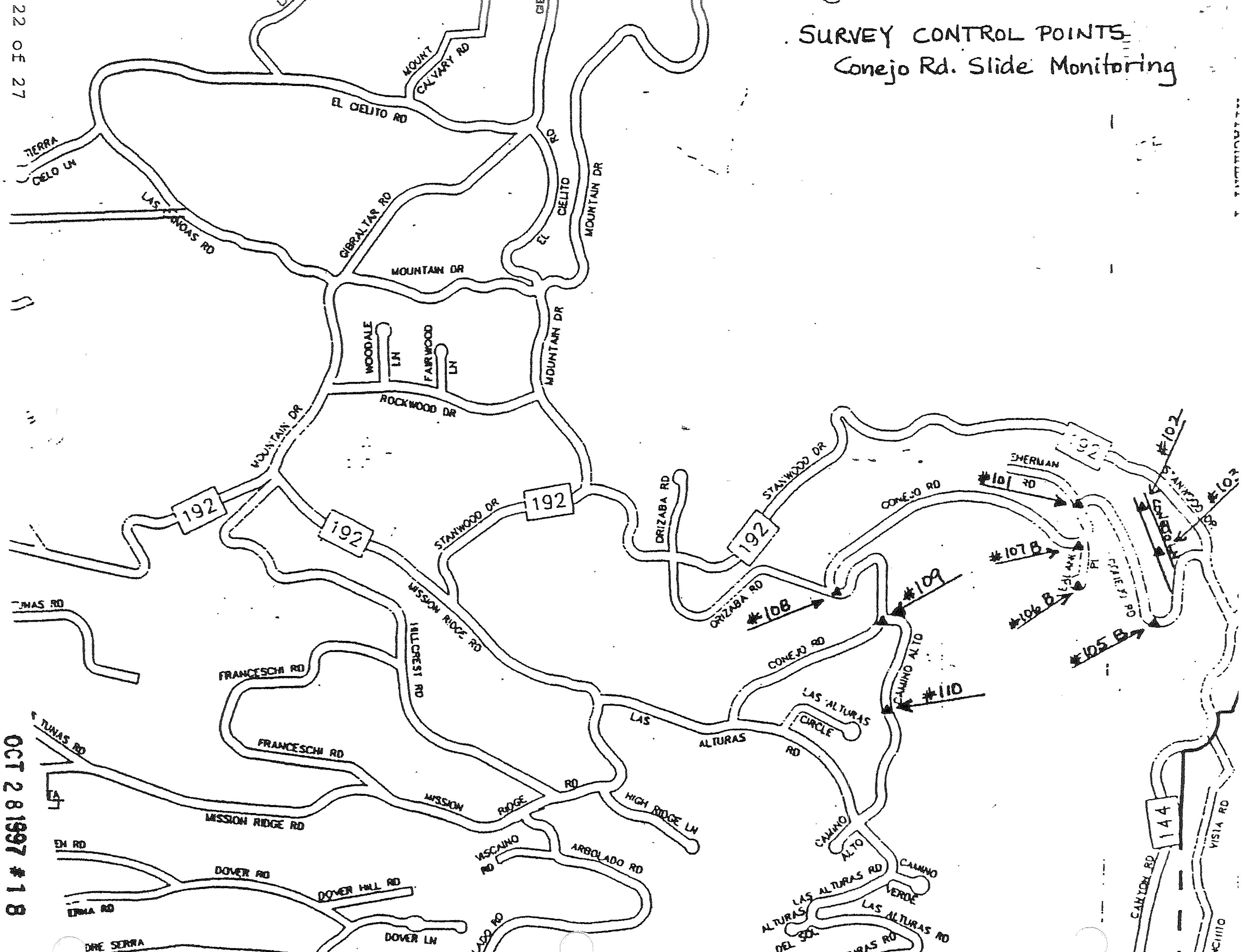
Vertical Movement 1990-1997

PT#	12/84	11/85	12/87	3/88	5/89	6/90	7/91	7/92	1/93	8/95	9/97	OVERALL CHANGE IN ELEVATION
101	394.58	394.55	394.537	394.560		394.52	394.497	394.61	394.55	394.491	394.498	-0.082
102	314.38	314.36	314.378	314.397		314.30	314.298	314.48	314.36	314.338		
102B											316.897	New Pt.
103	310.18	310.17	310.067	310.150		309.89	309.896	310.03	309.96	309.871		
103B											304.917	New Pt.
104	253.63	253.63	253.608	253.603								
105	294.37	294.35										
105B			295.035	295.028	295.007	294.97	294.967	295.00	294.99	294.936	294.927	-0.108
106	392.67	392.63										
106B			392.610	392.611	392.582	392.62	392.527	392.66	392.52	392.446	392.351	-0.259
107	414.64	414.58										
107B					415.621	415.61	415.457	415.58	415.46	415.739	415.741	+0.120
108	592.05	592.05		592.050	592.072	591.88	592.015	592.07	592.048	591.836	591.870	-0.180
109	678.76	678.77		678.827	678.851	678.85	678.905	678.77		678.782	678.823	+0.060
110	691.53	691.53				691.46	691.473	691.49	691.448	691.470	691.508	-0.022

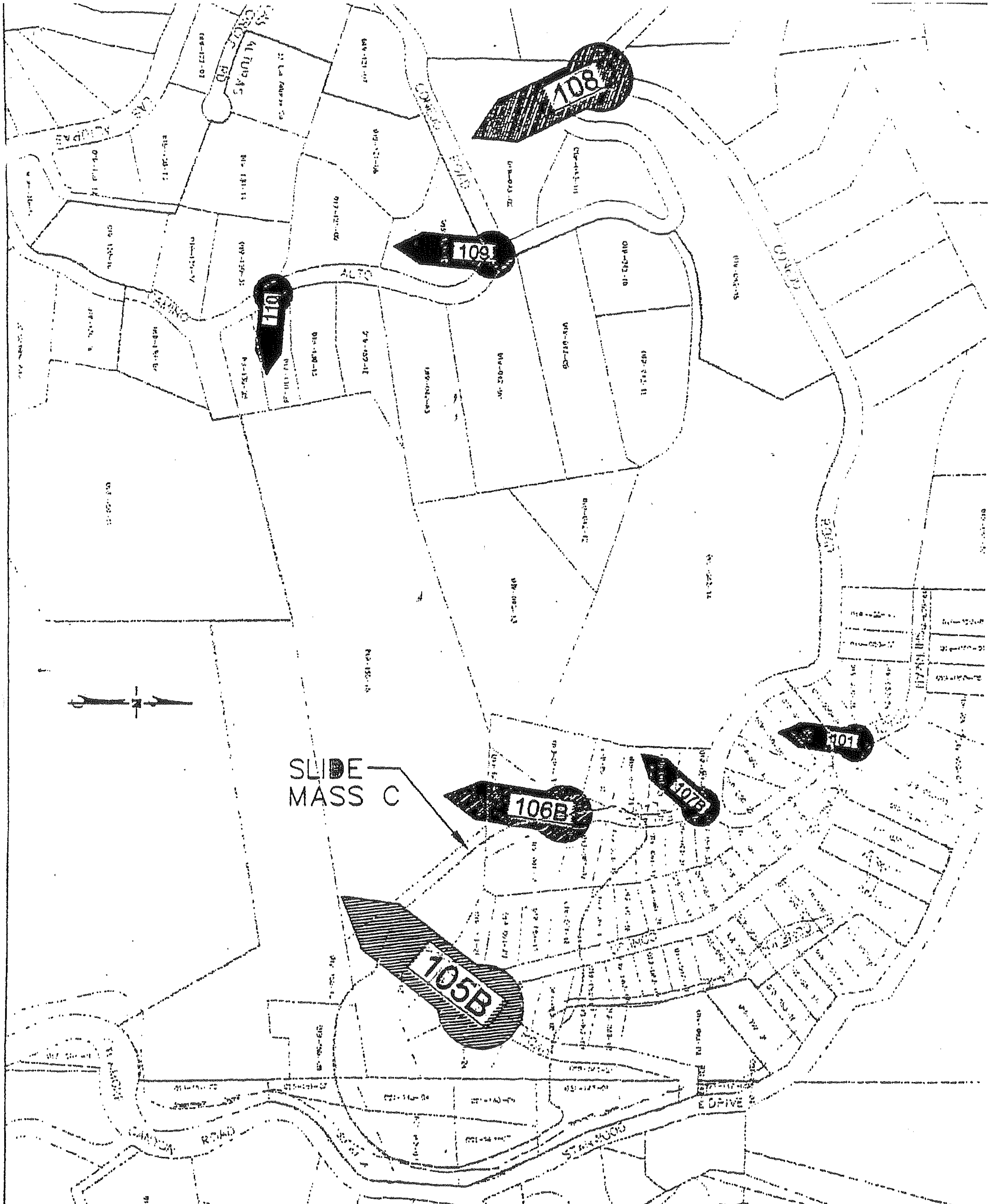
cbconejoexl.xls

OCT 2 8 1997 # 1 8

SURVEY CONTROL POINTS
Conejo Rd. Slide Monitoring



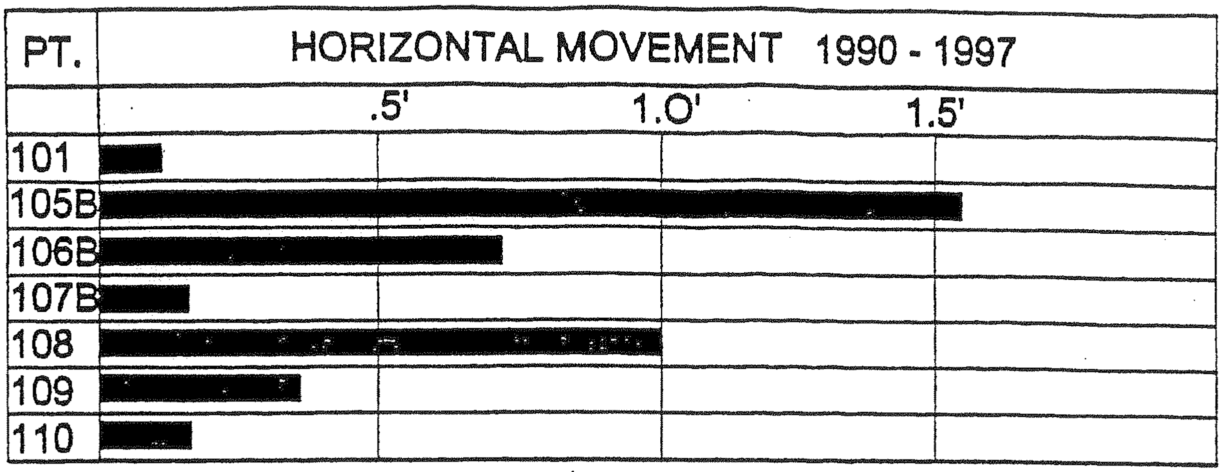
OCT 2 8 1997 #1 8



THE CONEJO SLIDE AREA HORIZONTAL MOVEMENT

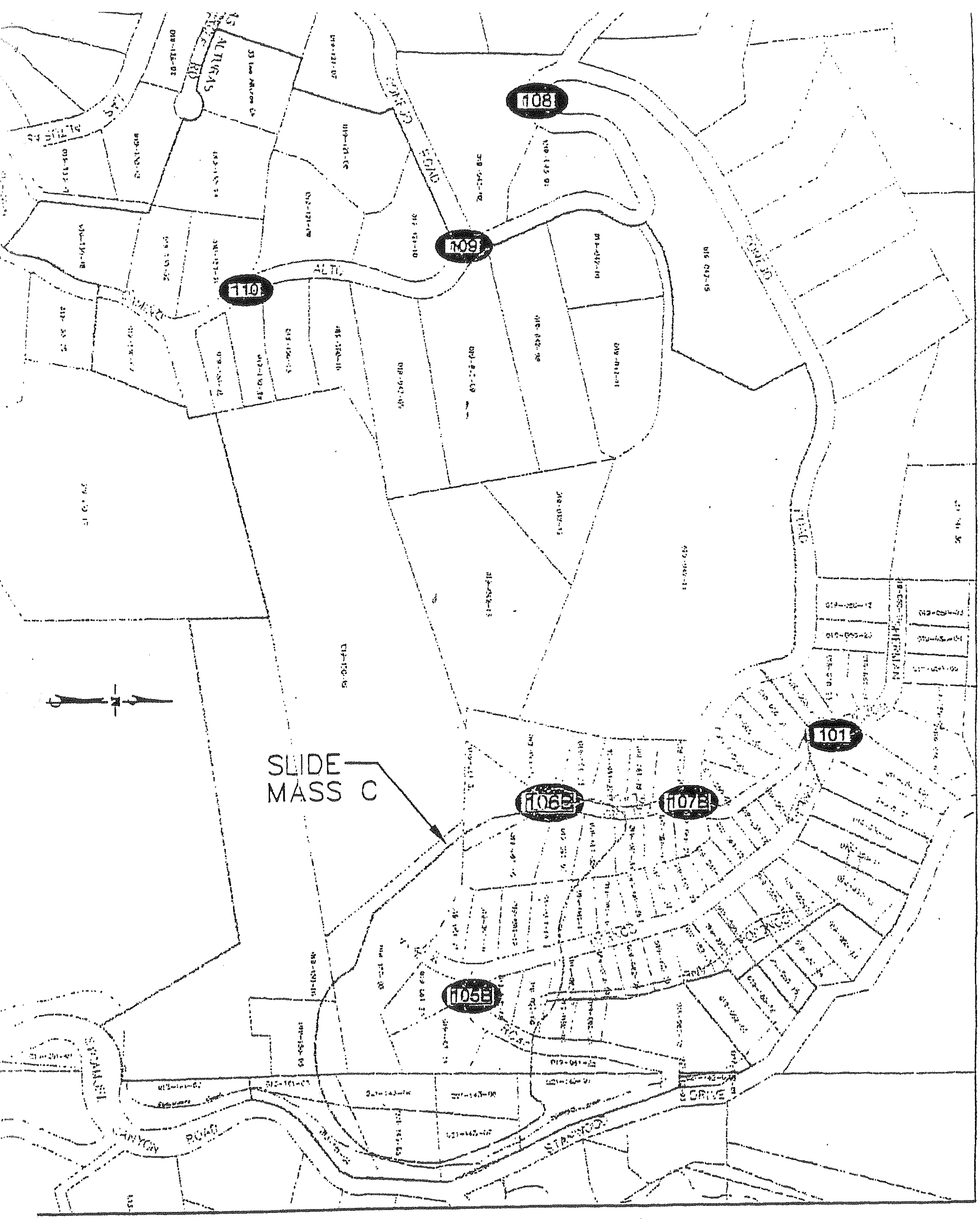
ATTACHMENT 3

OCT 28 1997 #18



ATTACHMENT 4

OCT 28 1997 #18

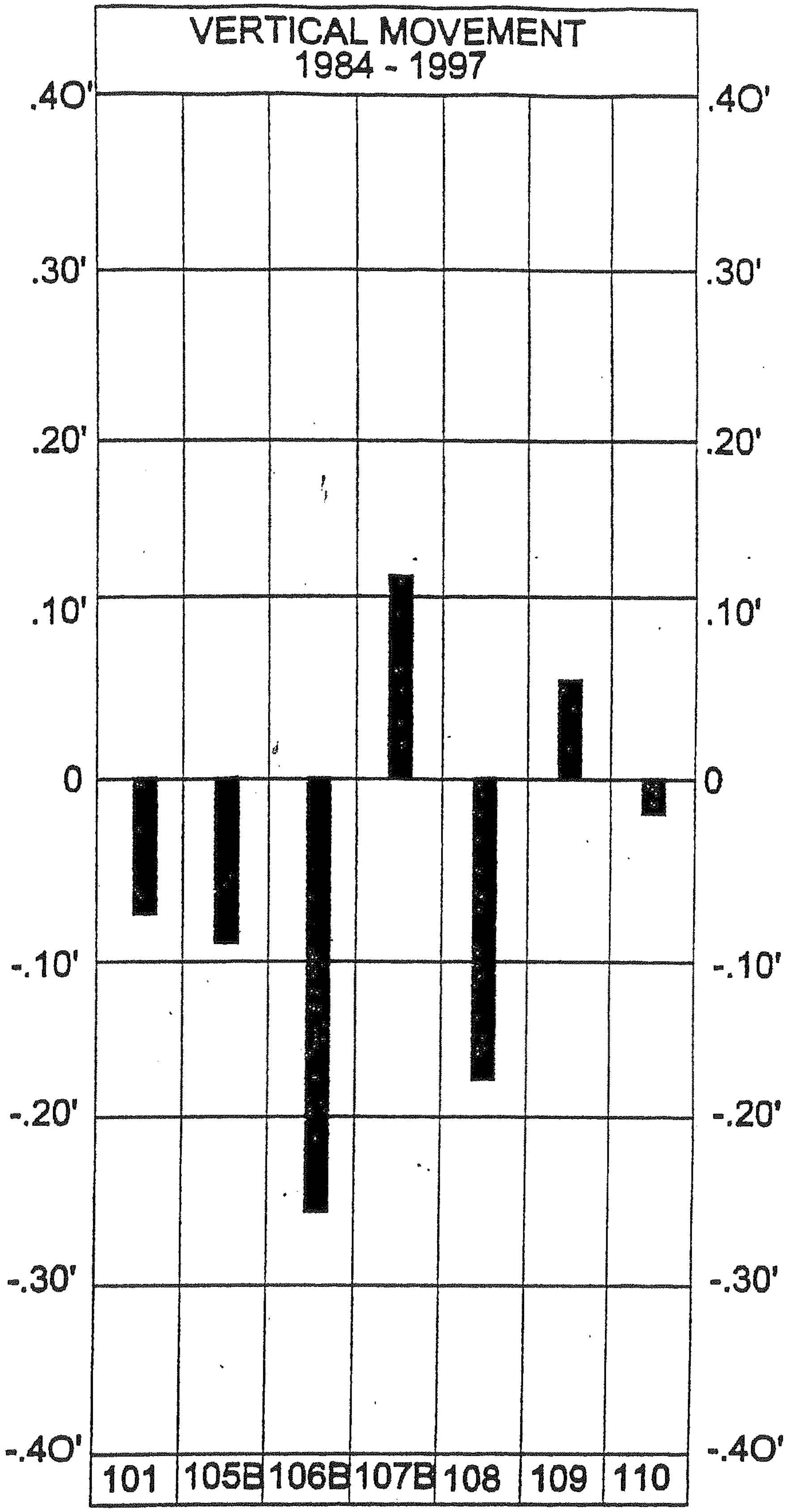


CONEJO SLIDE AREA VERTICAL MOVEMENT

ATTACHMENT 5

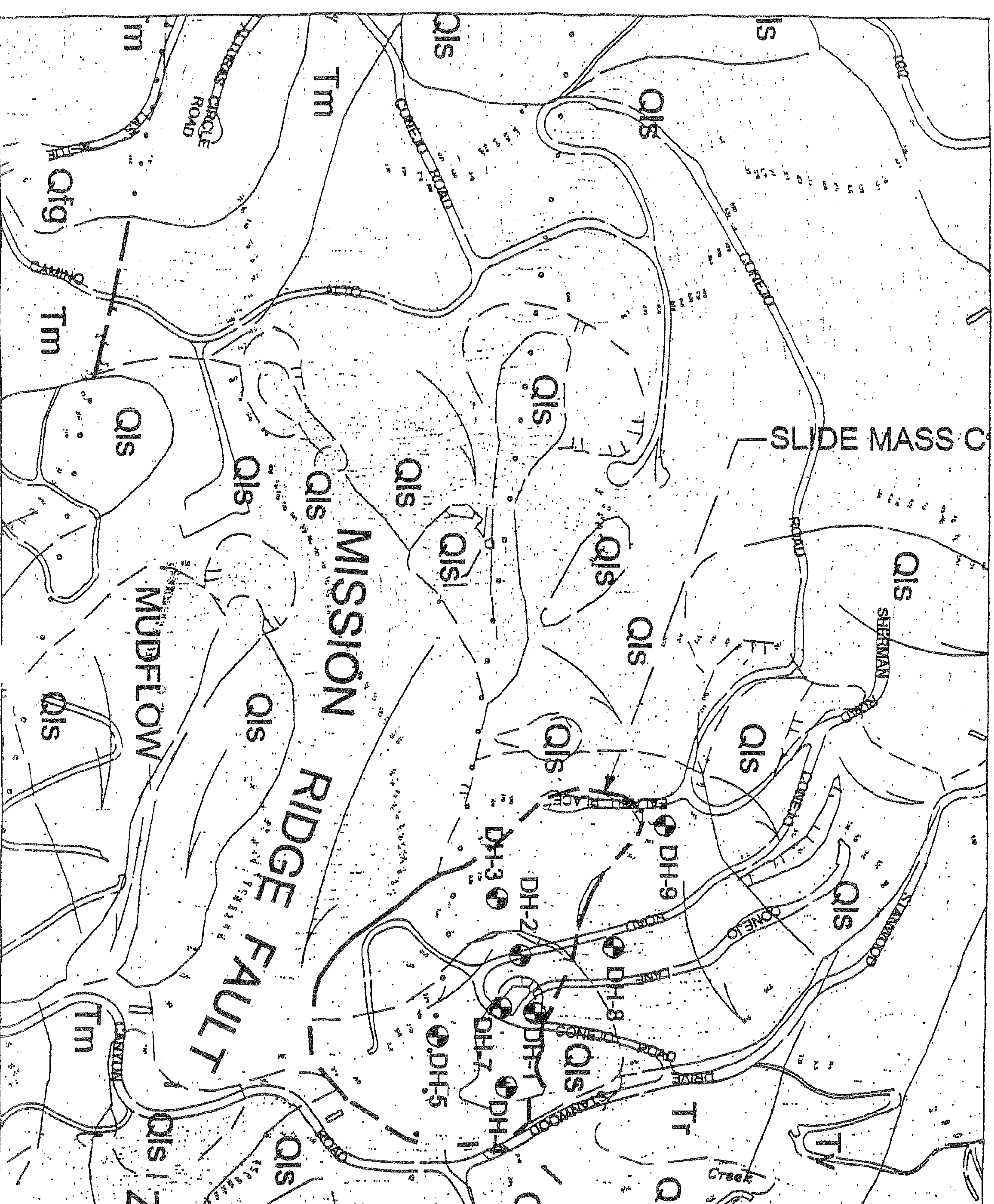
OCT 2 8 1997 #1 8

6/97



OCT 2 8 1997 #1 8

ATTACHMENT 6



CONEJO REGIONAL GEOLOGICAL MAP OCT 2 8 1997 #1 8

Qls - Landslide Debris

ATTACHMENT 7

November 6, 1997

«FirstName» «LastName»
«Address1»
«City», «State» «PostalCode»

SUBJECT: ADOPTION OF CONEJO ROAD LANDSLIDE ORDINANCE - RE: APN «APN»

Dear «Title» «LastName»:

Records indicate you own the above-referenced property in the vicinity of Conejo Road, which has experienced unstable soil conditions in the past and is subject to city ordinance that restrict construction of certain improvements.

For your information, at the meeting on November 18, 1997, the Santa Barbara City Council will consider a recommendation by the City Council Ordinance Committee to adopt an ordinance to extend protection from the Geologic Hazard of the Conejo Slide Area. Staff has determined that there has been no abatement of movement in the Conejo Road landslide area and is recommending that the City Council extend limitations on new construction within Slide Mass C, indefinitely. The revised ordinance will increase the size of additions allowed to existing buildings within Slide Mass C, from 50 square feet to 150 square feet, as is provided in the ordinance. It is recommended that existing prohibitions against new septic systems within the Conejo Slide Drainage Area be extended without change.

Should you desire to obtain a copy of the final Council Agenda Report, copies will be available from the City Clerk's office after 3:00 p.m., on Friday, November 14, 1997. The City Clerk's telephone number is (805) 564-5309.

Sincerely,

Pat Kelly
Assistant Public Works Director/City Engineer

PK/pv

cc: George Estrella, Chief of Building and Safety
David H. Johnson, Public Works Director

Attachment 2

Karl and Karin Eberhard
444 Conejo Road, Santa Barbara, California

November 03, 1997

Mayor and City Council
City of Santa Barbara
HAND DELIVERED

Re: Pending Ordinance regarding
Conejo Slide Area and Conejo Drainage Area

Madame Mayor and Honorable Council Members,

The Public Works Department has before you a proposal to make permanent the ordinance which which prohibits septic systems within the Conejo Drainage Area and which prohibits Building Permits within the Conejo Slide Area. My wife and I wholeheartedly endorse the prohibition on septic systems. However, with regard to the prohibition on Building Permits, we have some concerns.

First, the Geologist who prepared the study on which this ordinance is based, clearly states that Slide Mass C is pure conjecture on his part. This conjecture relates to the area and depth of the potential slide. This varies substantially from Slide Mass A and Slide Mass B, where distinct limits were established based on field observations and testing.

Second, the Geological Report opon which this ordinance is based is thirteen years old. We, the general public, can not use a report which is older than six months for our purposes, such as for a Building Permit from the City of Santa Barbara. It seems unfair to base an ordinance on a report which the City would not accept from the general public.

We have suggested several acceptable solutions as follows:

1. Make the permanent ban on Building Permits within the boundry of the known Slide Mass B.
2. Continue the temporary ordinance.
    a. At the current five year intervals (sunset).
    b. Until a new Geological Report is prepared.
    c. For one year to see how we do during "El Nino" (since all of this is based on rainfall levels).

Keep in mind as you are considering this ordinance that this will be a permanent loss of property rights for the affected properties, that this area is relatively affordable, that all Owners and Buyers are painfully aware of the soils conditions, and that experience demonstrates that building will continue in this area, albeit without permits.

Thank you for your consideration.

Sincerely,

Attachment 3

Smith
VEYORS
TA BARBARA
CALIF. 93101
(93102)

MARK LLOYD
NO. 5470
EXPIRES 9-30-00
STATE OF CALIFORNIA

Towill, inc.
301 MISSION STREET, SUITE 300
SAN FRANCISCO, CA 94105
(415) 243-4384

WARREN P. McKEAN
P.E. C23111
6-30-97
DATE

REGISTERED PROFESSIONAL ENGINEER
WARREN P. McKEAN
No. 23111
Exp. 12-31-97
CIVIL
STATE OF CALIFORNIA

N

SCALE IN FEET

0 100 200

NOTES:

1. HORIZONTAL DATUM: CCS ZONE V, 1983, VERTICAL DATUM: NAVD 1988
2. DATE OF PHOTOGRAPHY: APRIL 10,

ADJACENT SHEET INDEX

H03	J03	K03
H04	J04	K04
H05	J05	K05

TOPOGRAPHIC M
OF THE
CITY OF SANTA BA
PUBLIC WORKS DEPA

REVISED
APRIL, 1997

COMPOSITE TOPO OF CONEJO SLIDE AREA
(J4 & J5)

CITY OF SANTA BARBARA

INITY DEVELOPMENT DEPT.

lanning Division 564-5470
ousing & Redevelopment Division 564-5461
ivision of Land Use Controls 564-5485
irector's Office 564-5455
ax Number 564-5477

630 GARDEN STREET
POST OFFICE BOX 1990
SANTA BARBARA, CA 93102-1990

July 9, 1991

Robert Magnus
1705 Sycamore Canyon Rd.
Santa Barbara, CA 93103

Subject: Your geologist's request for consideration under the new exception to the Conejo Slide Ordinance #4698

Dear Mr. Magnus,

In response to the subject request, I am pleased to advise you that I have accepted your geologist's judgement in the matter of your desire to build an addition to your home at 1705 Sycamore Canyon Road. While the letter and supporting documentation are minimal, a site visit supports Mr. Dibblee's conclusions and your request is hereby granted. Pursuant to the terms of ordinance #4698, you will need to draft an indemnity agreement for the review by our City Attorney staff. A Mr. Bob Pike, Assistant City Attorney is most familiar with the ordinance and should be your first contact person.

Upon execution of the approved agreement, we can further consider your building permit application.

Sincerely,

Roy Harthorn

Roy Harthorn, Chief of Building and Zoning

cc. Thomas W. Dibblee, Jr.
James Taylor
Bob Pike, Assistant City Attorney

THOMAS W. DIBBLEE, JR.
316 E. Mission Street
Santa Barbara, CA 93101

June 17, 1991

Mr. Roy Harthorn
City of Santa Barbara Building Official
P.O. Drawer T-T
630 Garden St.
Santa Barbara, CA 93102

Dear Mr. Harthorn:

On June 11, 1991, I inspected the property at 1705 Sycamore Canyon Road, owned by Mr. Robert Mangus, in company with him and Mr. James Taylor, land planning agent, with respect to its relation and possible hazard from the Conejo Road landslide of 1984 as it pertains to city ordinance No. 4294.

I am told that Mr. Mangus proposes to build an approximate 8 x 35 ft. one-story room addition to the original home built on this site during the 1950's. I am a long-time local geologist and I was asked to determine if the Conejo Road landslide is a potential hazard to this homesite.

Enclosed is a copy of each of two maps showing the location of the 1705 Sycamore Canyon property with respect to the Conejo Road landslide. As shown thereon, the south boundary of the landslide as drawn barely crosses the northernmost corner of this property.

I saw this landslide a few days after it slid down toward Sycamore Creek in 1984 and severely damaged about 3 homes. The boundary drawn on these maps is far outside of the actual landslide boundary. Homes and buildings adjacent north of the 1705 property are outside the actual landslide and were not damaged. A small east-draining canyon separates the 1705 homesite from the landslide as outlined on the maps. There is no evidence of ground movement at this home, nor to the cement patio and walls around it.

From these conditions it is clearly evident that the Conejo Road landslide is not a hazard to the homesite at 1705 Sycamore Canyon, nor to any part of this property in any way.

Sincerely,

Thomas W. Dibblee Jr.

Thomas W. Dibblee, Jr.
California Registered Geologist
Certificate No. 3487

cc Mr James Taylor
Mr. Robert Mangus

ORDINANCES - For adoption (Cont'd):

31. Proposed Amendment to the Zoning Ordinance to Allow Bed and Breakfast Inns in New Structures on Properties Containing Structures of Merit and Landmarks in the R-O Restricted Office Zone - recommendation that Council adopt, by reading of title only, An Ordinance of the Council of the City of Santa Barbara Adding Section 22.22.092 and Amending Section 28.94.030.EE of the Santa Barbara Municipal Code Relating to Bed and Breakfast Inns in the R-O Zone. (Introduced on June 4, 1991 as Bill No. 4704).

** Adopted Ordinance No. 4697 **

32. Recommendation that Council adopt, by reading of title only, An Ordinance of the Council of the City of Santa Barbara Amending and Readopting a Prohibition on Construction of Buildings in the Vicinity of the Conejo Road Landslide. (Introduced on June 4, 1991 as Bill No. 4705)

** Adopted Ordinance No. 4698 **

adopted June 11, 1991

MAYOR AND COUNCIL MATTERS:

33. Report from the Finance Committee.
Set for 2:00 p.m.

** Presented **

34. Report from the Ordinance Committee.
Set for 2:00 p.m.

** Presented **

CITY OF SANTA BARBARA

COUNCIL AGENDA REPORT

REPORT DATE: May 31, 1991

TO: Mayor and Councilmembers

FROM: Richard D. Thomas, City Administrator SAN

SUBJECT: AMENDMENT TO CONEJO SLIDE ORDINANCE #4294

RECOMMENDATION:

That Council introduce and subsequently adopt by reading of title only an ordinance of the Council of the City of Santa Barbara Amending and Readopting a Prohibition on Construction of Buildings in the Vicinity of the Conejo Road Landslide.

DISCUSSION:

See attached staff report.

PREPARED BY: Roy W. Harthorn, Chief of Building and Zoning RH
APPROVED BY: David D. Davis, Community Development Director DD

REVIEWED BY: ______Finance ______Attorney

STAFF USE ONLY

TO:

FROM: City Administrator

ACTION TAKEN:

DIRECTIONS:

Meeting Date JUN 4 1991

Agenda Item No. 24

Staff Report
May 31, 1991
Conejo Slide Ordinance Amendment

Background

The Conejo Slide Ordinance #4294 was adopted on September 18, 1984 in response to a landslide that occurred in the area over a period of time between December of 1983 and January of 1985. The area was extensively studied under contract with the City, by Geotechnical Consultants Inc. of Ventura, who published a report dated April 1984. The result of the study led to the adoption of the moratorium prohibiting any new construction in an area identified in the study as slide mass "C". The area is considered an active slide and there are on going hazards to homes and improvements constructed in the area. More normal rainfall results in greater activity slide activity than has been observed in recent years.

Proposal

Recently, a possible inequity in the ordinance has become apparent as the result of a building permit application for a room addition to an existing single family home at 1750 Sycamore Canyon Road. It seems, the ordinance precludes such an addition since a <u>portion</u> of the parcel underlying the home extends into the area known as slide mass "C". The ordinance prohibits such construction whether the parcel is wholly or <u>partially</u> in the slide mass. It is presumed that the prohibition of any construction on a parcel even partially within the slide mass reflects the difficulty by which the boundaries of such a slide mass can be accurately determined. What the language fails to address, is the irregular and varying geometry of the various parcels along the perimeter of the slide mass.

In this particular case, the proponent of this amendment has a long narrow lot extending at an oblique angle away from the slide mass. The lot actually has only a small corner which extends (approximately twenty lineal feet) within the slide mass (approximately 375 square feet of area). The lot itself is approximately six (6) acres total. The building site of the proposed addition is 180 feet removed from the boundary of the slide mass and is separated geologically by a hill between the slide mass and the building site. As a frame of reference, assessors parcels 19-061-32 (24 Ealand Place), 19-061-16 (462 Conejo Road) and 19-062-08 (523 Conejo Road) are all (entirely) outside the slide mass and unaffected by the ordinance, yet each of these parcels are closer, (34', 14', and 42' respectively) to slide mass than the proponent's building site (180' from the slide mass).

JUN 4 1991 #24

ORDINANCE NO. ______

AN ORDINANCE OF THE COUNCIL OF THE CITY OF SANTA BARBARA AMENDING AND READOPTING A PROHIBITION ON CONSTRUCTION OF BUILDINGS IN THE VICINITY OF THE CONEJO ROAD LANDSLIDE.

THE COUNCIL OF THE CITY OF SANTA BARBARA DOES ORDAIN AS FOLLOWS:

SECTION 1. Findings and Purpose. A landslide has occurred in the vicinity of Conejo Road in the City of Santa Barbara. Geotechnical Consultants, Inc. has completed its investigation and submitted a report to the City concerning that landslide. In its report, Geotechnical Consultants, Inc. identified three separate landslide masses as being subject to special geologic hazard in the vicinity of Conejo Road and designated them as Slide Masses A, B, and C. Slide Masses A and B are contained within the boundary of Slide Mass C. The earth in Slide Masses A, B and C is unstable, structures and other property on Slide Masses A, B and C have been damaged because of that instability and further damage to structures and property on Slide Masses A, B and C is highly probable. <u>The provisions of this ordinance are necessary to maintain the public safety and welfare and to meet local geologic and soils conditions.</u>

SECTION 2. Definitions. For the purposes of this Ordinance, the following words and phrases shall have the meanings indicated, unless the context or usage clearly requires a different meaning:

CONSTRUCTION. Any construction of a building which requires a building permit, except for (i) routine repairs and maintenance, (ii) remodeling of the interior of an existing dwelling unit or (iii) during a twenty-four (24) month period, additions totaling fifty (50) square feet or less to an existing building.

SLIDE MASS C. The landslide mass as identified in the report by Geotechnical Consultants, Inc. (dated April, 1984) concerning its geotechnical investigation of the Conejo Road Landslide. The boundary of Slide Mass C is shown on the attached drawing dated August 28, 1984 and marked Exhibit A.

SECTION 3. Prohibition. All construction on parcels which are located entirely or partially within the boundary of Slide Mass C is prohibited except as provided herein. Said parcels are identified in the attached listing entitled "PARCELS WITHIN MASS C" dated August 28, 1984 and marked Exhibit B.

<u>Exception: Plans for construction upon such affected parcels, incorporating the recommendations of a licensed engineering geologist, based upon adequate site investigations, borings, soil samples, laboratory tests, and a review of all record data for the parcel and slide area, to the satisfaction of the Chief of</u>

JUN 4 1991 #24

LAND PLANNING AND DESIGN
JAMES TAYLOR AND ASSOCIATES
415 E. MICHELTORENA, SUITE C
SANTA BARBARA, CALIF., 93101
805-965-8387

January 11, 1991

Mr. Roy Harthorn
Chief of Building and Zoning
City of Santa Barbara
630 Garden Street
P.O. Drawer P-P
Santa Barbara, CA 93102

Re: Mr. & Mrs. Robert Mangus
1705 Sycamore Canyon Road
Santa Barbara, CA
A.P.N. no. 19-150-10

Dear Mr. Harthorn,

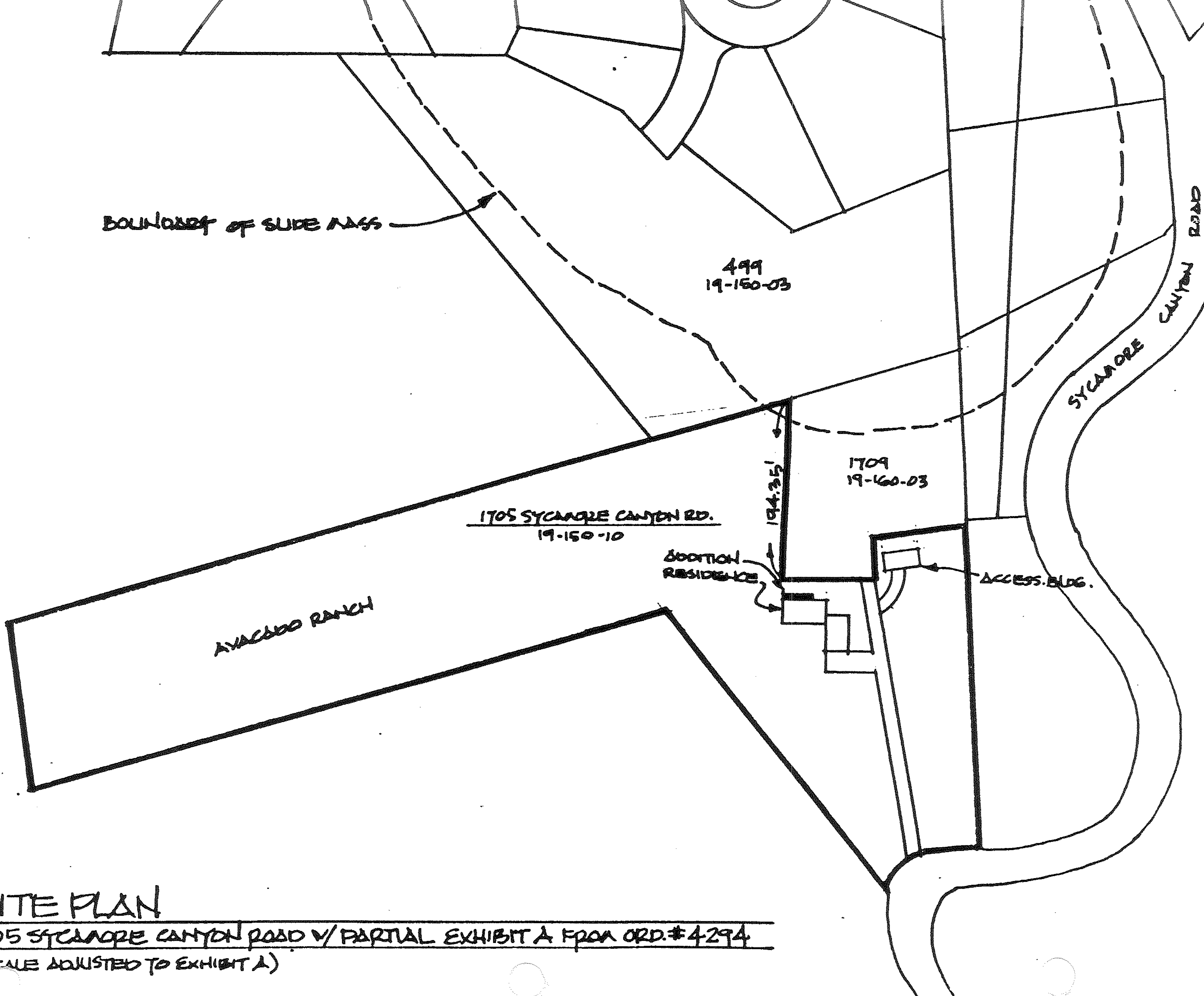
This letter is in regards to the City of Santa Barbara Ordinance No. 4294 (Conejo Road slide mass) and its relationship to the above mentioned property.

Exhibit B of this ordinance lists parcels that are either partially or wholly within the limits of the Conejo Road slide area. Listed is the address of the subject property; however, it also lists this property as vacant. This ordinance took effect on August 28, 1984 and at that time, a single family dwelling was in existence.

This particular parcel is 6+ acres with the majority used as an active avocado ranch. Enclosed please find a site plan of the parcel with Exhibit A from the ordinance attached. The upper most corner of the property is partially effected by the boundary of the slide mass. This area is approximately 190+ feet from the existing residence, as well as the proposed addition.

Geological studies historically have allowances as to the accuracy of any boundary line that is drawn. The boundary line of this slide mass would as well have its allowances. It is our contention that ample room exists from this far corner of the property to allow future building in a portion of this parcel that is not effected.

JUN 4 1991 #24

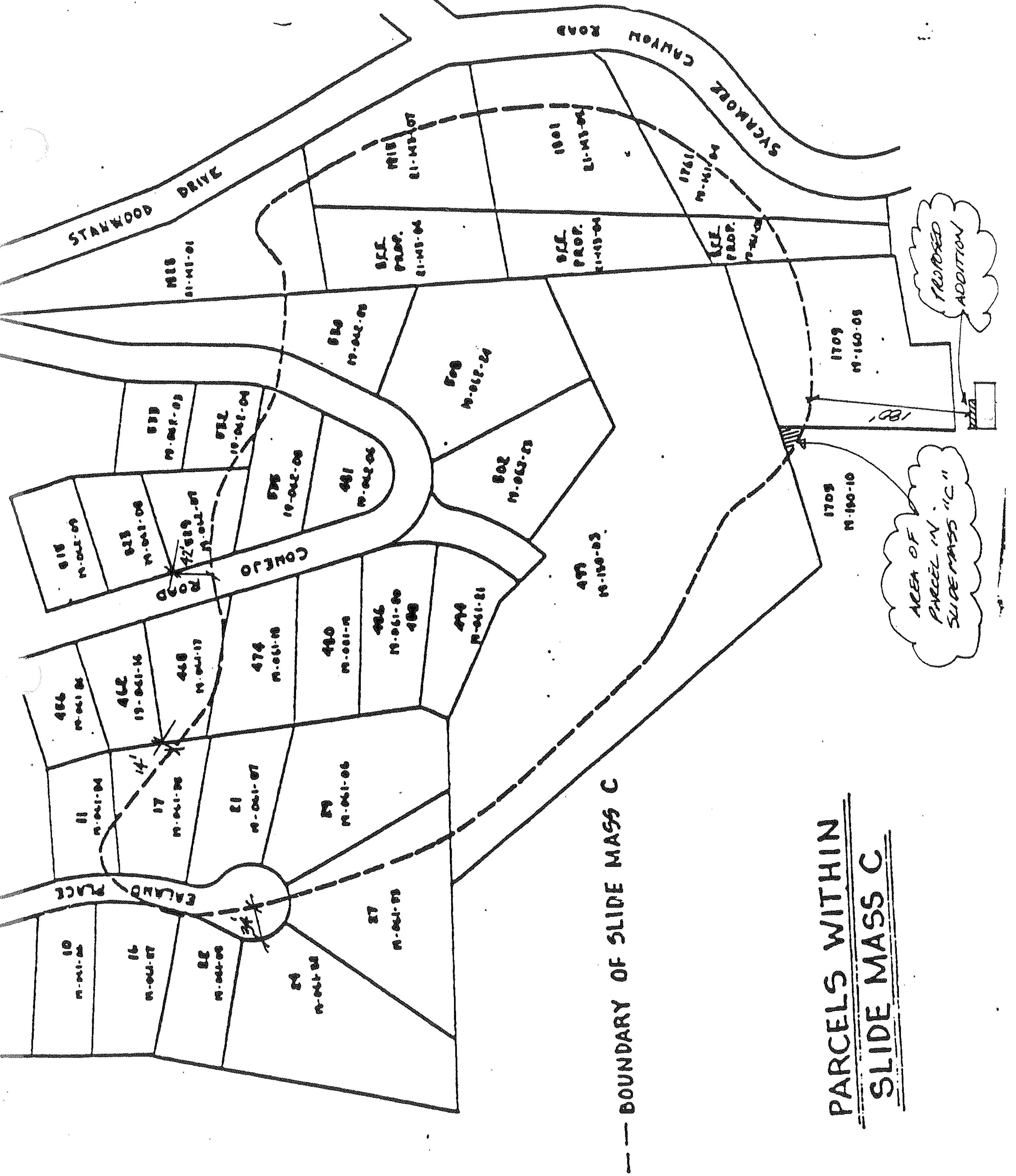


SITE PLAN

1705 SYCAMORE CANYON ROAD W/ PARTIAL EXHIBIT A FROM ORD. #4294

(SCALE ADJUSTED TO EXHIBIT A)

JUN 4 1991 #24



August 28, 1984

EXHIBIT A JUN 4 1991 #24

CITY OF SANTA BARBARA

COMMUNITY DEVELOPMENT DEPT.

Planning Division 564-5470
Housing & Redevelopment Division 564-5461
Division of Land Use Controls 564-5485
Director's Office 564-5455
Fax Number 564-5477

630 GARDEN STREET
POST OFFICE BOX 1990
SANTA BARBARA, CA 93102-1990

January 22, 1991

James Taylor
James Taylor and Associates
415 E. Micheltorena Ave., Suite C
Santa Barbara, CA 93101

Subject: your letter of January 11, 1991 re. 1705 Sycamore Canyon

Dear Mr. Taylor,

I am in receipt of the subject letter requesting relief from the Conejo slide building moratorium ordinance #4294 adopted September 18, 1984 (copy enclosed).

As you will read, the ordinance pertains to parcels either entirely or partially within the confines of the slide mass C. As for waivers, the only provision for waivers is for properties with permits which authorized construction prior to the September 18, 1984 adoption date. Accordingly, your only recourse would be to petition City Council for a change to the ordinance as currently adopted. The chances for successfully amending the ordinance are questionable, and technical support in the form of geologic studies would probably be necessary for such a proposal to be given favorable consideration.

Absent such an amendment, the ordinance limits additions to 50 square feet in the course of a twenty-four month period. Accordingly, your application for a permit to construct 273 square feet, unfortunately, may not be approved.

If I can be of further assistance or you wish to discuss this matter further, please do not hesitate to call.

Sincerely,

Roy Harthorn

Roy Harthorn, Chief of Building and Zoning

JUN 4 1991 #24

10/87

PERMANENT FILE
ORIGINATOR
READING

C_TY OF SANTA BAR_ARA

INTER-OFFICE MEMO

DATE: June 10, 1987

DEPARTMENT OF:
Public Works

TO: R. D. Thomas, City Administrator

FROM: Bruce Burnworth, Assist. Director/City Engineer BB
VIA: D. H. Johnson, Director DHJ
SUBJECT: CONEJO ROAD #067

The work completed in the Conejo Road area was specifically to address the drainage concerns of that area. During the construction period, the contractor widened, graded and paved two roadway sections that needed improvement. This was done to alleviate some of the concerns of the area residents.

Due to the amount and frequency of earth movement in the area it is not advantageous to reconstruct or realign the roadway. The earth movement would destroy the roadway within a matter of years.

Currently, the City Street Crews maintain the area roadways with patching and minor overlays. At this time, there are insufficient funds to reconstruct or improve residential area streets.

AAC/vh

10/86

CITY OF SANTA BARBARA

COUNCIL AGENDA REPORT

REPORT DATE: October 31, 1986

TO: Mayor and Councilmembers

FROM: Richard D. Thomas, City Administrator

SUBJECT: NOTICE OF COMPLETION - CONEJO ROAD DRAINAGE IMPROVEMENTS

RECOMMENDATION:

That Council accept the work completed by Granite Construction Company, under Contract No. 13,300 for Surface Drainage Structures for Conejo Road Landslide Area, Bid No. 1876, in the final contract amount of $237,884.89 and that a Notice of Completion be filed for the subject project.

PREPARED BY: Anthony A. Cabrera, Senior Civil Engineer
APPROVED BY: D. H. Johnson, Director

REVIEWED BY: ____ Finance ______ Attorney ______

STAFF USE ONLY

TO:
FROM: City Administrator
ACTION TAKEN: ** Accepted; Notice of Completion to be filed **

DIRECTIONS:

Meeting Date	NOV 4 1986
Agenda Item No.	8

DISCUSSION:

The Contractor, Granite Construction Company, has completed all work in accordance with the contract plans and specifications. Final inspection of the work for acceptance by the City was made August 1, 1986.

The final contract amount of $237,884.89 is $34,230.89 above the original bid amount. The increase is due to an increase in quantities and Contract Change Order No.s 1, 2 & 3.

The Change Orders consisted of work involving clearing and grubbing excess vegetation, asphalt concrete patching, and the grading and leveling and installation of a variable depth asphalt concrete cap over failed roadway areas.

The work consisted of constructing surface drainage structures for the Conejo Road Landslide Area, including approximately 1700 linear feet of corrugated aluminum pipe storm drain and appurtenance structures, 740 linear feet of concrete-lined channel and 1600 linear feet of asphalt concrete-lined ditches.

NOV 4 1986 #8

1/86

CITY OF SANTA BARBARA

COUNCIL AGENDA REPORT

REPORT DATE: January 27, 1986

TO: Mayor and Councilmembers

AMENDED REPORT
Recommendation B., and Last paragraph Page Two replaced with 3 paragraphs.

FROM: Richard D. Thomas, City Administrator

SUBJECT: CONEJO ROAD DRAINAGE - AWARD OF CONTRACT

RECOMMENDATION:

That Council:

A. Award and authorize execution of a contract with Granite Construction Company in their low bid amount of $203,654.00 for the Construction of Surface Drainage Structures for Conejo Road Landslide Area, Bid No. 1876;

B. Authorize the Public Works Director to approve Contract Change Order No. 1 for the realignment of Lines A, C and D and the deletions of portions of Lines C and E, and for the additional work of constructing a reinforced concrete transition structure, an energy dissipater and a debris collector at no change in the contract amount; and

C. Authorize the Public Works Director to approve contract change orders for extra work excluding Item B. above up to an aggregate total amount of $20,400.00.

PREPARED BY: Anthony A. Cabrera, Assoc. Civil Engr. AACabrera
APPROVED BY: D. H. Johnson, Public Works Director DHJ
AAC:aw

REVIEWED BY: ______Finance ______Attorney ________________

STAFF USE ONLY

TO:

FROM: City Administrator

ACTION TAKEN: Authorized execution of Agreement No. 13,300; concurred with revised recommendations

DIRECTIONS:

Meeting Date JAN 28 1986

Agenda Item No. 8

DISCUSSION:

A total of four bids was received for the subject work ranging as follows:

	Bidder	Bid Amount
1.	Granite Construction Co. (Watsonville)	$203,454.00
2.	Tierra Contracting Corp. (Goleta)	226,769.00
3.	Lash Construction, Inc. (Santa Barbara)	228,699.00
4.	Cushman Contracting (Santa Barbara)	296,950.00

The low bid of $203,654.00 submitted by Granite Construction Company is an acceptable bid which is responsive to and meets the requirements of the bid specifications. The work consists of constructing surface drainage structures for the Conejo Road Landslide Area, consisting of approximately 1550 linear feet of 18-inch corrugated aluminum pipe storm drain and appurtenance structures, 920 linear feet of concrete-lined channel, and 1550 linear feet of asphalt concrete-lined ditches.

Construction of the project requires drainage easements along the alignment of the drainage structures. At the bid opening on October 8, 1985, only six of the necessary sixteen easements had been received by staff. The lack of easements required a 30-day extension of award from Granite Construction Company, the apparent low bidder. The extension allowed additional time to obtain the remaining easements and a deadline of November 22, 1985 had been given for the receipt of the easements.

An additional 45-day extension granted by Granite Construction Company was accepted by council at its November 26, 1985 meeting. This additional extension enabled staff to continue its efforts to obtain the required easements. Staff's efforts were successful and finalization of these easements were completed on January 23, 1986.

Due to the refusal of some property owners to grant to the City the required easements, Contract Change Order No. 1 will delete 328 linear feet of the lower portion of Line C and approximately 202 linear feet of Line E. These deletions require the realignment of approximately 100 linear feet of the mid-portion of Line C and the addition to Line E of a reinforced concrete transition structure, energy dissipater and a debris collector.

In order to accommodate the concerns of the property owners, Line D will be realigned to within the 15-foot setback along the property line and Line A along the easterly edge of 27 Ealand Place.

The required easements obtained from the property owners specified limitations to access and the type of equipment to be used in construction of the project. These limitations have been discussed with Granite Construction Company and they have agreed to include the above described work and specified limitations within Contract Change Order No. 1 at no charge in cost of the contract amount. These deletions and realignments have been taken into consideration and the concept of the design of the drainage system will not be altered.

In the event the Council does not award the construction contract as anticipated at this time, it should reject all contractors' bids, defer or cancel construction of the project, reject all of the easements submitted for the project and return the easement documents to the owners.

There are sufficient funds available in the Capital Outlay Fund to cover the project cost (Account No. 500-1430.57750, Project #7248 and #7249).

extend.cr

Perm File

CITY OF SANTA BARBARA

COUNCIL AGENDA REPORT

REPORT DATE: November 27, 1985

TO: Mayor and Councilmembers

FROM: Richard D. Thomas, City Administrator

SUBJECT: SURFACE DRAINAGE STRUCTURES FOR CONEJO ROAD - TIME EXTENSION

RECOMMENDATION:

That Council approve an additional 45-day extension of award of contract with Granite Construction Company for the surface drainage structures for Conejo Road Landslide Area, Bid No. 1876, with the intention of rejecting all bids if all necessary easements have not been obtained by January 10, 1986.

PREPARED BY: A.A.Cabrera, Assoc. Civil Engr. AAC.
APPROVED BY: D.H.Johnson, Public Works Director DHJ
AAC:aw

REVIEWED BY: ______Finance ______Attorney ______

STAFF USE ONLY

TO:

FROM: City Administrator

ACTION TAKEN:

DIRECTIONS:

Meeting Date__________

Agenda Item No.__________

The low bid of $203,654.00 submitted by Granite Construction Company is an acceptable bid which is responsive to and meets the requirements of the bid specifications. The work consists of constructing surface drainage structures for the Conejo Road Landslide Area, consisting of approximately 1550 linear feet of 18-inch corrugated aluminum pipe storm drain and appurtenance structures, 920 linear feet of concrete-lined channel, and 1550 linear feet of asphalt concrete-lined ditches.

Construction of the project requires drainage easements along the alignment of the drainage structures. At the bid opening on October 8, 1985, only six of the necessary sixteen easements had been received by staff. The lack of easements required a 30-day extension of award from Granite Construction Company, the apparent low bidder. The extension allowed additional time to obtain the remaining easements and a deadline of November 22, 1985 had been given for the receipt of the easements.

To date, nine of the required easements have been received by staff which would allow a major portion of the project to be constructed. However, seven of the required easements have not been submitted to staff. These easements span over the following parcels:

OWNER	PARCEL
Edison	13-161-03
Herlow	19-150-05
Mangus	19-150-10
Jarvis	19-150-03
Satterfield	19-050-25
Curtis	19-050-08
Turk	19-050-09

Due to the current rainy season, construction cannot begin until the month of April. Staff can continue its efforts to obtain the remaining easements. If efforts are successful, the entire project can be built; if not, staff recommends that all bids be rejected.

A petition from the Sycamore Terrace Homeowners and Tenants Association was received on November 22, 1985. It was signed by 32 individuals representing 25 different properties. It asks, among other things, that work proceed immediately on portions of the project where all property owners have signed easements. The owners have been notified of the recommended Council action.

7/85

LEIGHTON and ASSOCIATES
INCORPORATED

SOIL ENGINEERING GEOLOGY GEOPHYSICS GROUND WATER HAZARDOUS WASTES

July 2, 1985

Project No. 3840788-01

TO: City of Santa Barbara
630 Garden Street
P.O. Box 33
Santa Barbara, California 93102

ATTENTION: Mr. D. H. Johnson

SUBJECT: Discussion of Design Considerations for Drainage Structures at the Conejo Road Landslide, Santa Barbara, California (reference: City of Santa Barbara letter of June 14, 1985)

Thank you for your letter of June 14, 1985. Unfortunately we did not receive it until June 19. This made a June 21 deadline almost impossible to meet. Thank you for the extension.

Regarding the concept of the design we will discuss each of your concerns separately.

1. *Asphalt concrete drainage swale:* We believe this is a good concept and we will include it in the plans and specifications. This will help assure rapid runoff and limit ponding in irregularities of the existing ditches. However, the use of such swales is limited to those areas where there are no driveways. If such swales are included where numerous driveways exist, each driveway would have to be redone to maintain both vehicular access and unobstructed flow. We believe that such reconstruction is unwarranted.

2. *Engineering alignment and grade:* We interpret this to mean more precise elevations, dimensions and ties for the structures. While this may be appropriate for most urban drains, the conditions on this project do not warrant such precision. Furthermore, the added cost of design surveys and construction surveys appear unjustified.

The conditions on this project a semi rural. The inlets must be low enough to drain the ditches and the alignments must go below or above utilities and between houses, garages, sheds and trees to the creek below. These details are shown on the plans. To our knowledge none of the existing improvements are anywhere precisely located with respect to lot lines and right-of-way lines. To obtain the precise relationship, a detailed survey is required. This added expense is then doubled when the contractor must redo the survey to locate and align his work.

We believe that the present grades and alignments are adequate to get the project built and functioning properly. A final survey should be made to record these lines and grades to acquire the easements for these structures.

3. *Corrugated aluminum pipe:* All pipe on the project will be aluminum.

4. *Standard fittings:* Standard fittings will be used at all major angle points. Concrete thrust blocks will be included where necessary.

5. *City standard catch basin:* This basin requires more form work than the proposed structure and would be more costly. We recommend using the proposed structure or a CAP riser inlet. The latter, however, is more subject to major damage from traffic.

6. *Interference of utilities and bedrock:* All known public utilities are shown in their approximate location on the plans. Potholing by the contractor is required to locate these in the field and make whatever adjustments are required to protect them. The contractor is also required to construct the drain according to the standard utility sketch. We believe that shallow cuts in bedrock can be accomplished with conventional excavating equipment, and special consideration is not warranted.

7. *Necessity of:*

   a) Lines C & E - Line C is provided to pick up drainage from existing culverts that presently discharge on to the slope. Furthermore, the line is strategically located to carry flows that would otherwise have to be diverted to other drains to keep the flow off the slopes.

   Line E - The proposed lined channel is aimed at quickly carrying runoff out of the canyon thus avoiding infiltration into the ground. It also carries the flows from Line A which include nuisance flows throughout the year that can contribute to infiltration.

   b) Northern catch basin of Line A - This catch basin is to collect flows from the north side of the street before they sheet flow over the street in an uncontrolled manner.

   C) Outlet structures with headwalls for Lines B, C & D - These structures will control erosion around the outlets. The headwalls reduce the erosion around the end of the pipe. The aprons spread the flows thus reducing erosion as the flows enter Sycamore Creek.

8. *Access structures:* Access to the drains is provided at each inlet. Additional access will be provided at strategic locations near the middle of Lines B, C & D.

9. *Drainage calculations:* A copy of the subwatersheds and the drainage calculations are attached. The Santa Barbara County Flood Control Standards were used. Capacities of existing facilities were estimated using basic hydraulic methods.

Construction drawings of surface drainage structures:

1. *Engineering grades and horizontal and vertical angle points:*

   See discussion in Item 2 above. Again, because of the possible conflict between legal descriptions and actual conditions we believe the best construction approach is to build the drains to the approximate grades and angles shown and then survey the as-built condition for obtaining easements. This reduces the number and cost of three surveys down to one, the as-built survey. Eliminated is the design survey and the construction survey.

2. *Line E rip rap:* A grouted stone apron has been substituted at the end of Line E.

3. *Pay Items:* These numbers have been removed from the drawings. However, our experience has shown that such numbering greatly reduces any confusion the contractor may have regarding payment coverage for the items shown on the drawings.

4. *Horizontal and vertical angle point stationing:* Those critical points have stationing shown on the drawings.

5. *Existing culvert alignment verification:* The alignment shown coincides with the alignment of the culvert exiting from the inlet. The outlet, however, could not be found. It may be underneath fill that has been dumped over the side or it may connect to the adjacent culvert which means that the culvert has an angle point beneath the street. In either case potholing is required to determine its exact location. The contractor is required to make that determination when he has equipment on the site.

6. *Minimum cover in streets:* All culverts require a minimum of two feet of cover within streets.

Construction drawings for hydrauger system:

1) *Hydrauger details* - The details of a typical hydrauger have been revised.

2) *Street names and house numbers* - The street names and house numbers are now shown on the drawings.

3) *Monitoring well details* - Ground surface and depth of casing are now shown on the well details. These, however, must be verified in the field.

4) *System B alignment* - The outlet and the alignment of the hydraugers has been revised to outlet upstream of the Line B inlet.

5) *Monitoring Well location* - The proposed well location is shown near the end of Ealand Street at the edge of the pavement in front of 21 Ealand Street. The legend symbol and location is now shown on the well detail.

Revised Plans and Specifications: The changes in the hydrauger drawings have been made and the drainage drawings revision will be completed by July 9, 1985. Specifications are being revised to incorporate the hydraugers and the surface drains in one volume. These revisions should also be completed by July 9, 1985.

Please call us at 805-495-6721 if you wish to incorporate other changes and revisions to either the plans or specifications.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

Frederick C. E. Gebhardt
RCE 13874

FG:ji

Distribution: (3) Addressee

Attachments: Calculations/watershed

LEIGHTON and ASSOCIATES INCORPORATED

CAPACITY OF NATURAL CHANNEL SOUTH OF CONEJO ROAD

Runoff, $Q = ciA$

c, runoff coefficient = 0.71, from S.B. Co. FCD chart

i, rainfall intensity (12 min. duration) = 2.9 in./hr, from S.B. Co. FCD Chart

A = area

$$(2.9 \text{ in/hr})\left(\frac{1 \text{ ft}}{12 \text{ in.}}\right)\left(\frac{1 \text{ hr}}{3600 \text{ s.}}\right)(0.71) = 4.8 \times 10^{-5} \text{ ft/s.}$$

Sub-Watershed	A, sq. ft.	$Q = (4.8\times10^{-5})(A)$, c.f.s.
a	102,500	4.89
b	113,000	5.39
c	77,000	3.67
d	72,500	3.46
e	20,500	0.98
f	71,500	3.41
g	140,000	6.67
h	31,500	1.50
i	130,500	6.22
j	95,500	4.55
k	68,000	3.24
l	31,000	1.48
m	51,000	2.43
n	64,000	3.05
o	81,000	3.86
p	86,000	4.10
	flow from culvert #11	+ 10.70
		69.6 cfs Total Flow in Natural Channel

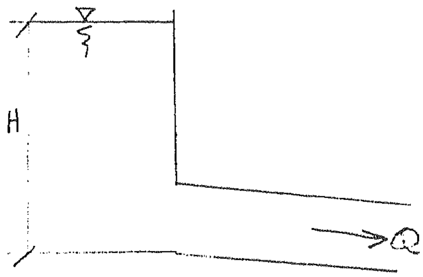
Potential Flow to Existing Culverts

Runoff, $Q = CiA$; $C = 0.71$; $i = 2.9$ in./hr. ; A = area

$Q = (4.8 \times 10^{-5})A$

Culvert	Area Culvert Serves (sq. ft.)	Potential Flow, Q (cfs)
2	37,000 + 34,000 + 23,500 + 58,000 = 152,500	7.27
4	29,000 + 23,000 = 52,000	2.48
5	23,500 + 60,000 = 83,500	3.98
6	174,500	8.32
7	culvert 5 + culvert 6 = 258,000	12.30
8	123,000	5.86
9	163,000	7.77
10	69,000 + 11,000 = 80,000	3.81
11	Max: 153,000 + 62,000 + 9,500 = 224,000	10.7
12	Max: 153,000 + 23,500 + 17,000 + 28,000 + 6,000 + 4,000 + Culvert 10 = 315,500	15.04
13	Max: 4,000 + 6,000 + 11,000 = 21,000	1.00
14	81,000 + 43,000 + 33,000 = 157,000	7.54
15	39,000 + 30,000 = 69,000	3.29
16	14,000 + 21,500 + 39,000 + 7,000 + 49,000 = 130,500	6.22

Capacity of Existing Culverts



King's Handbook, 3-2

$C_c \approx 0.62$
$C_v \approx 0.98$
$C_d \approx 0.61$

$$Q = C_c A_o C_v \sqrt{2g(\Delta H)}$$

for 12" culvert, H = 2':

$$Q = 0.62\,(0.79\,ft^2)(0.98)\sqrt{2(32.2\,ft/s^2)(2ft)} = 5.45\ cfs$$

for 24" culvert, H = 3', min

$$Q = 0.62\,(3.14)(0.98)\sqrt{2(32.2)(3)} = 26.5\ cfs$$

for 18" culvert, H = 2½' min.

$$Q = 0.62\,(1.77)(0.98)\sqrt{2(32.2)(2.5)} = 13.6\ cfs$$

$Q_p = (4.8\times10^{-5})(A)$

Culvert	Diameter	Capacity, cfs	Potential Flow, cfs	Overflow, cfs
1	12" CMP	5.45		
2	12" conc-CMP	5.45	7.27	1.82
3	CB			
4	12" CMP	5.45	2.48 + overflow from #2	ϕ
5	12" CMP	5.45	3.98 + overflow from #2	0.35
6	24" conc.	26.5	8.32	ϕ
7	12" conc.	5.45	12.30	6.85
8	24" CMP	26.5	5.86 + overflow from #7	ϕ
9	24" CMP	26.5	7.77	ϕ
10	12" conc.	5.45	3.81	ϕ
11	6" deep × 12" wide trough		10.7	—
12	12" conc.	5.45	15.04	9.59
13	outlet?, board cover	5.45?	1.0 + overflow from #12	5.14
14	18" CMP	13.6	7.54	
15	catch basin	5.45?	3.29	ϕ
16	18" CMP	13.6	6.22	ϕ
17	4½ ft			

Capacity of Proposed Culverts

Line A: Replaces #11, Potential Flow = 10.7 cfs

Capacity of 18" Line = 13.6 cfs

Line B: Potential Flow: $(4.8 \times 10^{-5})(A) = (4.8 \times 10^{-5})(155 \times 10^{3}) = 7.34$ cfs

Capacity of 18" Line = 13.6 cfs

Line C: Flow from #10: 3.81 cfs

Flow from #12: reduced by Line B to 1.44 cfs

Flow from #13: 1.0 cfs

Total = 6.25 cfs

Line D: Potential Flow = 7.54 cfs

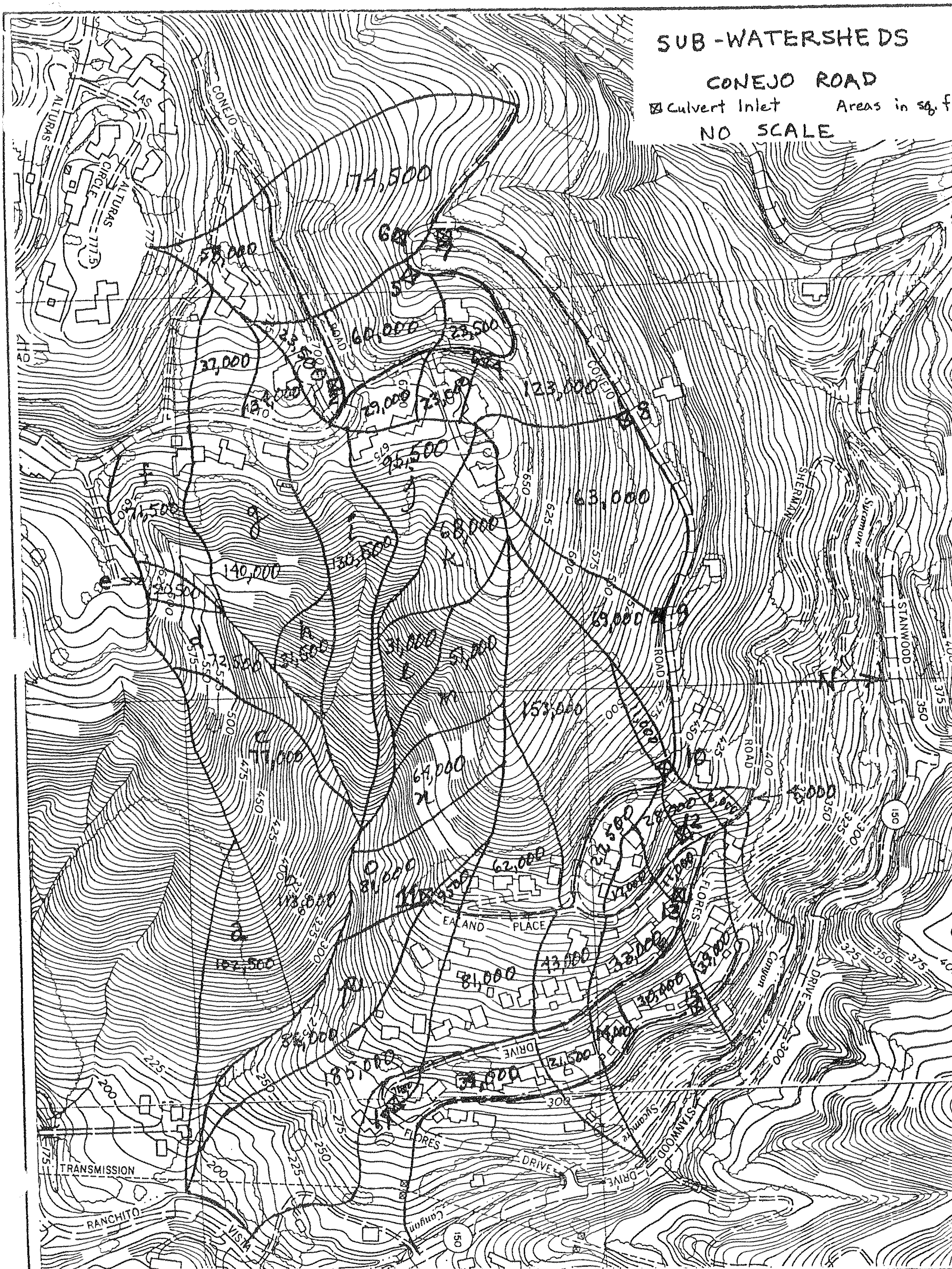
All Lines: $6.25 \leq Q_{pot.} \leq 10.7$ cfs

12" Culvert Capacity = 5.45 cfs, too small

18" Culvert Capacity = 13.6 cfs, O.K.

15" Culvert Capacity = 9.5 cfs, too small for Line A

∴ Use 18" culverts.


SUB-WATERSHEDS
CONEJO ROAD
☒ Culvert Inlet
Areas in sq. ft.
NO SCALE
74,500
57,000
60,000
23,500
37,000
123,000
163,000
140,000
130,500
68,000
153,000
64,000
62,000
81,000
118,000
102,500
85,000
TRANSMISSION
RANCHITO
VISTA
FLORES
DRIVE
EALAND PLACE
CONEJO ROAD
SHERMAN
STANWOOD
ALTURAS
CIRCLE
LAS

LEIGHTON and ASSOCIATES
INCORPORATED
SOIL ENGINEERING GEOLOGY GEOPHYSICS GROUND WATER HAZARDOUS WASTES

January 4, 1985

Project No. 3840788-01

TO: City of Santa Barbara
630 Garden Street
Santa Barbara, California 93102

ATTENTION: Mr. D. H. Johnson, Director
Public Works

SUBJECT: Final Phase I Report of Engineering Design Services for Improvements to Surface and Subsurface Drainage in the Vicinity of the Conejo Road Landslide, City of Santa Barbara, California

Introduction

This Final Phase I Report summarizes our findings from:

* Reviewing the proposed project with City staff
* Investigation of watershed area tributary to the landslide
* Evaluation of all available surface and subsurface data.

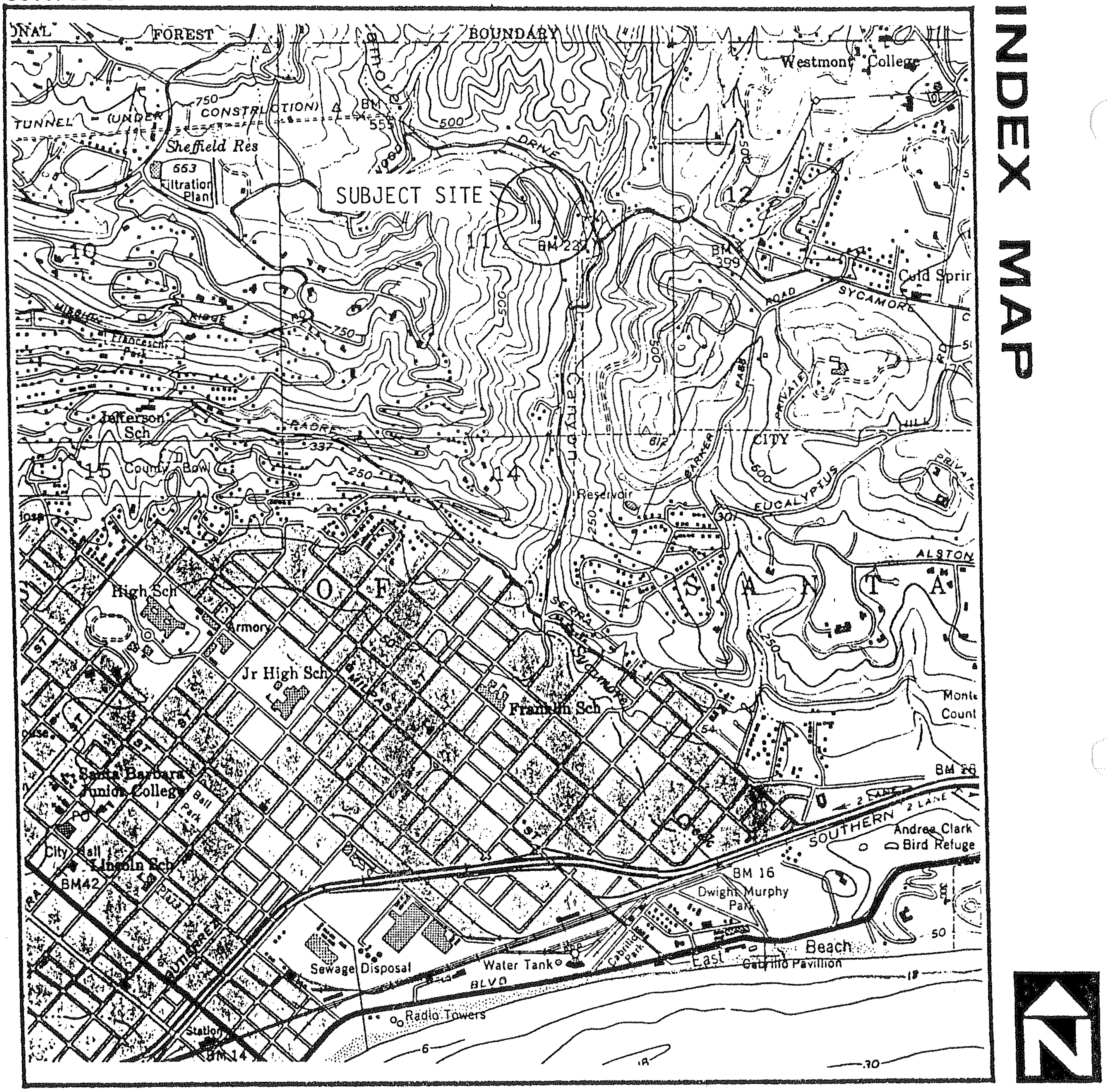
This report contains our findings, preliminary cost estimates for improvements and conclusions and specific recommendations. This report fulfills the Phase I portion (Para 1.a) of the Agreement dated September 17, 1984.

Accompanying Map, Plates and Appendices

Page 2 - Index Map
Plate 1 - Conejo Landslide and Watershed
Plate 2 - Existing and Proposed Drainage Structures
Plate 3 - Preliminary Hydrauger Locations
Plate 4 - Monitor Location Map
Appendix A - Typical Standard Procedure for Storm Patrol
Appendix B - Emergency Storm and Landslide Preparation
Appendix C - References

790 HAMPSHIRE ROAD, SUITE H, WESTLAKE VILLAGE, CALIFORNIA 91361 (800) 253-4567 • (818) 889-7745 • (805) 495-6721
IRVINE • WESTLAKE/VENTURA • DIAMOND BAR/WALNUT • SAN BERNARDINO/RIVERSIDE • SAN DIEGO
PALM DESERT • SANTA CLARITA/VALENCIA

INDEX MAP



0 2000 4000

scale feet

CONEJO ROAD LANDSLIDE

CITY OF SANTA BARBARA

CALIFORNIA

Base Map:
U.S.G.S. Santa Barbara Quadrangle
1942-52 (Photorevised 1967)

LEIGHTON and ASSOCIATES
INCORPORATED

Project Review

A meeting was held on September 17, 1984, to coordinate the project. Representatives from the City of Santa Barbara and Leighton and ASsociates discussed the scope of work. At that time the City emphasized their desire to proceed as rapidly as possible with the evaluation and design of the horizontal drainage system.

The City supplied Leighton and Associates with the following:

1. Topographic map of a portion of the landslide area (1"=20');
2. Topographic map of area surrounding the active landslide area (1"-200');
3. Assessors map of drainage area (1'=100');
4. Plan and profile for Conejo Road/Sycamore Terrace sewer project;
5. Rainfall records from three nearby stations;
6. Standard specifications and drawings of the City of Santa Barbara.

In addition to these Leighton and Associates acquired various maps and drawings from County agencies. These included:

1. Sycamore Fire Flood Emergency Map - Santa Barbara County Flood Control and Water Conservation District
2. Sycamore Fire Hydrologic Inventory - Santa Barbara County Flood Control and Water Conservation District
3. Aerial Photos
4. Standard Hydrology Design Curves - Santa Barbara County Flood Control and Water Conservation District

A major part of this review data was the Geotechnical Investigation-Conejo Road Landslide, Santa Barbara, California, dated April 1984 prepared by Geotechnical Consultants.

A search was also made for additional well data - none was found. Additional past and present aerial photos were ordered through Pacific Western Aerial Surveys.

At this initial meeting, the City requested that the hydraulogic study of the watershed should be on the basis of 25-year rainfall frequency.

Site Description

The subject area is located on the south flank of the Santa Ynez Mountain Range in the City of Santa Barbara. The site is west of Sycamore Canyon. Access to the site is from Stanwood Drive which parallels the canyon bottom or from Las Alturas Road from the crest of the ridge. Conejo Road winds through the site.

The area studied is a 74-acre watershed that is drained by tributaries of Sycamore Canyon. Ground surfaces slope primarily toward the north and east with a maximum topographic relief of 530 feet.

Single-family residences have been constructed on hillside lots throughout the area starting in the early 1930s. Gradual development has resulted in the present condition. Slope instability has been a continuing problem in the area with well-documented episodes of landsliding.

Landsliding

The entire watershed was previously mapped by others as a complex of active and inactive landslides. Only the three active landslides mapped in the eastern third of the watershed are addressed in this report. These landslides are significant due to the high degree of development on them and their active nature. These slides are the active Conejo Landslide (parts A, B and C); an unnamed active slide at the northeasternmost end of the watershed; and an incipient slide between them (see Plate 1). The Conejo slide has received the most attention due to its active nature and the road and residential distress resulting from its movement.

During our recent field mapping, cracking and distress were observed outside and farther upslope from the area previously mapped as Conejo Landslide C. This cracking was observed in the driveways at 10 and 16 Ealand Place. The cracks are above the head scarp of Landslide C. These cracks trend north/northwest and appear to connect with the active slide mass to the north. Distress of walls, stairways and cracking of buildings was observed in the area previously considered inactive. Our preliminary field mapping suggests that this entire area is moving as an active slide mass with the central block probably moving at a slower rate.

Slide debris at the toe of Conejo Road Landslide A is being removed by the resident to save the residence that is in imminent danger. This debris is being stockpiled south of the residence on Landslide B. This surcharging of Landslide B may result in increased movement of that mass.

Watershed Investigation

A hydrologic study was made of the watershed tributary to the landslide. This study included an inventory of the public drains and culverts of the watershed, a determination of the capacity of each, and an estimate of the discharge of each tributary. A summary of the culverts and their adequacy is shown in Table 1. Locations are shown on Plate 2.

This preliminary hydrology study showed that four of the culverts are under design capacity. However, all the culverts are constructed to simply carry water from one side of the road to the other where they drain over the natural slopes.

In addition to these culverts that drain local areas, there are the drainage questions at the end of Ealand Place, the switchback of Conejo Road above Landslide A and the larger, natural canyon south of the landsliding.

Ealand Place drains southerly to the end of the cul-de-sac. Here a small metal grate picks up the flows and drains them into a temporary culvert to the natural canyon to the south. This grate is not adequate for the predicted flows and must be supplemented with a catch basin on each side of the street. These should drain into the canyon below via a new culvert.

TABLE 1

CONEJO ROAD LANDSLIDE CULVERT ADEQUACY

Culvert Number	Location	Drainage Area, Ac	Runoff (25 yr Q)	Culvert Capacity	Comments
1	Conejo Rd 150' N of Altunas Rd	---	---	---	Outside of land-slide watershed
2.	Conejo Rd at Camino Alto	3.5Ac	7.3cfs	5.5cfs	Under capacity
3.	Altunas Rd 150' W of Conejo Rd	---	---	---	Outside of land-slide watershed
4.	Conejo Rd 350' N of Camino Alto	1.2	2.5	5.5	ok
5.	Conejo Rd 200' SE of Orizaba Lane	1.9	4.0	5.5	ok
6.	Conejo Rd 100' S of Orizaba Lane	4.0	8.3	26.5	ok
7.	Conejo Rd at Orizaba Lane	5.9	12.3	5.5	Under capacity
8.	Conejo Rd 700' NE of Orizaba Lane	2.8	5.9	26.5	ok
C 9.	Conejo Rd 800' W of Ealand Pl	3.7	7.8	26.5	ok
A 10.	Conejo Rd 400' W of Ealand Pl	1.8	3.8	5.5	ok
11.	End of Ealand Pl	5.1	10.7	?	Under capacity
B 12.	Conejo Rd at Sherman Rd	7.2	15.0	5.5	Under capacity
D 13.	Conejo Rd 150' SE of Sherman Rd	0.5	1.0	5.5	ok
14.	Conejo Rd Switchback	3.6	7.5	19.3	ok
15.	200' from end of Conejo Ln	1.7	3.3	5.5	ok
16.	Conejo Rd at Sycamore Canyon				
17.	Conejo Rd at Sycamore Canyon				
18.	Stanwood Dr 450' S of Conejo Rd	Outside of area that could drain into slide			
19.	Stanwood Dr 700' S of Conejo Rd				

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The Conejo Road switchback is now drained by an above-ground culvert that carries flows over the head scarp of Landslide A. This culvert may be adequate but consideration should be given to collecting flows from Conejo Road and directing them via culvert either to the canyon to the south or to Sycamore Canyon to the east.

The canyon south of the landslides is natural in its upper area which reaches to Camino Alto. A small trapezoidal concrete rubble channel has been constructed in the lower reach. This channel, which appears to have been placed by hand, is several feet wide and up to 1-1/2 feet deep. It is made of broken concrete slabs laid uniformly together. These concrete pieces do not appear to be mortered together. The capacity of this drain is not adequate for the expected 25-year discharge from the watershed. The discharge is expected to vary from 40 cfs just below Ealand Place to 55 cfs at Sycamore Canyon.

Existing culverts should be drained via controlled methods across the natural ground to Sycamore Canyon.

Parcel Survey

A drainage deficiency inspection was made of each of the parcels in the landslide area from Ealand Place down to Sycamore Canyon. This included all the parcels on Conejo Road from Sycamore Canyon to Ealand Place, all the parcels on Conejo Lane and all the parcels on Ealand Place.

The parcel inspection included looking for roof gutters and where they drained, yard drains and where they drained, areas of potential ponding, the presence of trash and floatable debris that might plug culverts and other deficiencies such as erosion, pavement cracking, etc.

TABLE 2

CONEJO ROAD LANDSLIDE PARCEL INSPECTION

Address	Roof Gutters Yes	Roof Gutters No	Where Drained	Ponding Yes	Ponding No	Debris & Floatsum Yes	Debris & Floatsum No	Other
Ealand Pl.								
27	x		slope		x	x		foundation erosion yard drains to slop
29		x			x	x		yard drains to slop
21	x		slope		x		x	
17	x		slope (?)		x	x		
11	x		slope (?)		x		x	badly broken drive
22	x		street		x		x	
16	x		street		x		x	
10	x		street		x		x	
Conejo Road								
352	x		slope		x		x	
351	x		street		x		x	
357	x		slope		x		x	
403	x		street		x		x	
428	x		street					ivy blocking inlet
430		x			x		x	
438	x		street		x		x	
444		x			x		x	
450		x			x		x	badly broken drive
456	x		street		x		x	
462	x		street		x		x	
468	x		street		x		x	
474	x		street		x		x	
480	x		street		x		x	
486	x		slope	x			x	
494	x		slope	x		x		
508	x		slope		x		x	
481	x		slope		x		x	
525		x			x	x		
533	x		street		x		x	
535	x		street		x		x	
529	x		street		x		x	
523	x		street	x		x		
515		x		x		x		house burned
507		x			x	x		
501	x		street	x		x		
447		x			x		x	
441	x		street	x		x		
435	x		street	x		x		
427		x			x		x	
425		x			x	x		
419		x			x	x		
Conejo Lane								
430	x		slope		x	x		

Ground Water

A search of city, county and private records was performed to locate any ground water data that might be available for the subject area. No water well records or other ground water data were found.

Active springs or flowing water (other than Sycamore Canyon) was not observed in any of the subject watershed tributaries during our field mapping. Phreatophytic (water-seeking)plants are abundant in the area along the northern bank of the main canyon south of the Conejo Road landslide. This suggests some source of moisture in that area.

A review of boring logs excavated by others during the recent landslide investigation and during other investigations in the area indicated perched zones of water yielding small to moderate volumes of seepage. Most of these zones appear to be related to slide plane boundaries. No significant amounts of water were reported in the underlying undisturbed bedrock material. A summary of the volume of water encountered is shown in Table 3.

A horizontal drain system (hydrauger) has been proposed for dewatering the Conejo Road Landslide, Parts A, B and C. Additional areas for subsurface drainage include Landslides D and E. A typical system is shown on Plate 3. Further analysis of this system has revealed several factors that influence the feasibility of such a system. These factors are the low yield of water that was encountered in borings; discontinuous or perched-appearing nature of these seeps; lack of historic high water yields from the underlying bedrock; and the fact that horizontal drains installed in landslides stand the risk of being sheared, rendering them useless.

Each area of seepage was generally associated with a slide plane or broken and fractured zones. Free water was reported in only one boring where water rose when the boring was left open overnight.

This data suggests that the primary source of water contained within the slide mass is from infiltration of surface waters through fractures rather than a rising water table from below or off-site.

Construction Cost Estimates

Preliminary construction costs were made for those items included in the Recommendations, below. These estimates are based upon conceptual plans and are subject to change when construction plans and specifications are completed. Costs were estimated on the basis of manpower, materials and machinery that would be required to construct the various structures.

Hydrauger installation costs include typical move in and move out charges for the special drilling equipment.

TABLE 3

CONEJO ROAD LANDSLIDE GROUND WATER SUMMARY

Date	Boring No.	Location	Ground Water Description	Depth	Volume	Total Boring Depth
2/6/84	DH 1	Conejo Ln & Conejo Rd	Seepage	10-15'	---	64'
2/6/84	DH 2	486 Conejo Rd	Seepage	11', 19', 48'	"minor"	90'
2/7/84	DH 3	486 Conejo Rd	See Page 7	Free Water at 26' on 2/8/84		95'
2/9/84	DH 4	530 Conejo Rd	Seepage	19' to 23'	1 gpm	65'
2/10/84	DH 5	508 Conejo Rd	Seepage	22'	"minor"	110'
2/13/84	DH 6	21 Ealand Pl	Seepage	43'	0.5 gpm	85'
2/14/84	DH 7	508 Conejo Rd	Seepage Seepage	8' 22'	"minor" 1-2 gpm	55'
2/21/84	DH 8	474 Conejo Rd	Seepage	36'	"minor	51'
2/22/84	DH 9	Conejo Rd & Ealand Pl	Seepage	45' to 50'	"minor"	110
1/15/82	B-1	494 Conejo Rd	Seepage	21', 27', 29', 34', & 38'	"slight"	40'
1/15/82	B-2	494 Conejo Rd	Seepage	11', 13' & 17'	---	17'
5/12/82		161 Conejo Rd	Seepage	Surface	---	---
2/27/79	B-1	481 Conejo Rd	"Ground Water"	22'	---	24'
"	B-2	580 Conejo Rd	Seepage	23'	1 gpm	24'
3/10/83	B-1	500 Conejo Rd	Seepage	14'	---	37'
"	B-5	" " "	Seepage	14'	---	26'(?)
"	B-3	" " "	No Free Water	---	---	11'
"	B-4	" " "	" " "	---	---	11'
10/25/83	B-1	" " "	Seepage	40' to 47'	"dripping wet"	59'
"	B-2	" " "	"	38' to 52'	" "	62'
"	B-3	" " "	"	30' to 38'	" "	50'
"	B-4	" " "	"	34' to 42'	"pouring in"	60'
"	B-5	" " "	---	---	---	75'
"	B-6	" " "	Seepage	24'	"water entry"	49'
"	B-7	" " "	"	26' to 42'	"in fractures"	52'

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CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. The subsurface geotechnical data accumulated over the years from the slide area along with the absence of water wells in the area confirms the fact that the subsurface materials have limited water-bearing capabilities. Borings have revealed seepage at levels usually associated with joints, fractures and slide planes. The bedrock beneath is non-water bearing.

2. The perched, discontinuous, low-yielding zones of water within the landslide mass may be difficult to intercept with the horizontal drain system. Shearing of these drains at various slide plane boundaries would further reduce the effectiveness of the drains. Implementation of a hydrauger system would best be done on a priority basis with the area of highest expectation drilled first. The productivity of that could then be evaluated before additional areas are drilled.

3. Site A appears to be the best site to begin subsurface dewatering (see Plate 3). The phreatophytics in this canyon are the only visable indication of surface seepage at this time, and the hydraugers can be located near the back of the slide plane, possibly intercepting seepage in this area before it enters the main slide mass. Site B would be the second priority set-up site because hydraugers could penetrate to the rear of the active Slide Mass A and portions of Slide Mass B. The cost of installing all hydraugers is expected to be from One Hundred Forty Thousand Dollars to One Hundred Sixty-Five Thousand Dollars ($140,000-$165,000).

4. Most existing drains within the watershed where the landsliding is taking place are adequate for the expected 25-year frequency rainfall. However these drains are basically culverts that intercept and direct flow from one side of the road to the other. In some cases the inlets and the outlets are restricted or buried by vegetation, trash and debris leaving the systems inoperative. Most drains can be extended to carry the flows above and away from the slide mass. Such extensions will extend across private property where easement will probably have to be acquired. Surface drainage improvements are expected to cost between Eighty Thousand and One Hundred Thousand Dollars ($80,000-$100,000).

5. The active landslides to the north and south appear to be connected by landsliding between the two. The installation and reading of vertical and horizontal survey monuments and inclinometers would aid in varifying if this is indeed true. These monitoring systems are estimated to cost from Five Thousand to Seven Thousand Dollars ($5,000-$7,000).

6. Local residents can assist in controlling surface drainage by draining roof, patio and driveway runoff into approved drains. They can reduce the infiltration of water into the slide by eliminating areas of ponding and by sealing tension cracks that continue to open as the slide moves. Residents can reduce plugging of drains by removing or tying down material and trash that could float to and plug drainage outlets.

Recommendations

1. A moritorium on new construction should be imposed within the landslide area and the contributing watershed until it can be conclusively shown that no further landsliding will occur and that new construction will not increase surface or subsurface flow that could affect the stability of the area.

2. Subsurface dewatering should be done on a phased basis. Hydraugers should be installed in alphabetical order as shown on Plate 3. Sites A and B should be designed immediately and Sites C through I should await determination of the effectiveness of A and B.

3. Ground water levels should be monitored to provide increased information as to the effect of the ground water on the movement of the slide masses and to monitor the effectiveness of the hydrauger system. This monitoring should be accomplished by drilling boreholes at selected locations and installing piezometers. Approximate borehole locations are shown on the Monitor Location Map, Plate 4.

4. Horizontal movement of the subject slide masses should be monitored by installing inclinometers in the same boreholes with the piezometers.

5. Horizontal and vertical movement of the subject slide masses should be monitored by creating a network of second-order survey monuments within the watershed. Approximate location of 10 suggested survey monuments is shown on the Monitor Location Map, Plate 4.

6. Surface drainage should be improved by increasing the capacity of inadequate drains and by extending the outlets of these drains away from the landslide. The following drainage improvements are listed in their order of priority:

   a. Construct an inlet on each side of the south end of Ealand. Place and construct a conduit down the slope to the canyon bottom.

   b. Construct an inlet on each side of Conejo Road at Ealand Place, construct a conduit down-slope to Sycamore Canyon and construct an inlet on the west side of pavement at 430 Conejo Road.

   c. Construct a conduit from Inlet 10 down to Sycamore Canyon, construct an inlet adjacent to No. 12 and construct laterals from Inlets 12 and 13 to that conduit.

   d. Construct an inlet at 468 Conejo Road, construct a conduit down to the lower end of Conejo Road and construct an inlet where conduit crosses Conejo Lane.

   e. Construct a lined, open channel in the canyon south of the development.

   See Plate 2 For schematic of proposed drainage improvements.

7. A storm monitoring team should be organized to provide 24-hour patrol of the area during moderate to severe storms. They should be prepared to redirect surface flows away from the slide masses, keep existing drains in operating condition and warn residents of impending danger if additional movement occurs. A typical standard procedure is found in Appendix A.

8. Local residents within the landslide area should be instructed how to help control and maintain proper drainage from their property. A sample instruction is included in Appendix B.

Thank you for this opportunity to serve you. If you have questions regarding this Phase I report, please contact this office at 805-495-6721.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

Frank Kenton

Frank Kenton
Project Geologist

Frederick C. E. Gebhardt

Frederick C. E. Gebhardt
RCE 13874

FK/FG/pk

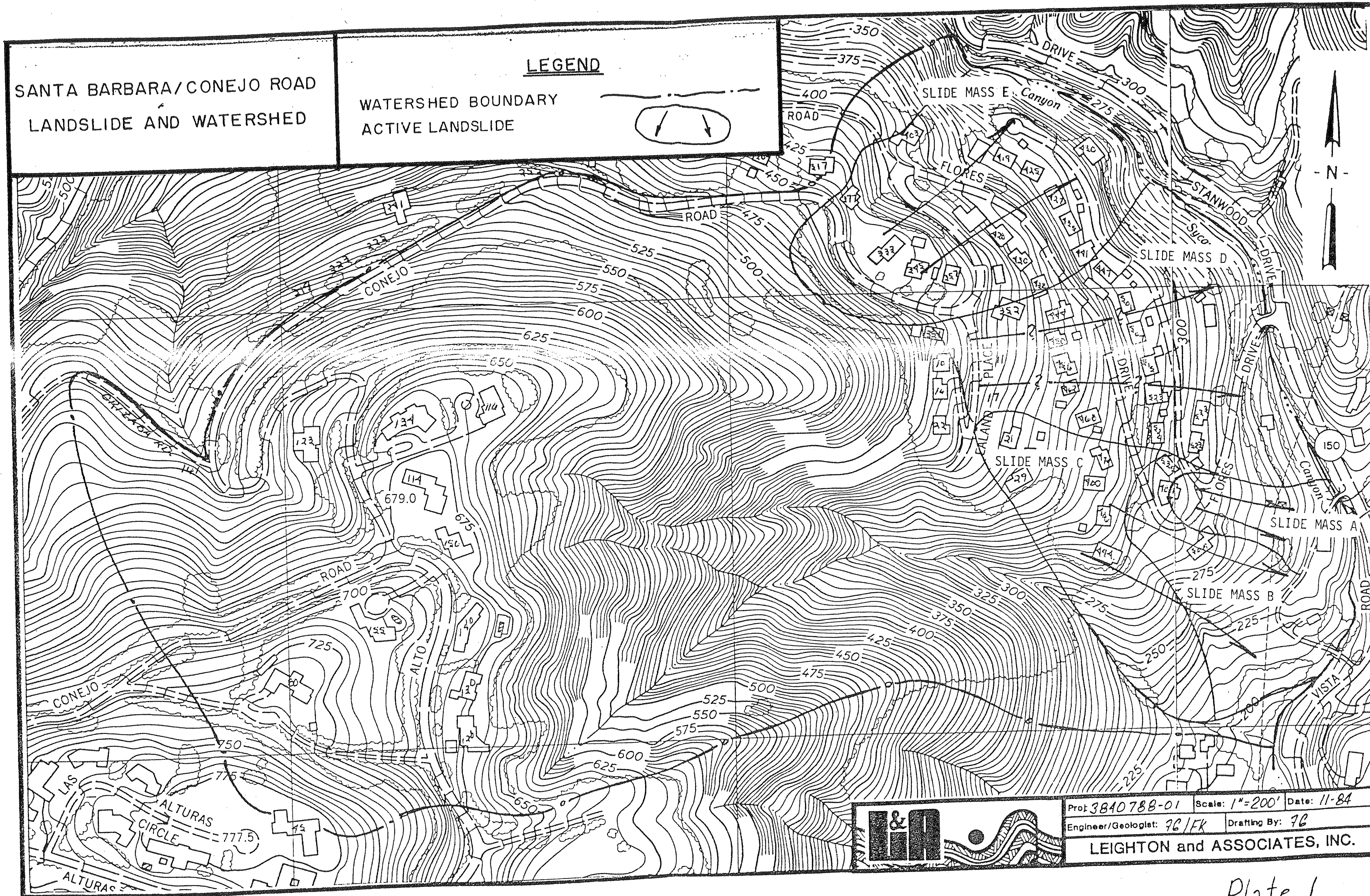
Distribution: (10) Addressee

SANTA BARBARA/CONEJO ROAD LANDSLIDE AND WATERSHED

LEGEND

WATERSHED BOUNDARY

ACTIVE LANDSLIDE



Proj: 3840788-01 | Scale: 1"=200' | Date: 11-84

Engineer/Geologist: 7G/FK | Drafting By: 7G

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Plate 1

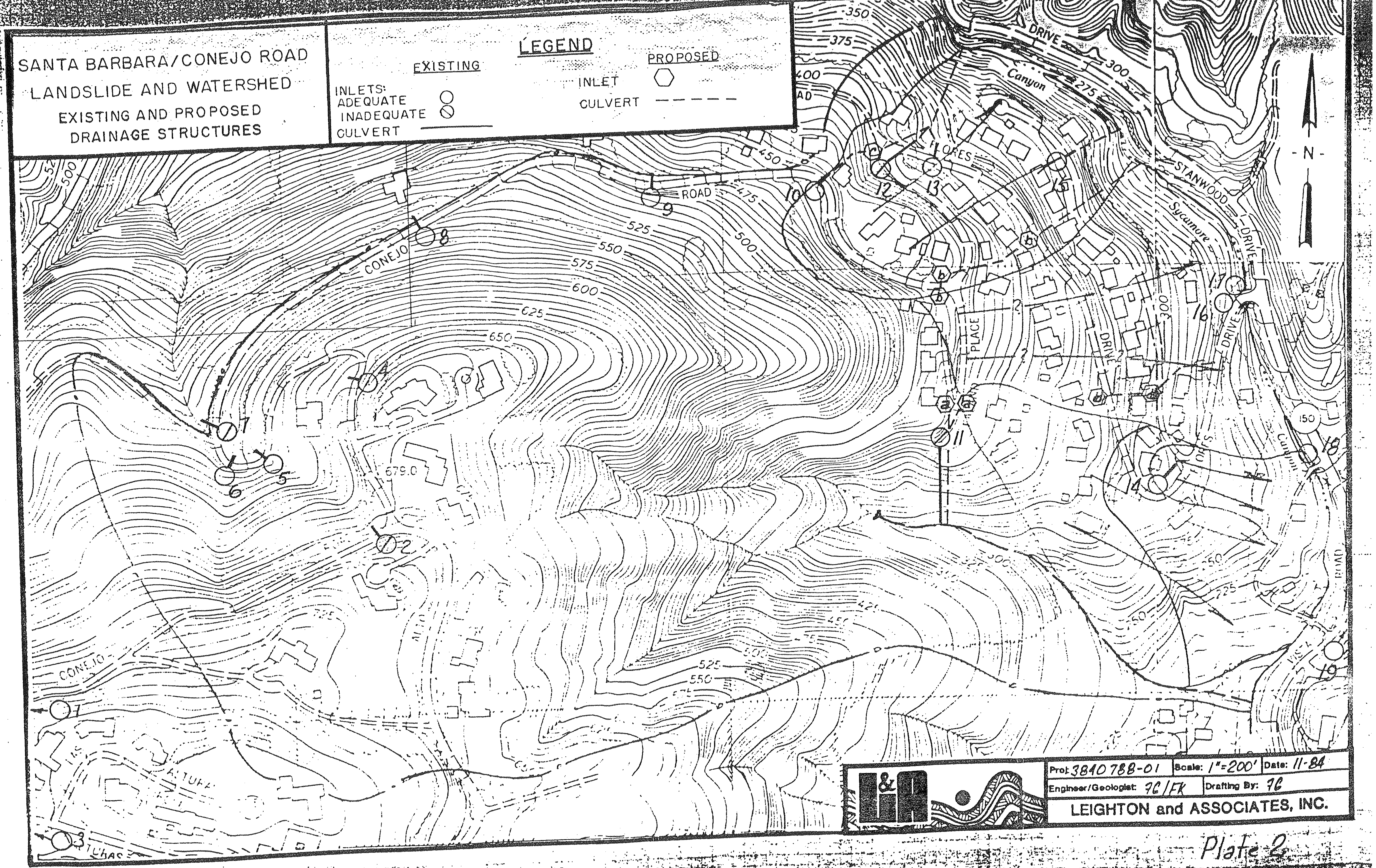

SANTA BARBARA/CONEJO ROAD
LANDSLIDE AND WATERSHED
EXISTING AND PROPOSED
DRAINAGE STRUCTURES
LEGEND
EXISTING
INLETS:
ADEQUATE
INADEQUATE
CULVERT
PROPOSED
INLET
CULVERT
CONEJO
ROAD
FLORES
STANWOOD
Sycamore
DRIVE
Canyon
PLACE
-N-
Proj: 3840788-01
Scale: 1"=200'
Date: 11-84
Engineer/Geologist: TC/FK
Drafting By: TC
LEIGHTON and ASSOCIATES, INC.

Plate 2

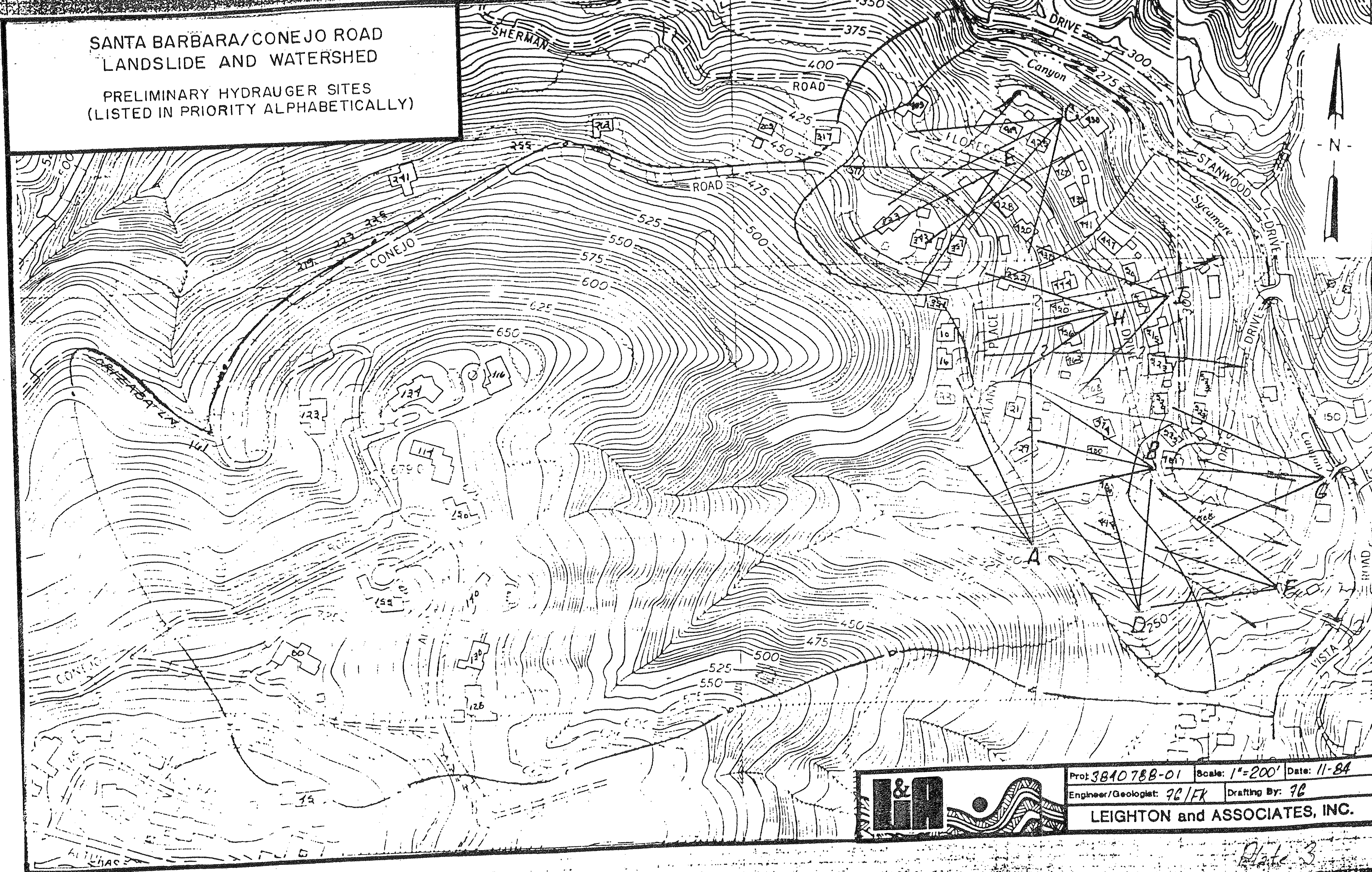
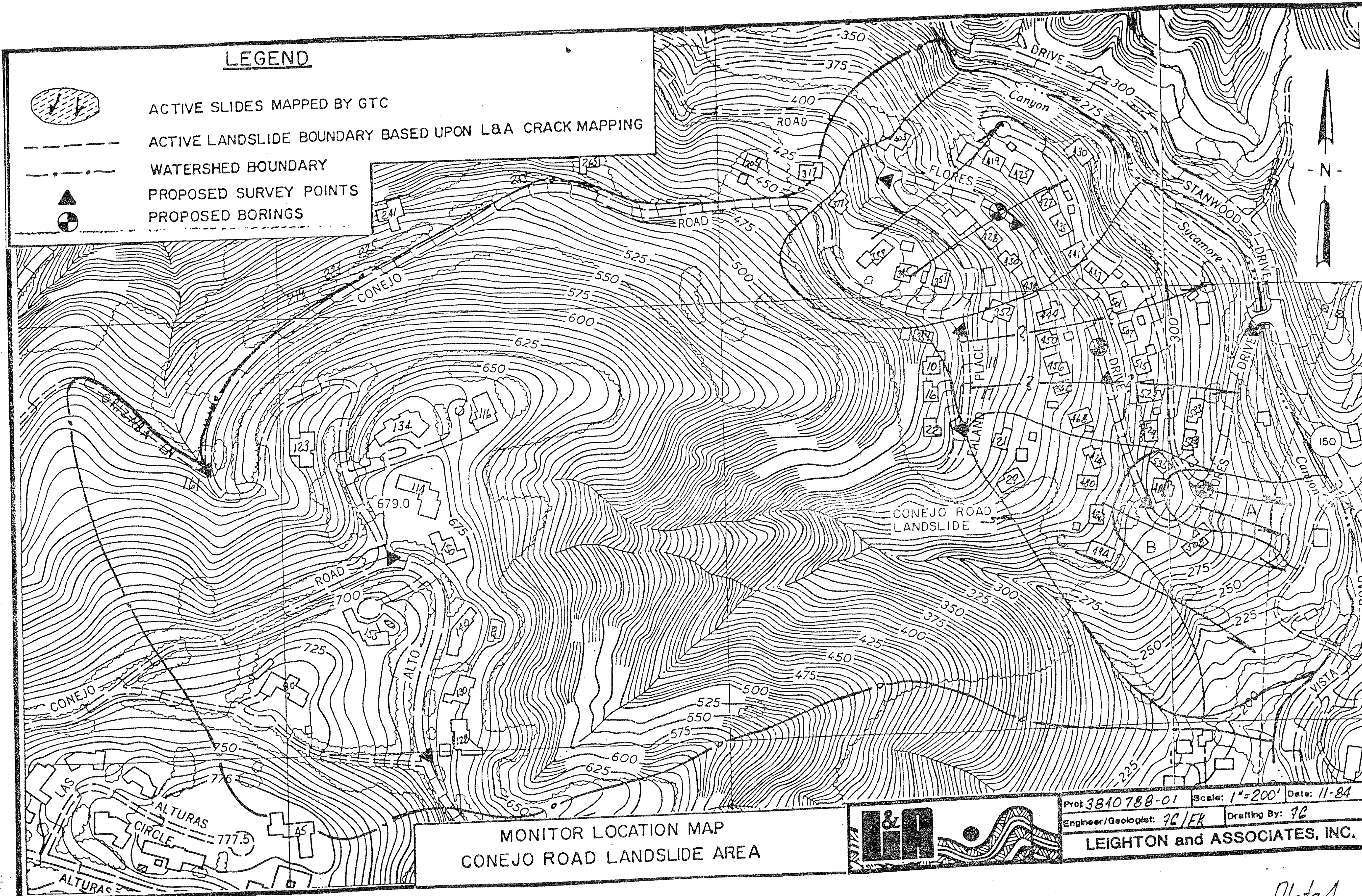

SANTA BARBARA/CONEJO ROAD
LANDSLIDE AND WATERSHED
PRELIMINARY HYDRAUGER SITES
(LISTED IN PRIORITY ALPHABETICALLY)
SHERMAN
ROAD
CONEJO
ROAD
STANWOOD
DRIVE
Canyon
Sycamore
FLORES
PLACE
DRIVE
VISTA
ROAD
ORIZABA LA
N
Proj: 3840788-01
Scale: 1"=200'
Date: 11-84
Engineer/Geologist: 7G/FK
Drafting By: 7G
LEIGHTON and ASSOCIATES, INC.

Plate 3



MONITOR LOCATION MAP
CONEJO ROAD LANDSLIDE AREA

Proj: 3810788-01	Scale: 1"=200'	Date: 11-84
Engineer/Geologist: 7G/FK	Drafting By: 7G	

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Plate 4

TYPICAL STANDARD PROCEDURE FOR STORM PATROL

Introduction

This procedure is for the periodic review and evaluation of "hot spots" and critical facilities during storms. Crew of two.

Equipment Needed

Vehicle with Radio Communication

Tools Needed

Amount	Type
2	Potato hooks
2	Pike poles, 8-foot
2	Fork, 5 tine, long handle
1	Axe, double blade
2	Flashlight, 5-cell
1	Manhole lifter
1	Bolt Cutter #0
2	Pliers, button
1	Digging Bar, 60-inch
1	Shovel, square, long handle
1	Shovel, round, long handle

Materials Needed

Amount	Type
12	Burlap bags
20	Batteries, D-cell
50 ft.	Rope, 1/2-inch, Manila
10 ft.	Chain, 1/4-inch
1	Life ring with 50 feet 3/8-inch nylon rope
6	Standard traffic cones
1 lb.	Rags
1	Clipboard
1	Storm record book
10 lbs.	Tie wire, 12 gage
5 lbs.	Tie wire, 14 gate

General Storm Procedure

1. Do not perform work when conditions are unsafe. Report condition immediately to supervisor.
2. Visit all facilities at the specified frequency and fill out Storm Reporting Form.
3. Perform minor work taking less than 10 minutes such as removing small amounts of debris to unplug an inlet or placing up to six sandbags to prevent further erosion.
4. Do not perform work on private property unless approval is given by supervisor.
5. Call supervisor when emergencies or field conditions requiring more than minor work are discovered.
6. Routinely communicate at least once every two hours with your immediate supervisor on field conditions at locations reviewed.
7. Turn over the Storm Record Book to the next patrol crew at the end of your work period.

Channels, Storm Drains and Inlets

1. Inspect each location for existing and potential problems such as plugging and erosion.
2. Inspect drain inlets for blockage.
3. Check area for signs of saturated fill.
4. Check pipe and wire revetments for damage or failures.
5. Check stabilizers for damage or failures.
6. Check outlets for debris obstruction.
7. Check berms and slopes for erosion and sloughing.
8. Check bridges for debris deposits and obstruction.
9. Check channel invert for major erosion or soil deposits.

CITY OF SANTA BARBARA

OFFICE OF THE CITY CLERK

CITY HALL
DE LA GUERRA PLAZA
P.O. DRAWER P-P
SANTA BARBARA, CA 93102
TELEPHONE (805) 963-0611 EXT. 276

EMERGENCY STORM AND LANDSLIDE PREPARATIONS

Your residence is located in a watershed that includes active landslides. The stability of these landslides is affected by water that either percolates in from the surface or migrates underground through joints and cracks in the subsoils.

Proper surface drainage is important to assure rapid runoff and to avoid excessive infiltration. Below are several simple measures that each resident can follow to help keep the community safe during storms and additional landsliding if it should occur.

1. Eliminate all areas where water ponds by regrading the area to provide rapid runoff.

2. Seal all tension cracks in paving, patios and soil to prohibit water from running into the ground. Paving and patios should be sealed with flexible sealant. Soil cracks should be sealed by digging a 1-foot wide, 6-inch deep trench along the crack and firmly tamping the soil back in place to form a seal. If the cracks reopen, reseal them.

3. Direct all drainage to the streets. Roof and yard drains should not outlet onto the slopes but be carried out to the street via pipes or lines.

4. All loose materials such as boards, plywood, cardboard, leaves, tumbleweeds, trash, etc., should either be removed or firmly secured to avoid floating or being blown into the street and plugging culverts.

5. All loose slopes should be compacted and planted to reduce erosion. Deposits from erosion will divert flows and can also plug or reduce the capacity of drains.

6. Keep two dozen sandbags available for filling and placing in strategic locations for directing flows to the street when necessary.

7. Notify the City immediately of any plugged drains or street runoff going over the slopes.

8. Keep proper tools available to turn off water and gas should either or both break. This can enable quick action to avoid fire and to avoid water running into the soil. Turn gas and water off at the meter when leaving for a weekend or vacation.

9. Report leaky water lines immediately so that extra water does not enter the soil.

10. Cooperate with neighbors and help each other prepare for an emergency. List the key telephone numbers in a handy place so that communication can be done quickly.

REFERENCES

1. Buena Engineers, Inc., October 4, 1979, Slope Treatment, Walsh Residence, Corner of Stanwood Drive and Conejo Road, Santa Barbara, California.

2. ————————, March 30, 1983, Soil Engineering Report Proposed Residence at 500 Conejo Road, Santa Barbara, California.

3. ————————, June 29, 1983, Laneslide, 1825 Stanwood, Santa Barbara, California.

4. ————————, November 15, 1983, Caisson Depths, 500 Conejo Road, Santa Barbara, California.

5. Geotechnical Consultants, Inc., April, 1984, Geotechnical Investigation, Conejo Road Landslide, Santa Barbara, California.

6. Michael F. Hoover, June 22, 1979, Geologic Investigation, Conejo Road Landslide.

7. ————————, October 27, 1978, Geologic Hazards Evaluation of City of Santa Barbara, California.

8. Leighton and Associates, October 15, 1984, Preliminary Findings in Phase I of Engineering Design Services for Improvements of Surface and Subsurface Drainage in the Vicinity of the Conejo Road Landslide.

9. Los Angeles County Flood Control District, October 1976, Design Report, Southern California Emergency Response Element, Report 1.

10. Henry H. Neel, Geologist, May 12, 1981, Letter regarding 161 Conejo Road, Santa Barbara, California.

11. Pacific Materials Laboratory, Inc., December 20, 1974, Foundation Exploration, Proposed Single Family Residence, 2200 Stanwood Drive, Santa Barbara, California.

12. Southern California Edison, April 10, 1978, Landslide-Caused Tower Failures, San Marcos-Santa Barbara, Goleta-Santa Barbara, Goleta-Santa Barbara, Carpinteria, Santa Clara-Ojai-Santa Barbara 66 kV T/L M24-T1.

13. ————————, October 28, 1983, Sycamore Canyon Landslide, Santa Barbara-Carpinteria-Goleta, 66 kV T/L.

14. ————————, September 18, 1978, Steel Pole Placement, Santa Barbara-Carpinteria-Goleta, 66 kV T/L, Sycamore Canyon.

15. Tierra Tech, February 23, 1982, Soils and Geologic Exploration-Proposed Single-Family Residence, 494 Conejo Road, Santa Barbara, California.

10/84

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INCORPORATED

SOIL ENGINEERING GEOLOGY GEOPHYSICS GROUND WATER HAZARDOUS WASTES

October 15, 1984

Project No. 3840783-01

TO: City of Santa Barbara
630 Garden Street
Santa Barbara, California 93102

ATTENTION: Mr. D. H. Johnson, Director
Public Works

SUBJECT: Preliminary Findings in Phase I of Engineering Design Services for Improvements to Surface and Subsurface Drainage in the Vicinity of the Conejo Road Landslide, City of Santa Barbara, California

Introduction

At your authorization, we have begun work for Engineering Design Services for Improvements to Surface and Subsurface Drainage in the Vicinity of the Conejo Road Landslide. The scope of work consisted of evaluating the existing surface drainage characteristics and providing specific recommendations for improvements in order that the highest percentage possible of runoff will be channeled away from the slide masses and making specific recommendations for improvements to surface drainage and placement of horizontal subsurface drains to facilitate de-watering of the unstable material. Our work to date consists of review of available records, field mapping and analysis of acquired data. This report presents our preliminary findings, conclusions and recommendations.

Accompanying Maps

Monitor Location Map (200-scale) - Appendix A

Site Description

The subject area is located on the south flank of the Santa Ynez Mountain Range in the City of Santa Barbara. The site is west of Sycamore Canyon. Access to the site is from Stanwood Drive which parallels the canyon bottom or from Las Alturas Road from the crest of the ridge. Conejo Road winds through the site.

The area studied is a 74-acre watershed that is drained by tributaries of Sycamore Canyon. Ground surfaces slope primarily toward the north and east with a maximum topographic relief of 530 feet.

Single-family residences have been constructed on hillside lots throughout the area starting in the early 1930s. Gradual development has resulted in the present condition. Slope instability has been a continuing problem in the area with well-documented episodes of landsliding.

Slope Stability

The entire watershed was previously mapped by others as a complex of active and inactive landslides. Only the three landslides mapped in the eastern third of the watershed are addressed in this report. These landslides are significant due to the high degree of development and their active nature. These slides are the active Conejo Landslide (parts A, B and C); an unnamed active slide at the northeasternmost end of the watershed; and an incipient slide between them. The Conejo slide has received the most attention due to its active nature and the road and residential destress resulting from it.

During our recent field mapping, cracking and distress were observed outside and farther upslope from the area previously mapped as Conejo Landslide C. This cracking was observed in the driveways at 10 and 16 Ealand Place. The cracks are above the head scarp of Landslide C. These cracks trend north/northwest and appear to connect with the active slide mass to the north. Distress of walls, stairways and cracking of buildings was observed in the area previously considered inactive. Our preliminary field mapping suggests that this entire area is moving as an active slide mass with the central block probably moving at a slower rate.

Slide debris at the toe of Conejo Road Landslide A is being removed by the resident to save the residence that is in imminent danger. This debris is being stockpiled south of the residence on Landslide B. This surcharging of Landslide B may result in increased movement of that mass.

Surface Drainage

Data gathered from field mapping and analysis of the existing topography indicate that the existing culvert system in the subject area will handle 25-year frequency flows with the exception of culverts in the far western and eastern portions of the subject area.

In the far western portion of the subject area, the culvert at the intersection of Camino Alto Road and Conejo Road and the culvert on the north side of the intersection of Orizaba Lane and Conejo Road are not adequate for 25-year frequency flows. These culverts may be supplemented or replaced with culverts of greater capacity or street improvements may be implemented to direct overflow via streets to downslope culverts able to carry the excess.

The culvert system in the eastern end of the subject area is inadequate for 25-year frequency flows. No outlets could be located for culverts located at the intersection of Sherman Road and Conejo Road, near 418 Conejo Road, and near 427 Conejo Lane. The areas downslope from these culverts where outlets might exist are covered with debris.

Surface runoff from the subject watershed is concentrated in the eastern end where the active landslides lie. Due to the inadequacy of the surface drainage system in this area, surface runoff periodically flows naturally into the landslide area. This flow may contribute to the active nature of the slides in this area.

Additional detailed (40-scale) topographic surveys will be required for further analysis of surface drainage in both the far western and eastern portions of the subject area.

Subsurface Drainage

A search of city, county and private records was performed to locate any ground water data that might be available for the subject area. No water well records or other ground water data were found.

Active springs or flowing water (other than in Sycamore Canyon) was not observed in any of the subject watershed tributaries during our field mapping. A review of boring logs excavated during the recent landslide investigation by others indicated perched zones of water yielding small volumes of water. Most of these zones appear to be related to slide plane boundaries. No significant amounts of water were reported in the underlying undisturbed bedrock material.

Phreatophytic (water-seeking) plants are abundant in the area along the northern bank of the main canyon south of the Conejo Road landslide. This suggests some source of moisture in that area.

A horizontal drain system (hydrauger) had been proposed for dewatering the Conejo Road Landslide parts A, B and C. Further analysis of this system has revealed several factors that influence the feasibility of such a system. These factors are the low yield of water that was encountered in borings; discontinuous or perched-appearing nature of these seeps; lack of historic high water yields from the underlying bedrock; and the fact that horizontal drains installed in landslides stand the risk of being sheared, rendering them useless.

Data presently suggests that the primary source of water contained within the slide mass is from infiltration of surface waters through fractures rather than a rising water table which could effectively be dewatered with a horizontal drain system.

Influence of Utilities

Utilities such as sewer and water lines extend throughout the slide mass area. Movement of the slide masses may have broken or crushed various utility lines, thereby potentially adding more water to the sliding area. Several areas already have surface utilities with flexible couplings. As the slide continues, these types of corrections may have to be expanded. Subsurface utilities should be monitored to detect leakage.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. Recent field mapping indicates that the active landslide mass extends upslope and to the north of previously mapped Landslide C. There is high concentration of surface runoff in this area.

2. Preliminary analysis of ground water data indicates that there are no continuous high yielding zones of ground water in the slide mass area. Water affecting the slide mass area, therefore, apparently comes primarily from infiltration of surface runoff.

3. The perched, discontinuous, low-yielding zones of water within the landslide mass may be difficult to intercept with the horizontal drain system. Shearing of these drains at various slide plane boundaries would further reduce the effectiveness of the drains. Implementation of this system is feasible; however, the results may not warrant the expense.

4. Surface runoff from the subject watershed is concentrated in the eastern end of the study area where the culvert system is inadequate for 25-year frequency flows. Most drains show adequate capacity, but culverts in the far western and eastern portions of the subject watershed are inadequate for 25-year frequency flows. Outlets of culverts in the eastern end of the site may be plugged by debris.

5. Slide debris excavated from the toe of Landslide A and placed on Landslide B is surcharging Landslide B. This may result in increased movement of the slide mass.

Recommendations

1. Drainage provisions should be designed and implemented to direct surface runoff away from the slide masses. Water should be carried in a controlled manner to appropriate outlets beyond the slides. These provisions should include curbs, culverts and drains at appropriate locations. Existing culverts should be cleared if plugged. This plan should be implemented as soon as possible before the rainy season begins.

2. Ground water levels should be monitored to provide increased information as to the ffect of the ground water on the movement of the slide masses. This monitoring should be accomplished by drilling boreholes at selected locations and installing piezometers. Approximate borehole locations are shown on the Monitor Location Map.

3. Horizontal movement of the subject slide masses should be monitored by installing inclinometers in the same boreholes with the piezometers.

4. Horizontal and vertical movement of the subject slide masses should be monitored by creating a network of first-order survey monuments within the watershed. Approximate location of ten suggested survey monuments is shown on the Monitor Location Map.

5. A storm monitoring team should be organized to provide 24-hour patrol of the area during moderate to severe storms. They should be prepared to redirect surface flows away from the slide masses, keep existing drains in operating condition and warn residents of impending danger if additional movement occurs.

If you should have any questions regarding this report, please feel free to call us at 805-495-6721.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

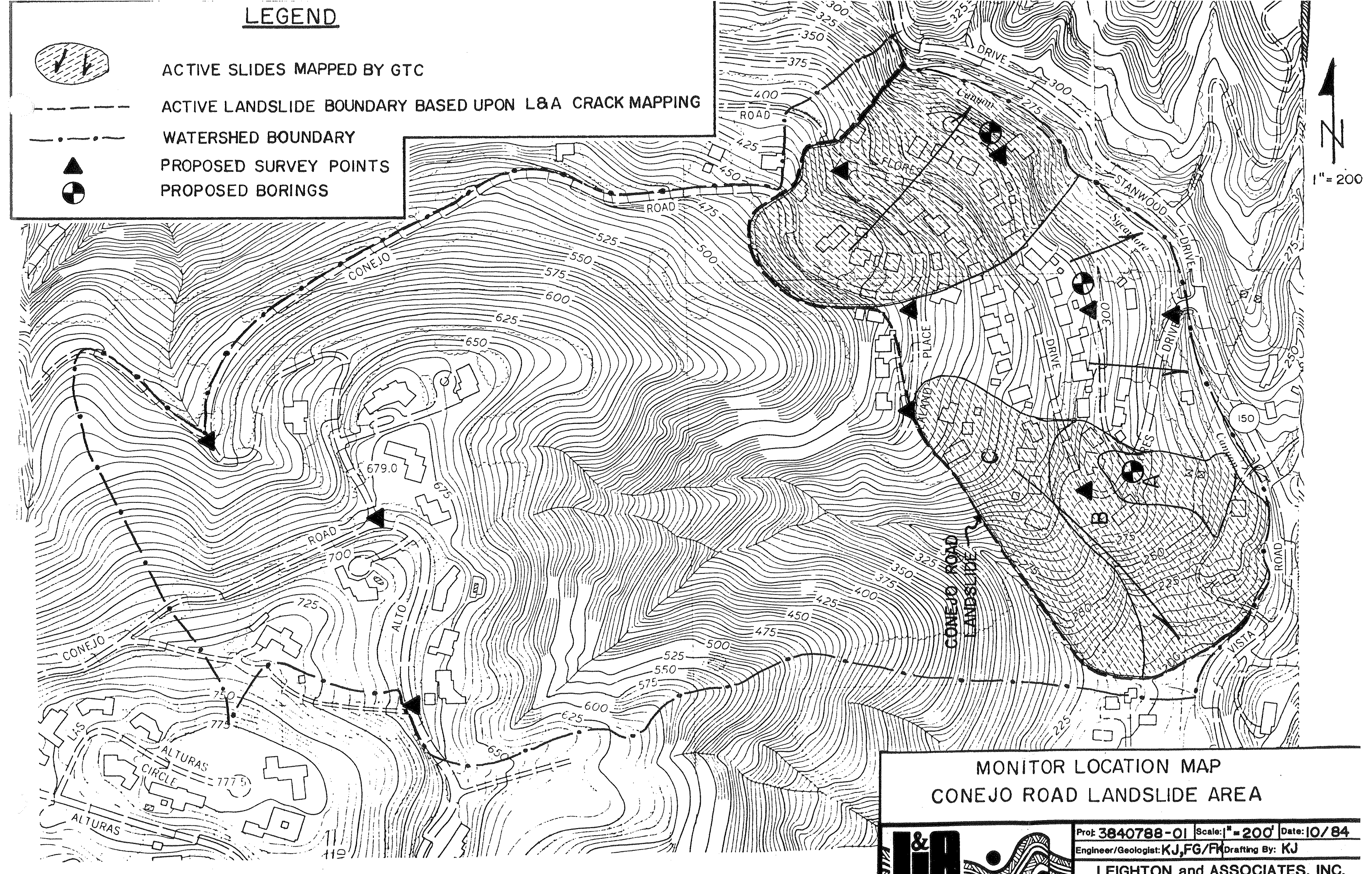
Frank Kenton
Project Geologist

Frederick C. E. Gebhardt
RCE 13874

Reviewed by: Richard Lung, EG 111
Principal Geologist

KJ/FK/FG:pk

Addressee: 10


LEGEND
ACTIVE SLIDES MAPPED BY GTC
ACTIVE LANDSLIDE BOUNDARY BASED UPON L&A CRACK MAPPING
WATERSHED BOUNDARY
PROPOSED SURVEY POINTS
PROPOSED BORINGS
N
1" = 200
CONEJO ROAD
ALTO ROAD
LAS ALTURAS CIRCLE
ALTURAS
CALAND PLACE
FLORES DRIVE
STANWOOD DRIVE
VISTA ROAD
Sycamore
Canyon
CONEJO ROAD LANDSLIDE
A
B
C
679.0
150
MONITOR LOCATION MAP
CONEJO ROAD LANDSLIDE AREA
Proj: 3840788-01
Scale: 1" = 200'
Date: 10/84
Engineer/Geologist: KJ,FG/FK
Drafting By: KJ
LEIGHTON and ASSOCIATES, INC.

COUNCIL AGENDA REPORT AUG 7 1984 #5

9/84

DATE: August 3, 1984

TO: Mayor and Councilmembers

FROM: Richard D. Thomas, City Administrator

SUBJECT: SELECTION OF LEIGHTON AND ASSOCIATES FOR ENGINEERING SERVICES FOR THE DESIGN OF DRAINAGE IMPROVEMENTS TO THE CONEJO ROAD LANDSLIDE AREA

RECOMMENDATION:

That Council approve selection of Leighton and Associates, Inc. and authorize execution of an agreement with the firm for engineering services for the design of drainage improvements to the Conejo Road Landslide Area at a not-to-exceed fee amount of $23,000.

PREPARED BY:

PE:aw D. H. Johnson, Public Works Director

REVIEWED BY: TR Finance X Attorney ____ Personnel ____

ADVICE OF COUNCIL ACTION DIRECTED TO: ____

ACTION OF COUNCIL: ____ Approved ____ Disapproved ____ Hearing Set ____

____ Continued to ____ ____ Adopted/Executed ____ (Res/Ord/Contract)

____ Other: Authorized execution of Agreement No. 12515

DIRECTIONS OF ADMINISTRATOR: ____ Prepare documents ____ Implement as approved

____ Prepare for further Council action on ____

____ Prepare Progress Report by ____

____ Other ____

COMMENTS: ____

DATE AUG 7 1984

AGENDA ITEM NO. 5

AUG 7 1984

DISCUSSION:

Invitations for proposals to provide engineering services for the subject project were sent to six (6) firms, after Public Works staff received letters of interest from same. Only one proposal, from Leighton and Associates, was received. This proposal is responsive to the needs as outlined in the Request for Proposal. The engineering services consist of work in two (2) phases:

Phase 1. Investigate the water shed area tributary to the landslide including each individual parcel within the defined area. Evaluate the existing surface drainage characteristics and provide specific recommendations for improvements in order that the highest percentage possible of runoff will be channeled away from the slide masses. Make specific recommendations for improvements to surface drainage, and for the placement of horizontal subsurface drains to facilitate de-watering of the unstable material.

Phase 2. Following the City's evaluation of Phase 1 findings, Consultant shall prepare final plans, specifications and a cost estimate for construction of specified improvements.

Sufficient funds are available to cover the cost of these services in the Street Capital Program.

At this time, the City Attorney has not yet drafted an ordinance covering a building moratorium and ban on septic systems in the landslide area. These will be brought before Council at such time as they are available.

40 work days

Mid October
PS&E's

CITY OF SANTA BARBARA
COUNCIL AGENDA REPORT

JUN 19 1984 #24

DATE: June 15, 1984

TO: Mayor and Councilmembers

FROM: Richard D. Thomas, City Administrator

SUBJECT: CONEJO ROAD LANDSLIDE AREA

Bergeron/Hiroya
4/0

RECOMMENDATION:

That Council:

A) Direct City Attorney to draft ordinances for submittal to the Council Ordinance Committee for creation of a building moratorium on each lot wholly or partially within the area designated as Slide Mass C in the Geotechnical Report and for creation of a ban on new septic tanks within and upslope of the existing slide masses;

B) Authorize Public Works staff to proceed with the selection of a consultant to design surface and subsurface drainage improvements in the vicinity of the slide; and

C) Direct staff to study financing alternatives which include i) assessment district financing with all benefiting property owners, including the City, contributing, and ii) City financing providing for agreements that require owners to contribute to the project using one or a combination of the following:

- right of entry
- release
- indemnification
- cash contribution

PREPARED BY: D. H. Johnson, Public Works Director

RJC:lm

REVIEWED BY: TR Finance   JAK Attorney   ____ Personnel

ADVICE OF COUNCIL ACTION DIRECTED TO: T. R. Ruether, J. A. Kahan, D. H. Johnson

ACTION OF COUNCIL: XX Approved ____ Disapproved ____ Hearing Set ____
____ Continued to ____ ____ Adopted/Executed ____ (Res/Ord/Contract)
____ Other: ____

DIRECTIONS OF ADMINISTRATOR: X Prepare documents ____ Implement as approved
____ Prepare for further Council action on ____
____ Prepare Progress Report by ____
____ Other ____

COMMENTS: ____

DATE JUN 19 1984
AGENDA ITEM NO. 24

GEOTECHNICAL CONSULTANTS, INC.

GEOTECHNICAL INVESTIGATION

CONEJO ROAD LANDSLIDE

SANTA BARBARA, CALIFORNIA

for
CITY OF SANTA BARBARA

APRIL, 1984

1023 East Thompson Boulevard • Ventura • CA 93001 • Phone (805) 643-2203

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INTRODUCTION

GENERAL

Presented in this report are the principal findings, conclusions, and recommendations developed as part of a geotechnical investigation of landslide features present within portions of the Sycamore Terrace residential area in the City of Santa Barbara. As shown on Figure 1 - Location Map, the area of investigation specifically includes an approximate 5-acre area located southwest of the intersection of Sycamore Canyon Road and Stanwood Drive. Since early December of 1983, this area has experienced a relatively well-defined landslide. Evidence of several upslope areas of regressive distress are also apparent.

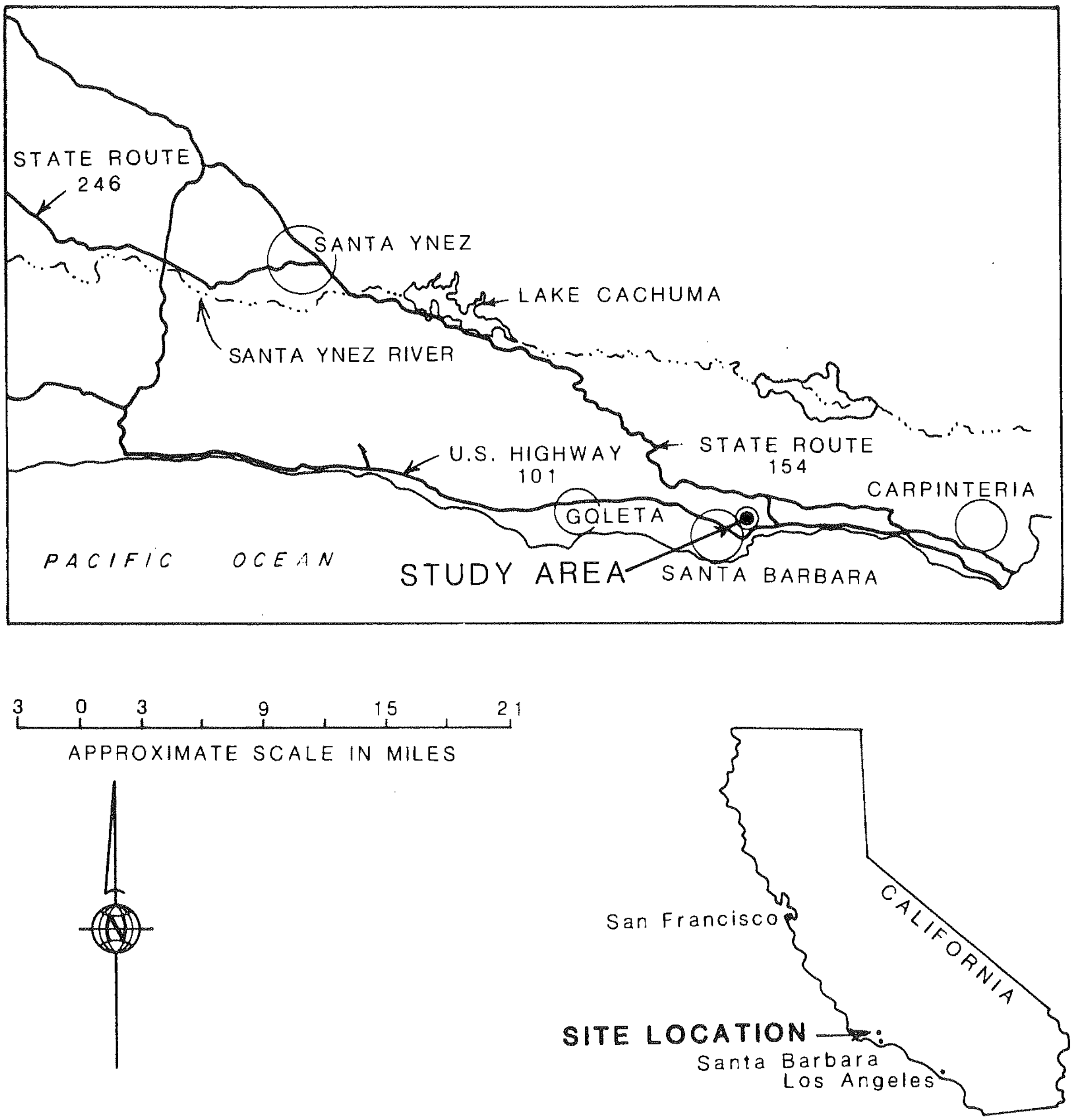
The purpose of this study was to investigate and define the nature and extent of the current landslides; to determine the geologic/geotechnical factors contributing to the overall distress; and to provide general recommendations for slope restoration and stabilization.

WORK PERFORMED

The scope of our investigation was developed through discussions with Mr. Ron Calkins, City Engineer for the City of Santa Barbara Public Works Department, and was outlined in our initial reconnaissance level report dated January 13, 1984. As completed, our services included:

1. Detailed surface and photogeologic mapping of the Sycamore Canyon-Mission Ridge area to define the overall geologic setting.

FIGURE 1
LOCATION MAP



2. Drilling and geological logging of nine bucket auger borings within and adjacent to the areas of slope failure and distress to locate and define subsurface geologic conditions and slide planes. Samples of representative earth materials encountered were collected.

3. Analyzing the results of the surface and subsurface exploration to determine the areal extent of the slide mass, depths of slide planes, and the mechanisms and potential for further movement.

4. Recommending appropriate buttressing and stabilization schemes.

5. Addressing local residents' written comments regarding the significance of alleged landslide related features in the area.

6. Presenting the results of the investigation in a written report including the logs of the borings, appropriate geologic maps, and geotechnical recommendations for stabilization.

The focus of our original scope of work was the most obvious and recent landslide located near the intersection of Conejo Road and Conejo Lane (identified in this report as Slide Mass A). During the subsurface exploration it became apparent that Slide Mass A represents only a portion of at least one and perhaps two or more larger regressive-type landslides (Slide Masses B and C). The scope of our work was accordingly expanded to include the area of Slide Masses B and C.

Borings in this upslope area revealed instability and zones of multiple and composite slides to depths of 110 feet suggesting that development of buttressing schemes for the area may be logistically and technically difficult and possibly not economically feasible.

For the preparation of this report, a number of past published and unpublished reports were reviewed which describe the general geology of the area and the historical development of landslide conditions in the specific area of this investigation. These previous reports and correspondence include:

1. April 10. 1978. September 18. 1978, and October 28, 1983, Southern California Edison Company interoffice memoranda.

2. June 1979, "Geologic Investigation, Conejo Road Landslide", report prepared by Michael F. Hoover, Consulting Geologist.

3. December 17, 1981 through December 1, 1983, correspondence between Messrs. James Tobin and Jim Cook of the Sycamore Terrace Homeowners and R. W. Puddicombe, Dave Johnson, Ron Calkins, and Bob Furman of the City of Santa Barbara Public Works Department (six letters).

4. March 21, March 30, November 2, and November 15, 1983, reports and letters prepared by Buena Engineers, Inc., for the proposed residence at 500 Conejo Road.

5. February 22 and January 31, 1984, letters prepared by Mr. Daryl D. Errett, resident at 345 Conejo Road.

Additional published references utilized include:

6. Dibblee, T.M., 1966, "Geology of the Central Santa Ynez Mountains, Santa Barbara County, California", California Division of Mines and Geology, Bulletin 186.

7. Lian, H. M., 1954, "Geology and Paleontology of the Carpinteria District, Santa Barbara County", U.C.L.A. Doctoral Thesis.

8. Lownes, R. E., 1959, "Geology of Portions of the Santa Barbara and Goleta Quadrangles, California", University of Southern California, Master Thesis.

9. Muir, K. S., 1968, "Ground Water Reconnaissance of the Santa Barbara-Montecito Area, Santa Barbara County", United States Geological Survey, Water Supply Paper 1959-A.

In addition to these reports, a series of vintage air photos of the area which document the development history of the Sycamore Terrace Tract was reviewed. These include stereo air photos dating from 1928, 1938, 1948 as part of the Fairchild Collection, and more recent coverage dating from 1977 and 1983.

Plate 1 - Geotechnical Map, shows the extent of the landslide features, areas of distress, locations of borings drilled as part of this and previous studies, and the location and orientation of geotechnical sections. This map was prepared on a topographic base, scale 1 inch = 40 feet, provided by Pacific Western Aerial Services, Inc. Supporting geotechnical data including details of the exploration program, logs of drill holes, and methods of sampling are presented in the Appendix.

FINDINGS

SITE HISTORY

As shown on Figure 1, Sycamore Canyon is located within the City of Santa Barbara approximately two miles northeast of the central business district within the eastern extension of an area informally designated as the Mission Ridge. The eastern part of the Mission Ridge including the Conejo Road area was developed as a lot sale type subdivision known as Sycamore Terrace Tract in the early 1930's. Review of historic air photos indicates that grading of Conejo Road, presumably as a light duty dirt road, occurred at some time prior to 1928, although as of 1928 no homes had as yet been constructed in the area. Comparison of the 1928 to the 1938 air photos reveals that only one home was constructed along Conejo Road during this intervening period, at 486 Conejo Road, but that Ealand Place was graded and a residence at 21 Ealand Place was constructed. Little change in the overall development of the area is apparent during the period 1938 to 1948. Inspection of later air photos reveals that the majority of the residential homes constructed in the area began in the mid-1950's and that the overall present day development was largely completed by the late-1960's.

The first report of landslide problems in the area coincided with the heavy winter rains of early 1969, although no documentation of the severity of problems appears to have been recorded. This landslide was the precursor to the presently defined Slide Mass A. After a period of apparent stability, landsliding was reinitiated after the heavy rains in February of 1978 and continued intermittently, presumably in the location of the earlier 1969 instabilities, through July of that year. This series of movements severed City water and sewer lines and prompted affected homeowners to retain a geologic consultant resulting in the investigative report by Hoover (1979). Subsequently, verbal reports from residents in the area indicate the slide has moved incrementally following winter and spring rains each year. Shortly after this period of movement, i.e. circa late 1978, the Southern California Edison Company abandoned their transmission towers which were being jeopardized by the slide mass, and relocated the towers further south out of the apparent area of distress as shown on Plate 1.

In December 1983, movement of Slide Mass A recurred producing approximate vertical displacements within the head scarp area of two feet on December 19 and later six feet on December 25. This renewed movement again severed City utilities and rendered a portion of Conejo Road impassable. In addition, the house at 481 Conejo Road was undermined and partially collapsed, and three other homes at 508 and 530 Conejo Road and 1815 Stanwood Drive were jeopardized.

During this most recent phase of landslide activity, a potential secondary failure plane (Slide Mass B) and possibly a tertiary failure plane (Slide Mass C), began to develop upslope. These slides are oriented roughly concentric to the original failure. Slide Mass B has displayed vertical movement on the order of six inches to one foot from January to February of 1984, causing distress to pavement, driveways, streets, and floor slabs. The uppermost slide (Slide Mass C) has not yet produced observable vertical displacement. Its presence is suggested by cracks in the street on Ealand Place and cracks and buckling in driveways at 474 Conejo Road and 11 and 17 Ealand Place.

GEOLOGIC CONDITIONS

Regional Setting. The Sycamore Canyon area lies within the eastern extension of the Mission Ridge District, which constitutes one of a series of elevated coastal foothill terraces of the Santa Ynez Mountains. The bedrock geology exposed in this area is comprised of Oligocene and Miocene age sedimentary rocks of the Sespe, Vaqueros, Rincon, and Monterey formations. These rocks have been steeply tilted during uplift of the Santa Ynez range and presently dip southward at angles ranging from 60 to 90 degrees. This structural orientation conforms with the general southward dipping homoclinal structure observed on the southern flanks of the range (Dibblee, 1966).

The geomorphology of this area is dominated by fault related features of youthful origin which disrupt the otherwise simple geologic structure along the southern mountain front and coastal plain. Faulting has occurred along several east-west trending zones and has resulted in uplift of some blocks and downdrop of others. Mission Ridge represents one of these uplifted areas. It is bounded to the north by Mission Ridge fault zone and to the south by the so-called Sycamore fault (Hoover, 1978).

Movement along the Mission Ridge fault zone and Sycamore fault has elevated the central portion of Mission Ridge 100 to 300 feet above the heavily dissected terrain to the north. The fact that the ridge retains a positive geomorphic expression suggests that movement on the faults has occurred recently in geologic terms (late-Pleistocene time). The Mission Ridge fault zone has in fact offset deposits of fanglomerate which overlie the bedrock formations exposed in the area.

Dibblee (1966) describes the fanglomerate as coarse alluvial material which accumulated as an unconsolidated deposit along the southern front of the Santa Ynez range. He suggests that at one time it formed a continuous coalescing surface that sloped southward toward the ocean and estimated that it was deposited between middle- and late-Pleistocene time. Remnants of the fanglomerate are present on dissected residual surfaces north of Mission Ridge, and offset remnants cap many of the higher hills within the ridge.

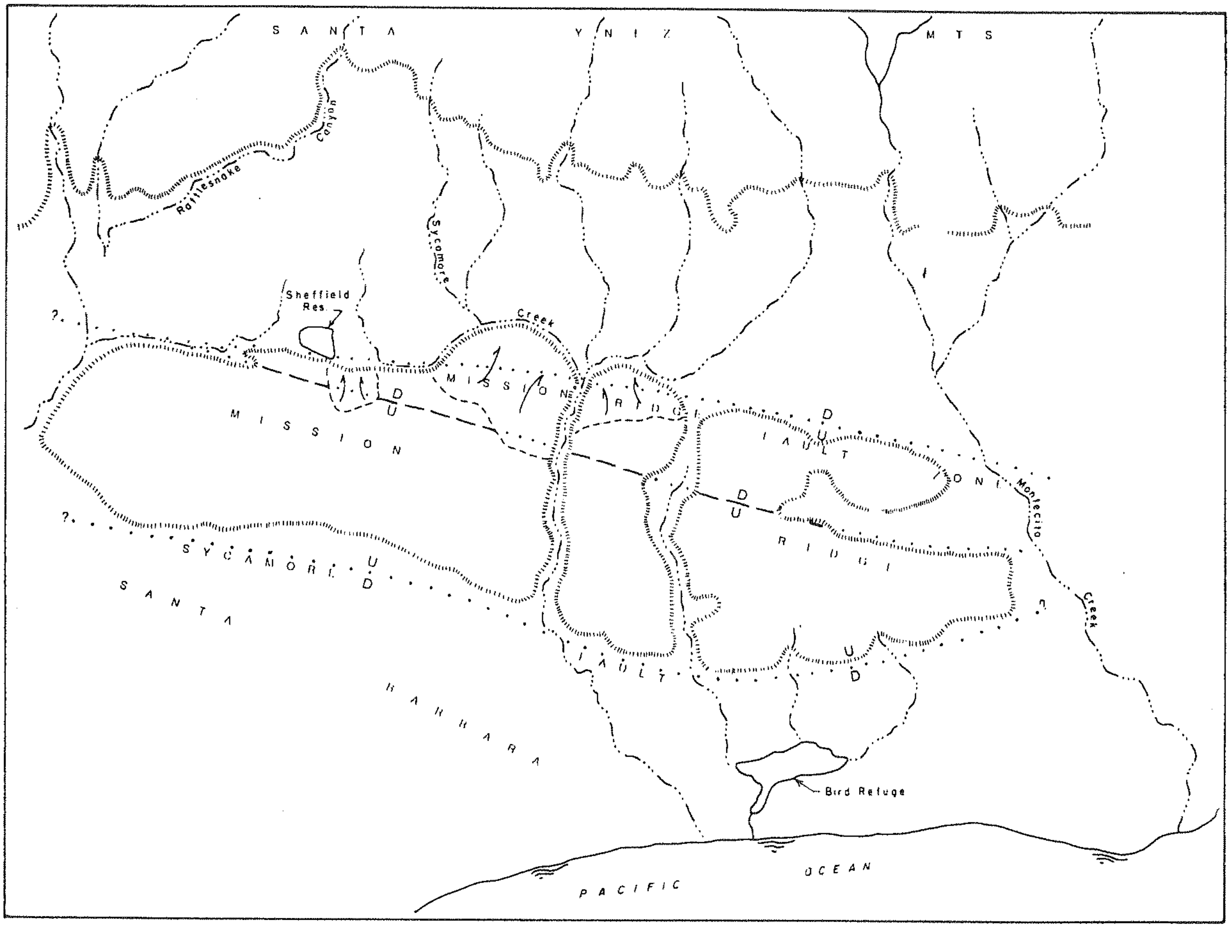
Interpretation of aerial photographs for the area indicates that at least two discrete faults comprise the Mission Ridge fault zone along the northern margin of the ridge. The faults are recognized by linear alignments of small hills, ridges, and beheaded drainages (see Figure 2 - Geomorphic Map of the Mission Ridge District, and Plate 2 - Regional Geologic Map). In spite of the apparent geologic youthfulness of the faulting suggested by offset of the fanglomerate and positive topographic expression of the ridge, remnants of north facing scarps along the two faults are heavily dissected. More importantly, large scale landsliding appears to have obliterated all evidence of the former scarps in the Sycamore Canyon area and buried the fault traces with slide debris.

The landsliding has apparently occurred as a complex series of slump and mudflow type failures on the north facing scarps of the Mission Ridge fault zone. The slide complex has produced a strong northward and eastward deflection of Sycamore Creek in the vicinity of the study area which is readily observed on aerial photographs (see Figure 2). The oldest slides are heavily dissected by gullying such that original slide related features are largely obscured. Based on their subdued appearance, the oldest slides are estimated to be several thousand to several tens of thousands of years old. The fact that the slide complex is not offset by faulting and actually conceals the fault traces in the vicinity of Sycamore Creek suggests that the most recent activity on the Mission Ridge fault zone is pre-Holocene in age.

Quaternary Evolution of Mission Ridge. Recognition of the large scale landsliding in Sycamore Canyon has improved present understanding of the Quaternary evolution of Mission

FIGURE 2

GEOMORPHIC MAP OF THE MISSION RIDGE DISTRICT



4000 0 4000 8000

SCALE IN FEET

LEGEND

U/D — — . . . . . FAULT- DASHED WHERE APPROXIMATELY LOCATED, DOTTED WHERE CONCEALED.
U- INDICATES UPTHROWN BLOCK
D- INDICATES DOWNTHROWN BLOCK

AREA WITH WELL DEFINED LANDSLIDE MORPHOLOGY AND WELL DEFINED BOUNDS. ARROWS INDICATE DIRECTION OF LANDSLIDE MOVEMENT.

Ridge. As developed through interpretation of published geologic maps, aerial photographs, and field reconnaissance, the Quaternary history of this area has involved a sequence of events culminating with the aforementioned landsliding. These events are schematically represented in the various diagrams on Figure 3 - Quaternary Geologic Evolution of Mission Ridge.

As shown on Figure 3a, accelerated uplift and emergence of the Santa Ynez Mountains occurred in the middle to early Pleistocene time (Dibblee, 1966), probably 300,000 to one million years ago. Accompanying this was a period of extensive erosion which denuded mountain slopes exposing bedrock formations. As uplift slowed, deposition of fanglomerate on lower mountain slopes commenced. Deposition of the late Pleistocene alluvial fan probably continued for several hundred thousand years. During this period, faulting on the Mission Ridge and Sycamore faults commenced as depicted on Figure 3b. As faulting continued, the drainage pattern in the area was altered in response to uplift of Mission Ridge. Some drainages such as Sycamore Canyon became incised and others were captured and beheaded such as those to the east. By latest Pleistocene time (within the past 100,000 years), uplift of the ridge had reached several hundred feet creating a steep northward facing escarpment and exposing weak clay shale of the Rincon and Monterey formations beneath the faulted fanglomerate. Ultimately, the highest portions of the escarpment progressively failed, either as single large landslides or as a complex of smaller coalescing slides (Figure 3c). It appears that the latest offset on the Mission Ridge fault zone predates the landsliding since the fault traces are buried by slide debris. The sliding has further altered drainage patterns in the area as suggested on Figure 3d. Continued incision of Sycamore Canyon has resulted in heavy dissection and removal of most of the fanglomerate deposits from areas north of the fault and has undermined the toe areas of the older slide complex leading to the development of new failures.

Two important observations may be drawn from the above discussions. First, the most recent faulting on the Mission Ridge fault zone appears to predate the large scale landsliding and therefore is probably pre-Holocene in age. Second, the ancient slide complex appears at least to involve the area shown on Plate 2.

Site Geologic Conditions. The predominate geologic formation occurring in the Conejo Road area is that of the lower to middle Miocene age Rincon Formation. This formation is locally capped by late Pleistocene fanglomerate deposits and, within Sycamore Creek, dissected and buried by alluvial deposits.

The Rincon formation is composed of weakly to moderately well-lithified strata of siltstone and claystone and typically weathers deeply, developing a thick soil profile. As such, exposed outcrops which display well defined bedding planes are rare. As described by Dibblee (1966), the Rincon Formation, where freshly exposed, is characteristically a blue-gray, massive to indistinctly laminated, moderately hard, argillaceous to silty claystone. Where weathered, the Rincon Formation typically forms a residuum of brown to olive green, stiff to very stiff, moderately plastic silty clay. The Rincon Formation also locally contains lenses of yellowish-gray impure dolomite, which weather to ochre-yellow on the surface. These impure dolomitic beds also occur as spheroidal concretions which have been called "dolostones" by previous authors. Samples of the Rincon Formation taken from drill holes in the study area were generally consistent with the above description (refer to the Logs of Drill Holes).

The orientation of bedding within the Rincon Formation in the area is obscured by the thick soil profile and is complicated by sliding, but based on the regional trend, bedding is believed to strike approximately east-west and dip steeply to the south. Surface geologic mapping of exposures in the Mission Ridge area conducted as part of this study indicates southerly inclinations at from 50 to 70 degrees. Near the southerly segment of the Mission Ridge fault, fracturing within the Rincon and overlying fissile shale of the Monterey Formation becomes progressively more pronounced and bedding is locally overturned.

Tertiary age bedrock units in the area are locally overlain by fanglomerate. This unit was draped over the Rincon Formation in late-Pleistocene time and has subsequently been differentially removed by erosion and now exists only as dissected remnants. The fanglomerate is composed of cobbles and boulders in a sandy matrix and is believed to have been derived from the Eocene age sandstones of the Santa Ynez Mountains to the north (Dibblee, 1966).

LANDSLIDE DESCRIPTION

The Conejo Road landslide, as presently defined, comprises two and possibly three roughly concentric slide masses. The configuration and postulated depths of these landslides are shown in plan on Plate 1 - Geotechnical Map and in section on Plates 3.1 through 3.3 - Geotechnical Cross Sections. The slide plane for Slide Mass A is relativey well defined based on the data obtained from the borings. However, the depths to slide plane B and particularly slide plane C are poorly defined and conjectural, and additional exploration would be required for accurate definition.

Slide Mass A has displayed the most recent movement which totals approximately eight feet vertically and in excess of 20 feet horizontally. Movement in general appears to be progressing easterly in a translational fashion. However, the surface of the upper third of the slide mass dips 10 to 15 degrees into the hillside suggesting that rotational slumping may in part be operative as the mechanism of failure. This slide mass currently measures approximately 320 feet from its head beneath the residence at 481 Conejo Road to the toe against the residence at 1815 Stanwood Drive. The slide is approximately 100 feet wide at its head scarp and widens to approximately 150 feet at the toe. The lower portions of the slide are characterized by a highly distorted and hummocky ground surface culminating in the toe which rises or bulges 10 to 12 feet above original grade (refer to Plate 1). The northern flank of the slide follows a minor ridgeline down toward the creek, although recently the toe has extended to the north encroaching onto the property at 1825 Stanwood Drive. The southern flank is defined by a well exposed scarp in the upper portions of the slide and by the uplifted ground surface in the lower portion.

Slide Mass B displays 6 to 12 inches of recent vertical movement in its headscarp. This scarp can be traced across the front yards and driveways of the homes at 480, 486 and 494 Conejo Road. The boundaries of this slide mass are less obvious; the southern limits are believed to trend down the small drainage through the vacant lot to the south of 508 Conejo Road. The northern limits appear to pass through the home at 535 Conejo Lane and then apparently merge with the northern margin of Slide Mass A downslope. Slide Mass B appears to be moving roughly parallel with Slide Mass A but the configuration of the scarp suggests a greater southerly component.

The arcuate cracks in the pavement on the south end of Ealand Place define the possible head scarp of Slide Mass C. Slide Mass C is the poorest defined of the three slide masses and its limits cannot be traced for any distance from the surface expression in the pavement. The distressed asphalt in the upper driveway and the broken rock wall at the home at 474 Conejo Road suggest that the northern limit of Slide Mass C may trend through this property and then merge with the northerly limits of the two downslope slide masses. No expression of the southerly limits of Slide Mass C was evident. The actual amount and direction of movement is indeterminant.

Field mapping and exploratory borings within Slide Mass A suggest that this portion of the slide is moving above a depth of 15 to 25 feet. Evidence from borings reveals the presence of sheared and weathered Rincon Formation just below the fanglomerate unit at these depths. The shearing is evidenced by the presence of abundant slickenside surfaces and prismatic fractures in Drill Hole Nos. 1, 4, and 7. Further exploration of the area directly upslope of the Slide Mass A, but below the Slide Mass B slide scarp, suggests a second zone of probable sliding at an average depth of 40 feet. This zone of probable sliding is supported by evidence of a second sheared zone of Rincon Formation at depths of 35 to 45 feet in Drill Hole Nos. 2, 5 and 7. The logs of the caisson borings for the property west of 508 Conejo Road on the southern edge of Slide Mass B also support this depth of movement.

Evidence suggesting a discrete zone of movement for Slide Mass C is not conclusive. The three borings drilled above the scarp of Slide Mass B and below the inferred developing scarp of Slide Mass C were not correlative. Drill Hole No. 3 encountered approximately 55 feet of fanglomerate and alluvial materials underlain by highly altered Rincon Formation, while Drill Hole No. 8, at the same approximate elevation and 150 feet northeast, encountered only three feet of fanglomerate before penetrating zones of alternately fresh and sheared Rincon Formation and then meeting refusal in very hard, fresh Rincon Formation at a depth of 50 feet. Further upslope on Ealand Place, Drill Hole No. 6 penetrated 70 feet of alternate zones of sheared and fresh Rincon Formation before encountering a well defined slide plane underlain by fanglomerate and alluvial materials similar to those encountered downslope in Drill Hole No. 3. An additional boring, 150 feet to the north and five feet higher than Drill Hole No. 6, encountered solely alternately fresh and sheared Rincon Formation for its entire depth of 110 feet.

The non-correlative nature of the data from the upper drill holes support the premise that the study area is a portion of a much larger prehistoric slide complex. The multiple zones of shearing evident in the drill holes suggest many possible depths of movement. The anomalous presence of fanglomerate below relatively large and seemingly intact solid blocks of Rincon Formation supports movement on a very large scale. This is further supported by the presence of shearing at depths 30 to 40 feet below the existing grade of Sycamore Creek in Drill Hole No. 5. In addition, the apparent displacement of Sycamore Creek to the north and east and the apparent overriding of the Vaqueros Formation by landslide debris to the north, further support the premise of large scale movement. This evidence from the field work and exploratory drill holes appears to be supportive of the geomorphic features evident on the air photos of the region.

GROUND WATER

Ground water in the form of seepage was encountered in all of the borings drilled as part of this investigation. The occurrence of ground water was generally consistent with past descriptions of ground water as discussed by Buena Engineers, Inc. (reference No. 4) in investigations conducted during 1978. In general, ground water was restricted to weathered horizons within landslide masses derived from the Rincon Formation at depths coinciding with zones of shearing, gouge, and indications of movement. As would be expected, ground water flow is directionally oriented from west to east-southeast, or from uphill to downhill. Of some interest was the occurrence of ground water under apparent artesian head within fanglomerate deposits in Drill Hole No. 3. Ground water in the form of seepage was first encountered in this boring at a depth of 32 feet and subsequently rose as standing water in the drill hole to a depth of 26 feet below ground surface.

It should be noted that observations of the occurrence of ground water were often masked by the shallow presence of seepage which then obscured the presence of ground water at greater depths. A summary of ground water information as encountered in the drill holes is presented on Table 1 - Summary of Ground Water Data.

TABLE 1

SUMMARY OF GROUND WATER DATA

Drill Hole No.	Depth of Occurrence (feet)	Geologic Formation (pre-sliding)
1	10	Fanglomerate
2	11	Rincon (weathered)
2	19	Rincon (weathered)
2	48	Rincon (fresh)
3	32	Fanglomerate
4	19 at 1 gpm	Alluvium
5	22	Rincon (weathered)
6	43 at 1/2 gpm	Rincon (weathered)
7	8	Artificial Fill
7	22 at 1 to 2 gpm	Fanglomerate
8	36	Rincon (fresh)
9	45	Rincon (weathered)

The general mineral characteristics of ground water encountered in Drill Hole No. 3 were analyzed to assess possible sources. The analysis, as performed by Fruit Growers Laboratory, is presented in the Appendix. Of interest are the elevated levels of total dissolved solids and nitrate ions, 2,838 and 54 milligrams per litre (mg/l), respectively, and the presence of MBAS (methylene blue active substances), zinc, and copper. The water is classified as sodium calcium sulphate in chemical character. The water displayed no noticeable odor when sampled.

Water purveyed by the City of Santa Barbara in the Sycamore Terrace Tract is derived from Gibraltar Reservoir and is typically calcium sulphate in chemical character with total dissolved solids concentrations on the order of 700 to 800 mg/l. Of interest are the low concentrations of sodium and chloride ions in the City's water and absence of nitrate ions compared to the ground water. The presence of MBAS is suggestive of detergents in the ground water, possibly indicating a sewage effluent origin, although the source may also be from surface runoff in combination with naturally occurring ground water.

SEWAGE EFFLUENT DISPOSAL SYSTEMS

During the course of our investigation, the City of Santa Barbara Public Works Department solicited and received a number of comments from local residents in the study area regarding alleged slope stability and surface drainage problems. One widespread concern was the past and present utilization of private sewage disposal systems in the area and their potential affect on slope stability problems. City staff has prepared a tract map delineating the distribution in the area of residences which have historically used private effluent disposal systems. We note that the residence most recently connected to the City sewer system in the area within the confines of Slide Mass A was that at 481 Conejo Road located at the top of this slide mass. The manner in which effluent disposal systems in the area have been abandoned over the years is unknown. As discussed further below, several areas still utilize private effluent disposal systems, notably along Camino Alto Road and in the vicinity of the 200 block of Conejo Road. However, effluent from these residences is believed to be sufficiently removed from a hydrologic, topographic, and geologic standpoint, such that they would not have a direct effect on the present landslides. Their presence and potential effect on future landslides, however, should not be ignored.

The ground water obtained from Drill Hole No. 3 contains constituents such as MBAS, trace metals, and an overall mineral character suggestive of sewage effluent, although the presence of these constituents may also be explained as originating from surface water sources and/or gray water runoff in combination with natural ground water.

LOCAL RESIDENTS' OBSERVATIONS

Additional local residents' observations include the following:

1. Caissons excavated for a planned residence at 500 Conejo Road have been observed to be full of water. Water has partially filled six, three-foot diameter, approximately 25 to 40 feet deep holes (shown on Plate 1) from December 1983 through at least February of 1984. These holes were eventually backfilled in early February of 1984. We surmise the presence of water in these holes is due to a natural mechanism of ground water inflow under existing hydraulic gradients. We do not believe

the presence of the caissons has contributed to the landslide conditions in the area.

2. Cracks and fractures have been reported in the asphalt at 17 Ealand Place since the summer of 1983. The location of these cracks coincides with stress relief occurring as part of the postulated Slide Mass C.

3. Concern has been expressed that inadequate surface drainage facilities exist along Ealand Place. Conversations with Mr. Daryl Errett, a resident of the area for many years, suggest that storm runoff along Ealand Place historically followed a flow line on the west side of the street and was ultimately discharged at the south edge of the street by simply overflowing into the canyon. Erosion due to these concentrated flows reportedly prompted local residents to protect the channel by infilling with debris. Ealand Place has differentially subsided and sheet flow is now directed to the driveway at 29 Ealand Place. The local residents' runoff control measures are largely inadequate to accommodate any significant flow. A related concern is the presence of an abandoned sewer line running from 29 Ealand Place to the rear yards between 486 and 480 Conejo Road. We noted that noxious odors were present within the upper six feet of earth materials penetrated at the location of Drill Hole No. 6, suggesting that surface waters may be concentrating in this abandoned line and trench. The presence of significant quantities of ground water encountered in Drill Hole No. 3 under apparent artesian head may, in

part, be related to storm water inflow and/or ground water infiltration into this abandoned sewer line.

4. Concern was expressed that residences from 110 through 150 Camino Alto Road and in the vicinity of the 200 block of Conejo Road are not connected to the City sewer system. A review of City compiled information reveals that these lots have not been verified as being on the City's sewer system. At present, sanitary sewer lines have not been installed along Camino Alto.

5. A final comment was that storm water runoff was conveyed via a corrugated metal pipe beneath Conejo Road in the vicinity of 241 Conejo Road that simply discharges onto the hillslope to Sycamore Creek. Although this condition was not verified in the field, the need for an evaluation of surface drainage conditions has been recognized.

CONCLUSIONS AND RECOMMENDATIONS

1.0 GENERAL STATEMENT

Based upon the results of field exploration and analyses of geologic data, it is apparent that the Conejo Road landslide consists of two and possibly three separate slide masses in various stages of development. The failure mechanism of these slide masses is of an apparent combined translational and rotational type that is gradually progressing upslope as the downslope portions of the slides move. In our opinion, the failure has occurred as a result of the inherently poor strength characteristics of the Rincon Formation combined with abundant ground water due to the unusually heavy seasonal precipitation that has occurred in the past five years.

Although the presence of multiple shear zones, excessive weathering within the Rincon Formation, and evidence of past landslide activity was noted in a number of borings to depths of up to 110 feet, we believe these larger slide masses are prehistoric in origin and are likely in a metastable condition. Renewed movement along these deep slide planes, however, cannot be precluded, particularly following heavy precipitation and possibly in conjunction with seismic activity.

We believe the most practical and cost-effective manner to achieve increased stability of these larger slide masses is through a series of subsurface horizontal drainage holes. It is apparent that the size of the entire landslide complex precludes complete stabilization by conventional grading and buttressing methods. An analysis of the depth to critical slide planes and the geometry of the slide masses indicates removal of earth volumes would be on the order of 40,000 cubic yards, 220,000 to 250,000 cubic yards, and in excess of 1,000,000 cubic yards for Slide Masses A, B and C, respectively. Problems facing such a large scale mass grading operation would include the removal of existing homes, logistical and access problems, the need for stockpiling and processing areas, environmental impacts, legal considerations, and problems of temporary slope support during excavation.

We believe that portions of Slide Mass A and partly Slide Mass B can be removed and recompacted as a sidehill fill to restore access along Conejo Road and potentially improve the stability of a part of Slide Mass B. Future stability will be dictated largely by control of surface drainage, the ability of subsurface dewatering holes to effectively drain the slide mass, and the nature of future hydrologic and seismic conditions.

All residences within and upslope of the slide areas should be connected to public sewers and private effluent disposal systems should be properly abandoned. We recommend that a moratorium be placed on future building within the area encompassed by Slide Masses A, B, and C (see Plate 1). We also recommend that a civil engineer experienced with surface drainage investigate and develop recommendations to improve the surface drainage of the entire area.

2.0 RESTORATION SCHEMES

Several alternatives for the restoration of access and public utilities have been considered as discussed below. Common to all alternatives is the modification of surface drainage features in the area, and the provision of subsurface horizontal drain holes for dewatering of the slide masses. Suggested locations of horizontal drains are shown on Figure 4. We estimate the installation of the horizontal holes will cost on the order of \$40,000 to \$50,000 and they will require two months to install.

2.1 **Alternative A.** This alternative would include termination of the use of Conejo Road at the present landslide and provision of alternative access and relocation of sewer and water lines to a suitable location northwest of the present landslide. This alternative is estimated to cost \$10,000 to \$20,000 and require about three weeks to implement assuming suitable alignments for utility relocation can be obtained.

2.2 **Alternative B.** Alternative B would involve the surficial regrading of Conejo Road across the present landslide with subsequent reinstallation of the sewer and water utility lines in the new roadway fill. This alternative is very questionable inasmuch as the reconstructed roadway will probably fail within the next rainy season and thus may require annual reconstruction. This alternative is estimated to cost from $15,000 to $20,000 and require about two to four weeks to implement.

2.3 **Alternative C.** Alternative C involves the reconstruction of Conejo Road down to slide plane A within Slide Mass A as shown on Figure 5 - Restoration Schemes. The approximate excavation limits are shown on Figure 6 - Limits of Grading for Various Alternatives. In conjunction with this grading, horizontal drains should be installed on the west side of the fill as shown on Figure 4 - Suggested Locations of Horizontal Drain Holes. This alternative will involve the grading of approximately 10,000 cubic yards of earth and the removal of one house within Slide Mass A and two or three houses on the west side of the scarp of Slide Mass A. These houses would include those with street addresses at 481, 508, and 530 and possibly 535 Conejo Road. By proper grading and benching operations, this restoration scheme is expected to stabilize Conejo Road down to the bottom of slide plane A, however, renewed sliding along slide plane B would jeopardize the stability of the regraded road. This alternative would pose a low to moderate risk during construction to the stability of residences at 474, 480, 486, 494, and 532 Conejo Road. Costs of this alternative, exclusive of real property value, are estimated at from $100,000 to $150,000, and the restoration would require 6 to 8 weeks of grading.

2.4 **Alternative D.** This option would involve the removal and regrading of Conejo Road within Slide Mass A to the level of slide plane B. An approximate outline of the grading operation is shown on Figures 5 and 6 and would involve

6/84

[illegible]			
TO:		Info	Action
Johnson			
Calkins			
Oehl			
Pion			
Furman			
Ourslan			
Hopkins			
Roberson			
Pasinato			
Sanchez			
Youngblood			
Fischer			
FILE:			

CITY OF SANTA BARBARA

June 19, 1984

To: D. H. Johnson, Director, Public Works
S. A. Amerikaner, City Attorney

From: Richard D. Thomas, City Administrator

SUBJECT: ADVICE OF COUNCIL ACTION
Item 24, Agenda of 6/19/84
Conejo Road Landslide Area

"Concurred with recommendations that Council:

A. Direct City Attorney to draft ordinances for submittal to the Council Ordinance Committee for creation of a building moratorium on each lot wholly or partially within the area designated as Slide Mass C in the Geotechnical Report and for creation of a ban on new septic tanks within and upslope of the existing slide masses;

B. Authorize Public Works staff to proceed with the selection of a consultant to design surface and subsurface drainage improvements in the vicinity of the slide; and direct staff to study financing alternatives which include - i) assessment district financing with all benefiting property owners, including the City, contributing; and ii) owners to contribute to the project using one or a combination of the following:

- right of entry
- release
- indemnification
- cash contribution."

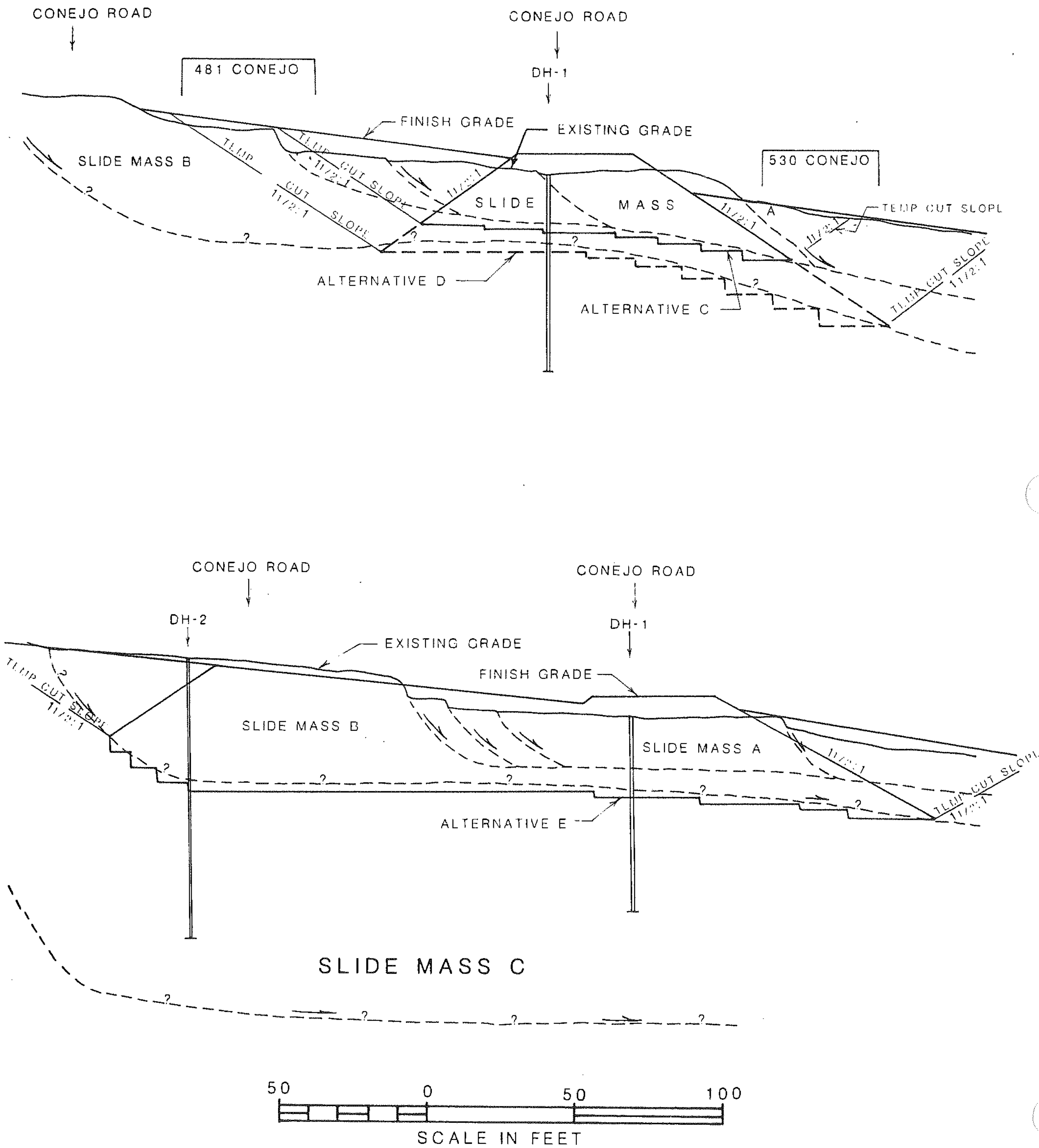
To: D. H. Johnson:

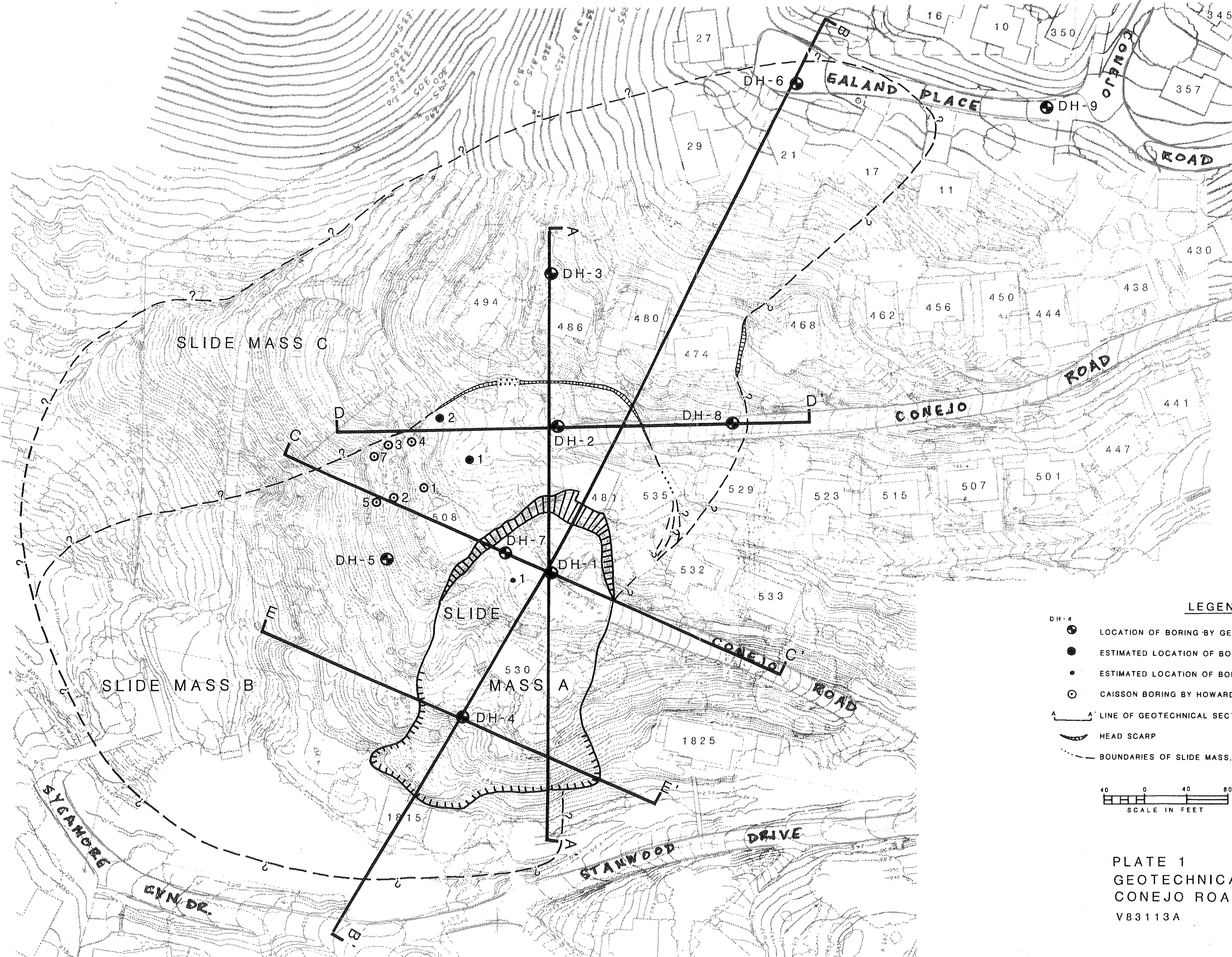
Please give a date when we will have the consultants selected to reschedule the consultants with the City Council.

To: S. A. Amerikaner:

City Attorney to draft two (2) ordinances per Council recommendation.

FIGURE 5
RESTORATION SCHEMES





LEGEND

- DH-4 LOCATION OF BORING BY GEOTECHNICAL CONSULTANTS, INC.
- ESTIMATED LOCATION OF BORING BY BUENA ENGINEERS, 1983
- ESTIMATED LOCATION OF BORING BY HOOVER, 1979
- CAISSON BORING BY HOWARD ENGINEERING, 1983
- A A' LINE OF GEOTECHNICAL SECTION
- HEAD SCARP
- BOUNDARIES OF SLIDE MASS, DASHED WHERE INFERRED

40 0 40 80
SCALE IN FEET

PLATE 1
GEOTECHNICAL MAP
CONEJO ROAD LANDSLIDE
V83113A APRIL, 1984

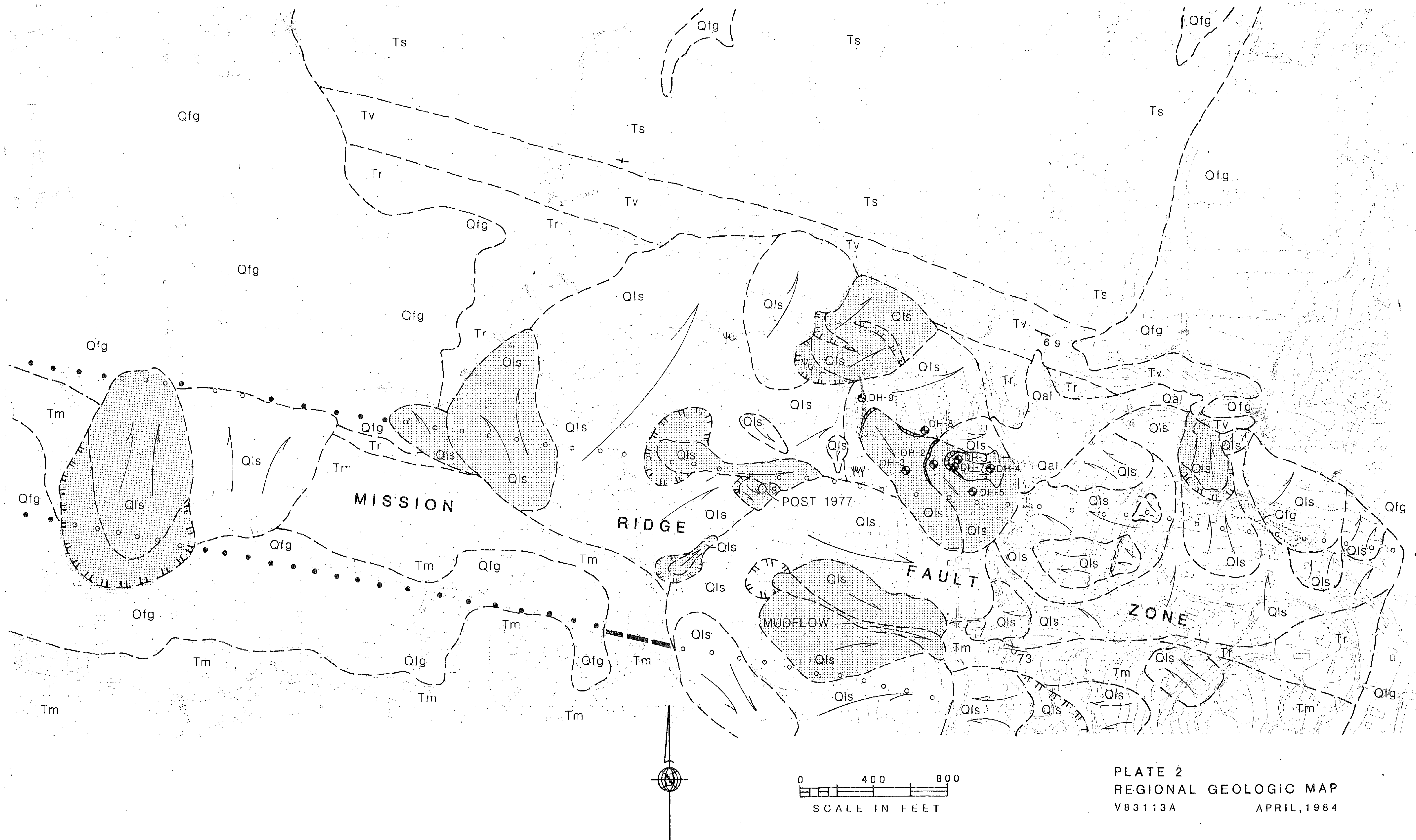


PLATE 2
REGIONAL GEOLOGIC MAP
V83113A APRIL, 1984

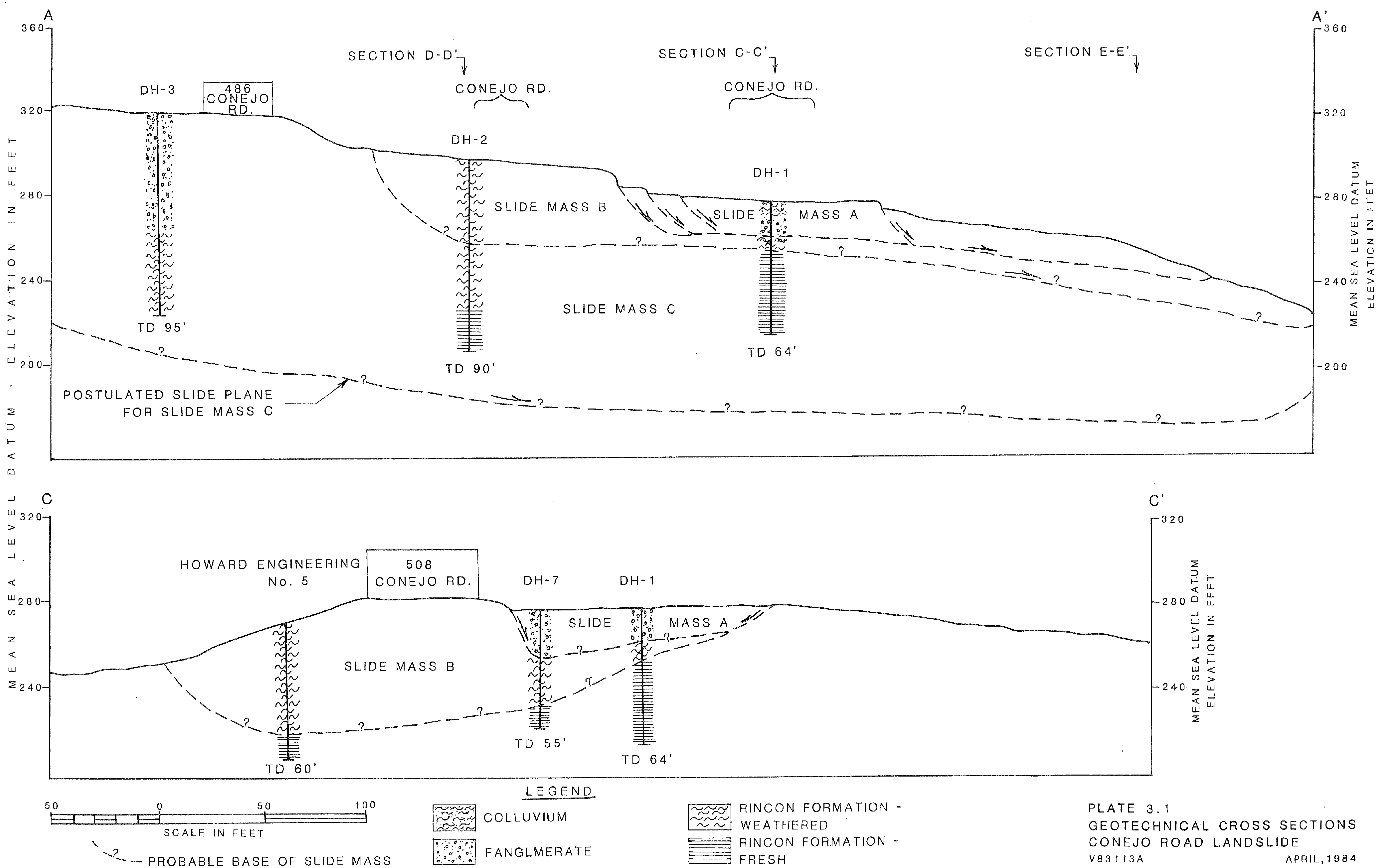


PLATE 3.1
GEOTECHNICAL CROSS SECTIONS
CONEJO ROAD LANDSLIDE
V83113A
APRIL, 1984

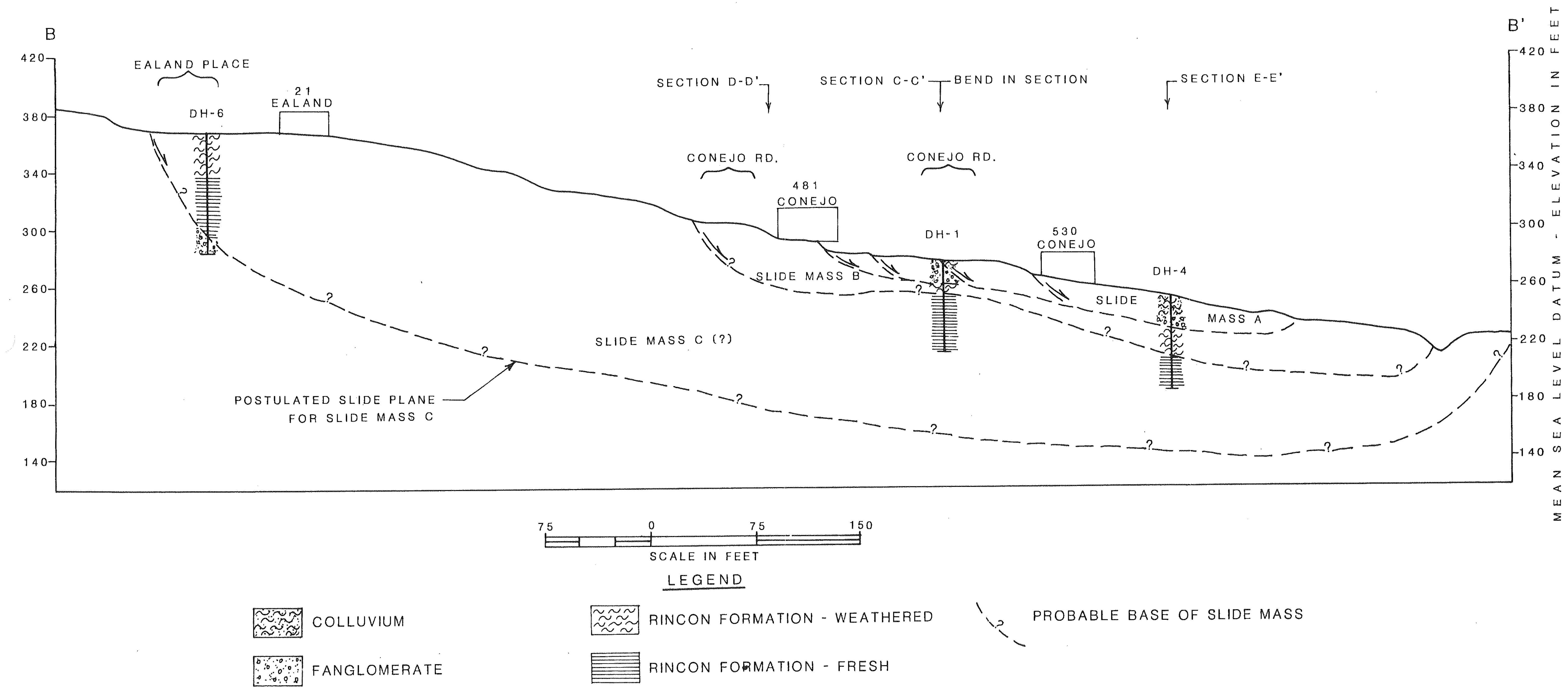


PLATE 3.2
GEOTECHNICAL CROSS SECTIONS
CONEJO ROAD LANDSLIDE
V83113A APRIL, 1984

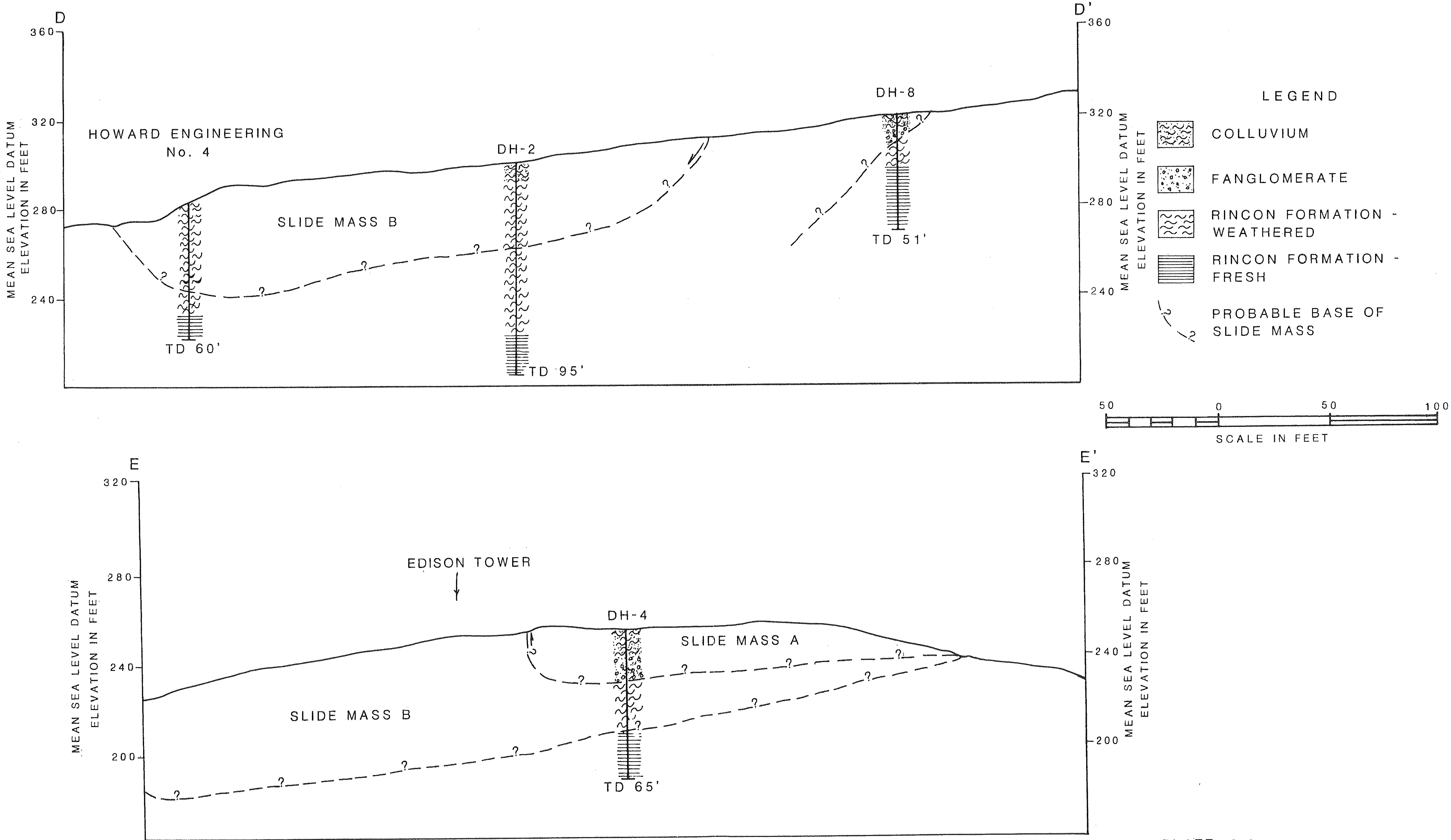


PLATE 3.3
GEOTECHNICAL CROSS SECTIONS
CONEJO ROAD LANDSLIDE
V83113A APRIL, 1984

LEGEND

- **Qls** LANDSLIDE DEPOSITS
- **Qal** ALLUVIUM - SAND, SILT AND GRAVEL
- **Qfg** FANGLOMERATE - BOULDER, GRAVEL AND SAND
- **Tm** MONTEREY FORMATION - SILICEOUS SHALE
- **Tr** RINCON FORMATION - CLAY SHALE
- **Tv** VAQUEROS FORMATION - SANDSTONE
- **Ts** SESPE FORMATION - SANDSTONE, SILTSTONE, AND CONGLOMERATE

GEOLOGIC CONTACT - DASHED WHERE APPROXIMATELY LOCATED

FAULT - DASHED WHERE INFERRED, DOTTED WHERE CONCEALED

AREA WITH WELL DEFINED LANDSLIDE MORPHOLOGY AND WITH WELL DEFINED BOUNDS. ARROWS INDICATE DIRECTION OF LANDSLIDE MOVEMENT. CONTACT DASHED WHERE LANDSLIDE MORPHOLOGY BOUNDS ARE INDISTINCT.

AREA WITH QUESTIONABLE LANDSLIDE MORPHOLOGY AND WELL DEFINED BOUNDS: MAY BE OF LANDSLIDE ORIGIN. CONTACT DASHED WHERE QUESTIONABLE LANDSLIDE MORPHOLOGY BOUNDS ARE INDISTINCT.

LANDSLIDE SCARP MORPHOLOGY

FLOW-TYPE LANDSLIDE MORPHOLOGY OF LIMITED AREAL EXTENT: ARROW SHOWS DIRECTION OF MOVEMENT.

PHREATOPHYTES

DH-6 LOCATION OF EXPLORATORY DRILL HOLE

69 STRIKE AND DIP OF BEDDING

73 STRIKE AND DIP OF OVERTURNED BEDS

STRIKE OF VERTICAL BEDDING

approximately 37,000 cubic yards. This option would also involve the removal of at least four houses, those at 481, 508. 530, and 535 Conejo Road. This alternative would pose a moderate risk during construction to the stability of residences at 468, 474, 480, 486, 494, 523, 529, 532, and 533 Conejo Road. Costs for this alternative, exclusive of real property value, are estimated at from $300,000 to $400,000 and the restoration would require about 12 to 14 weeks of grading.

2.5 **Alternative E.** Alternative E would involve the reconstruction of Conejo Road approximately as shown on Figures 5 and 6. This alternative will require excavations to depths of 40 to 50 feet and probably generate earth work quantities on the order of 65,000 cubic yards. The alternative would require the removal of at least seven houses, those at 480, 481, 486, 508, 530, 532, and 535 Conejo Road, and will pose a high risk to the stability of additional houses at 474, 494, and 529 Conejo Road and a moderate risk to other houses upslope. Costs for this alternative, exclusive of real property value, are estimated at from $700,000 to $800,000. The restoration would involve from 16 to 20 weeks of grading.

2.6 **Alternative Considerations.** In order to reduce the excavation and fill requirements and also increase stability during construction, consideration was given to the use of retaining walls and caisson (shear pins) in various locations. It was concluded, however, that the use of walls and caissons would be of questionable technical value with respect to increased stability and would significantly add to the cost of the remedial work.

It should be understood that whichever alternative the City selects for restoration of Conejo Road, the possibility exists that excessive water infiltration or seismic activity may lead to renewed sliding on one or more of the slide planes encountered. It is hoped, however, that surface water control and subsurface drains will adequately reduce the presence of ground water and prevent sliding from recurring. Whichever restoration scheme the City selects, it is important that a specific engineering design and geotechnical analysis be performed prior to implementation. All grading work, if initiated, should be performed with adequate consideration to avoid the wet season during the winter months of November through April.

3.0 GROUND WATER

Ground water was encountered in the form of seepage in all of the holes drilled as part of this investigation and is considered to constitute a significant factor in the occurrence of the recent landslide activity. The quality characteristics of the ground water, at least as analyzed from Drill Hole No. 3, indicate a quality significantly different from water purveyed in the area and we conclude the water likely represents naturally occurring ground water. The occurrence and movement of ground water both within and beneath the identified and postulated slide masses remains somewhat speculative, although we believe a mechanism for ground water movement within buried fanglomerate deposits, such as that encountered in Drill Hole No. 3, may play an important role in the initiation of landslide activity. The drilling and logging of the horizontal drain holes may provide additional information on this possibility.

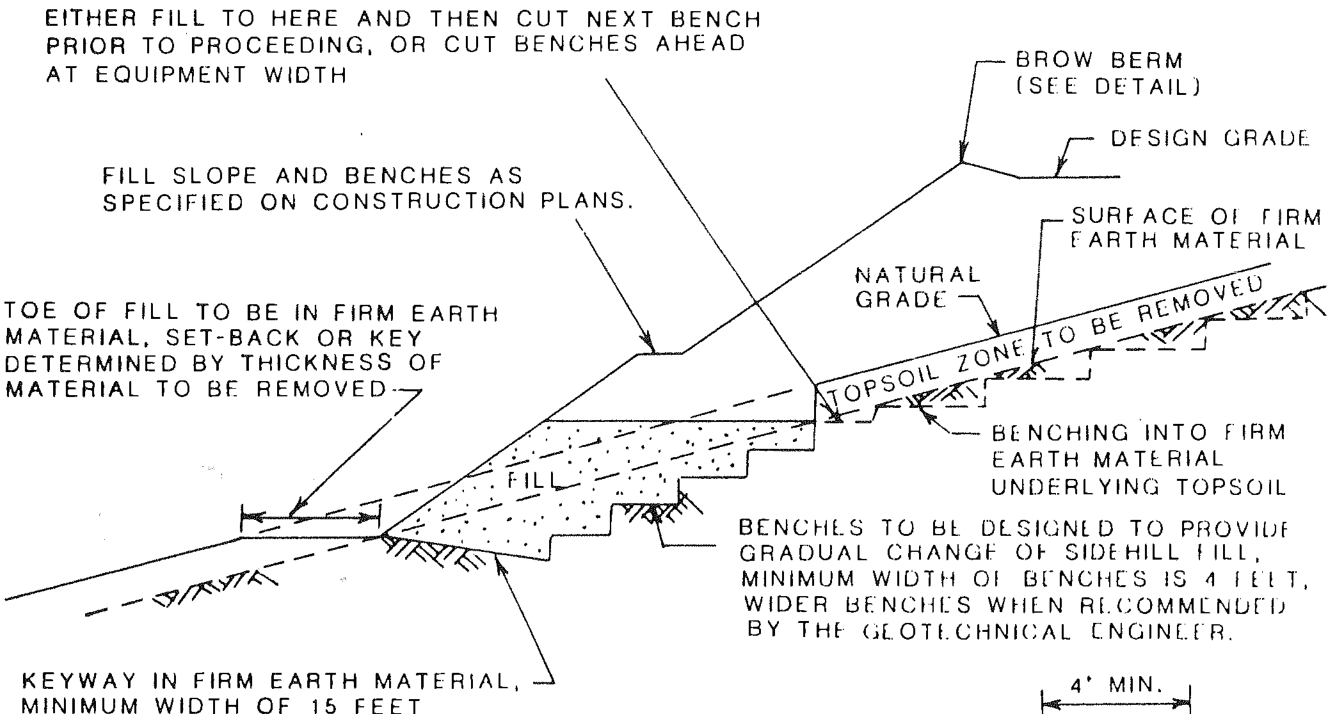
4.0 GRADING AND EARTHWORK

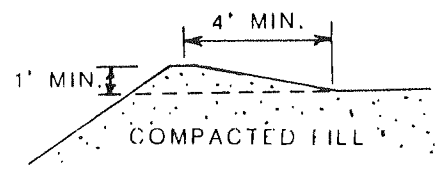
4.1 **Site Preparation.** Prior to commencing earthwork, all organic matter and other deleterious material should be stripped from the area and removed from the site. In particular, the debris remaining from removal of the residences and all unsuitable materials (trees, roots, and pipe) must be stripped from the slide area in order that remaining materials meet the specifications required for fill operations. As excavation operations expose successive slide layers, this cleaning operation must continue to remove unsatisfactory material.

Wherever compacted fill is being placed, the slope should be keyed and benched as shown on Figure 7 - Sidehill Fill. It is important that the keyways and benches penetrate through any compressible topsoil, loose slide debris, and highly weathered zones.

4.2 **Engineered Fill.** As is evidenced by the large arcuate fracturing across the existing head scarp of Slide Mass B, the area is still in distress and should be regarded as unstable. The fill construction should take place in stages to minimize the possibility of reactivating this and other upslope slide masses. Dewatering should precede all excavation as indicated on the Activity Sequence presented below.

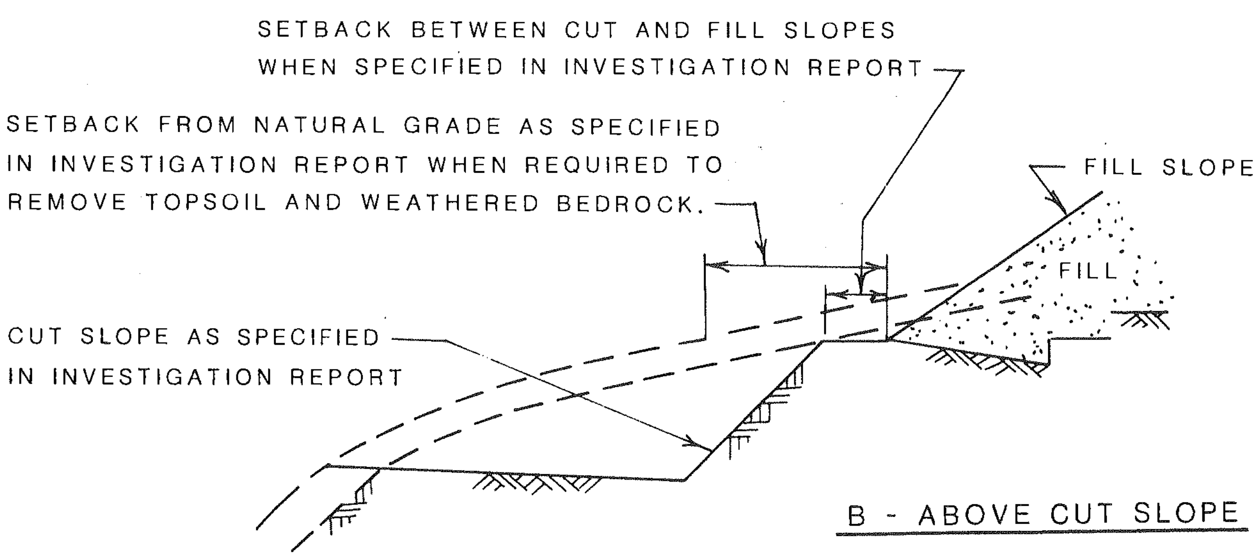
FIGURE 7
SIDEHILL FILL



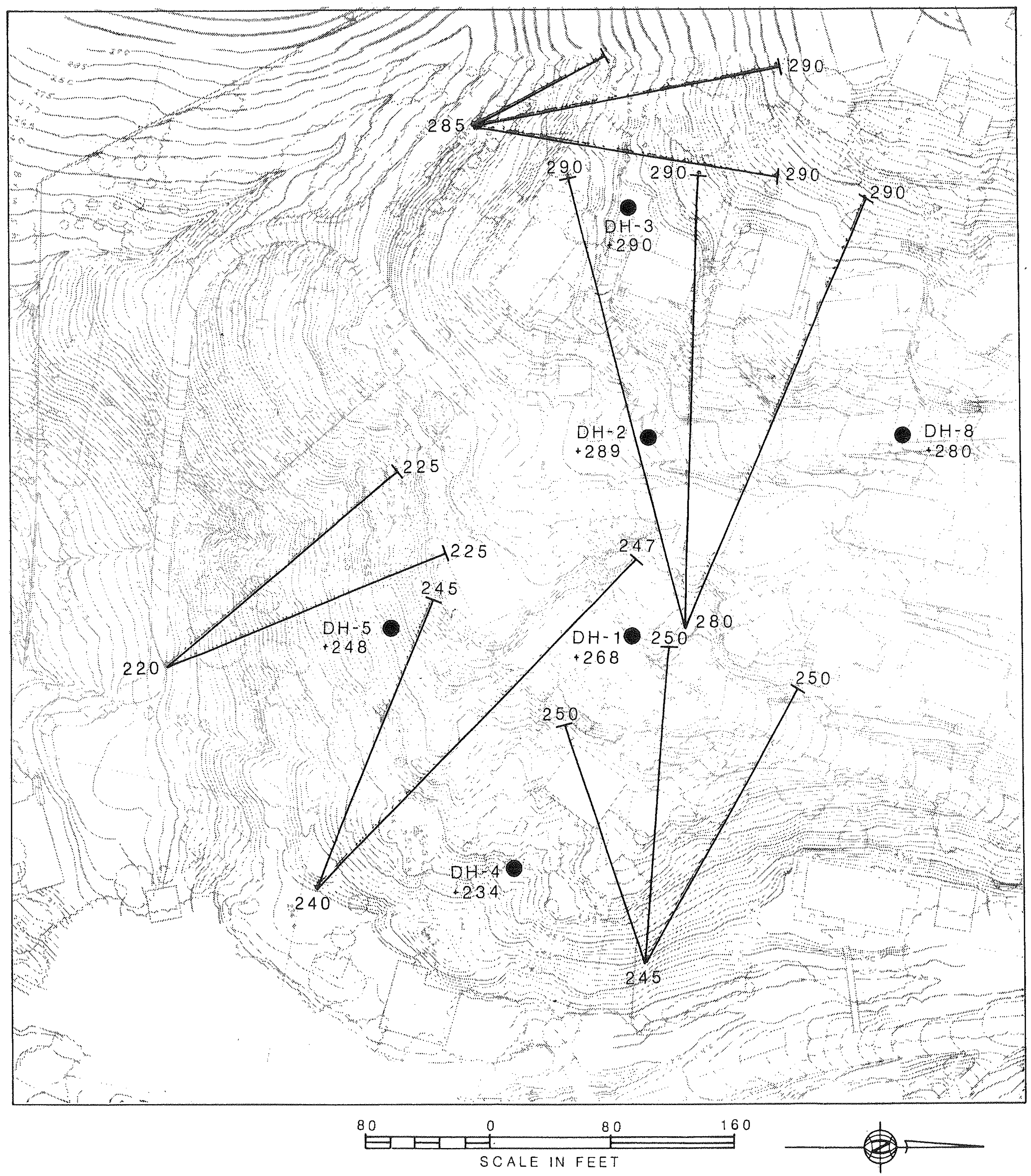


A - ABOVE NATURAL SLOPE

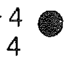
BROW BERM DETAIL



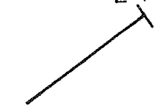
B - ABOVE CUT SLOPE



LEGEND



APPROXIMATE LOCATION OF DRILL HOLE WITH ELEVATION AT WHICH GROUND WATER SEEPAGE WAS FIRST ENCOUNTERED



SUGGESTED LOCATION OF HORIZONTAL DRAIN HOLE WITH INITIAL AND FINAL ELEVATION

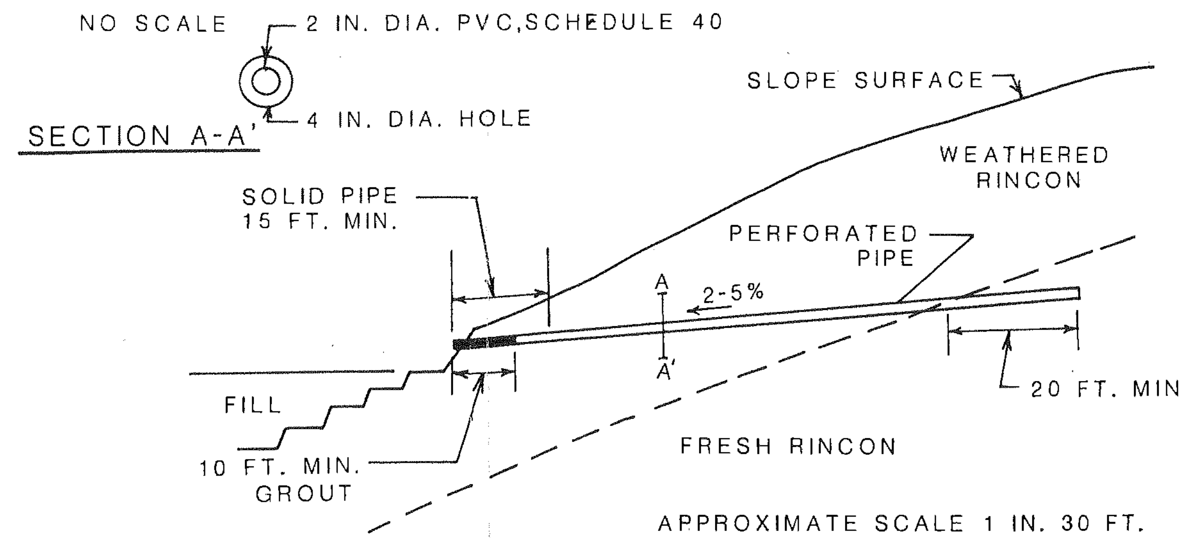


FIGURE 4
SUGGESTED LOCATIONS OF HORIZONTAL DRAIN HOLES
V83113A APRIL,1984

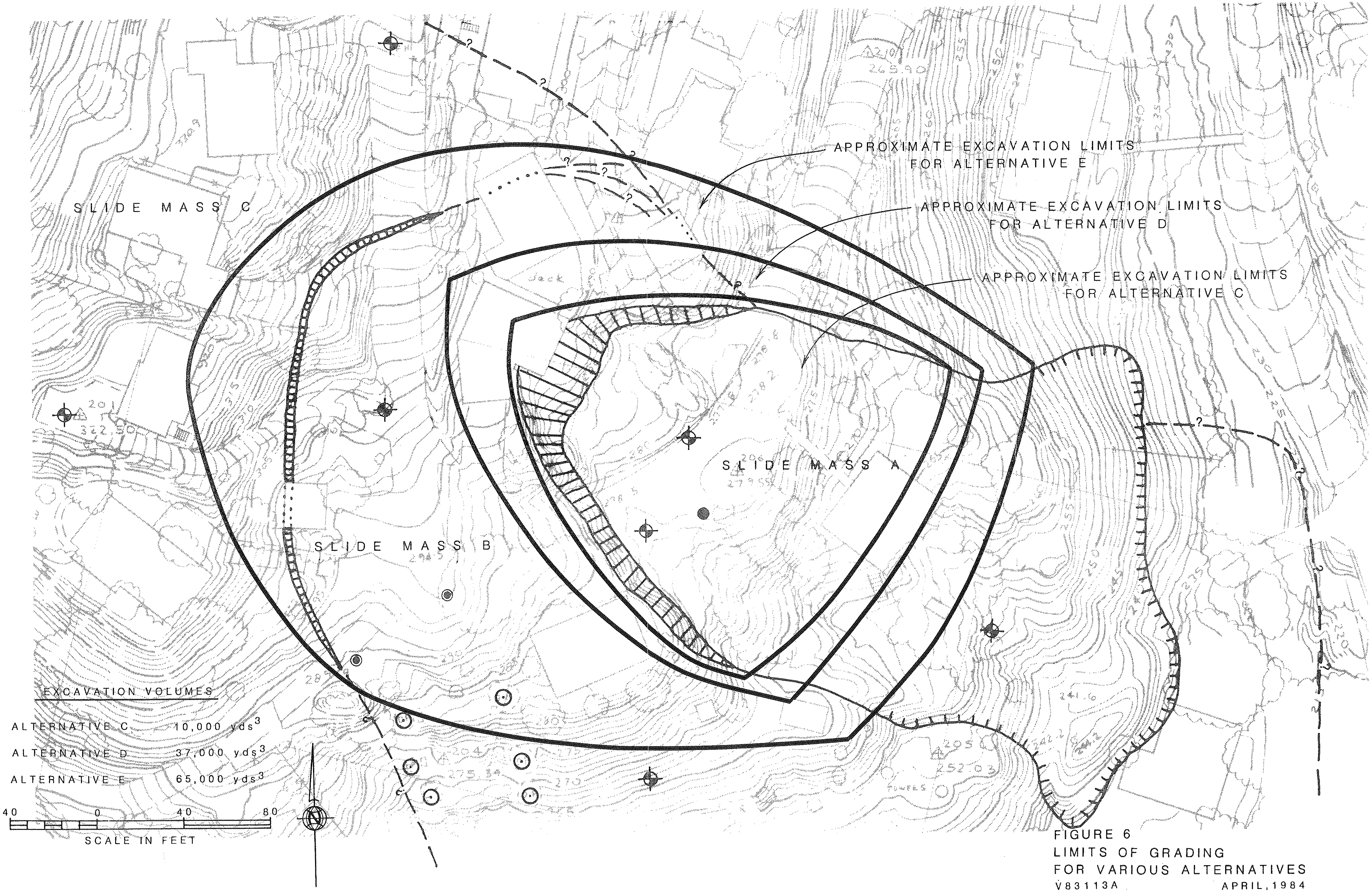
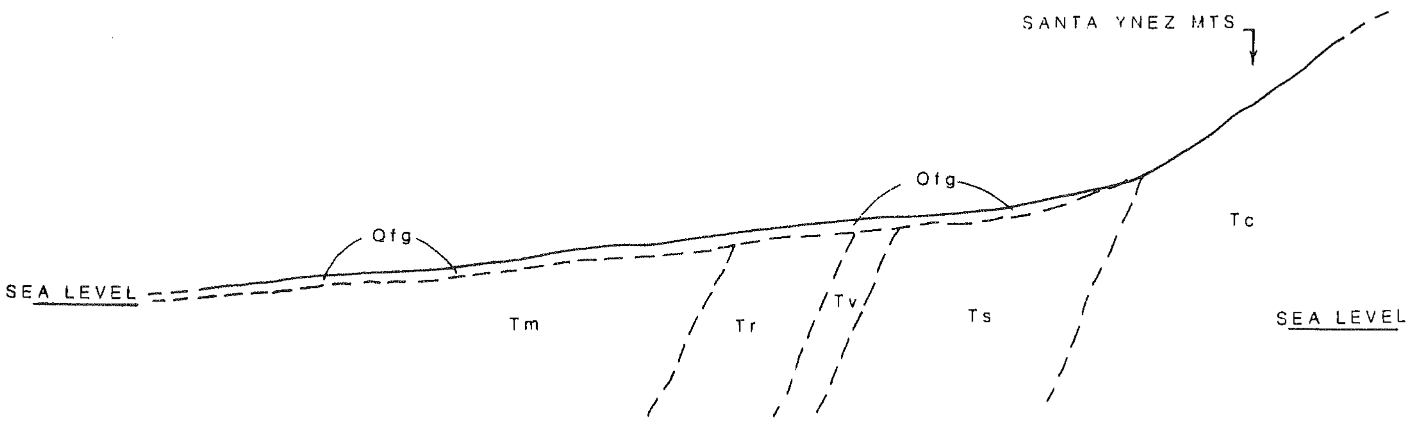
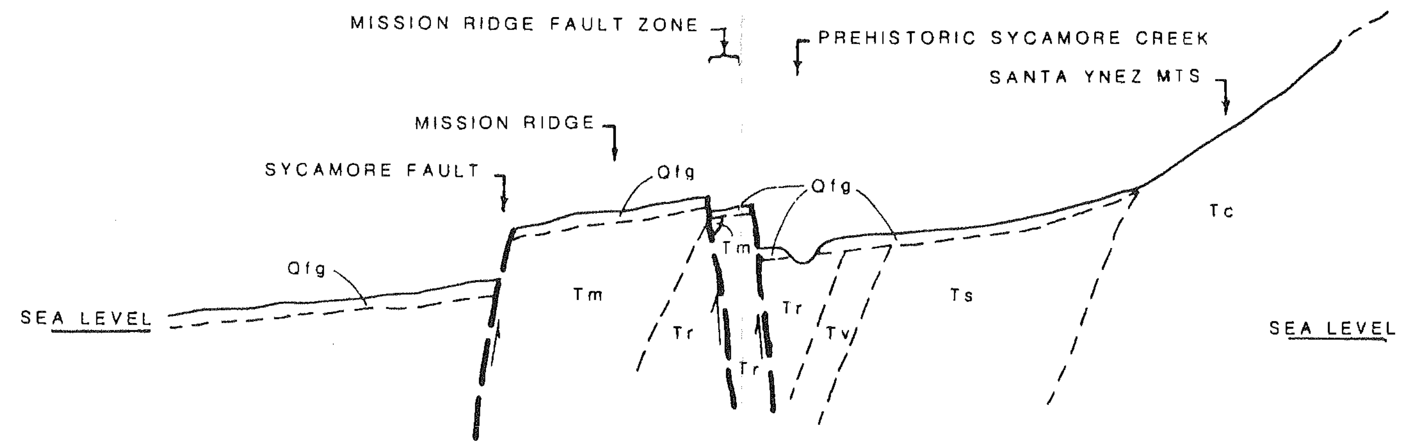


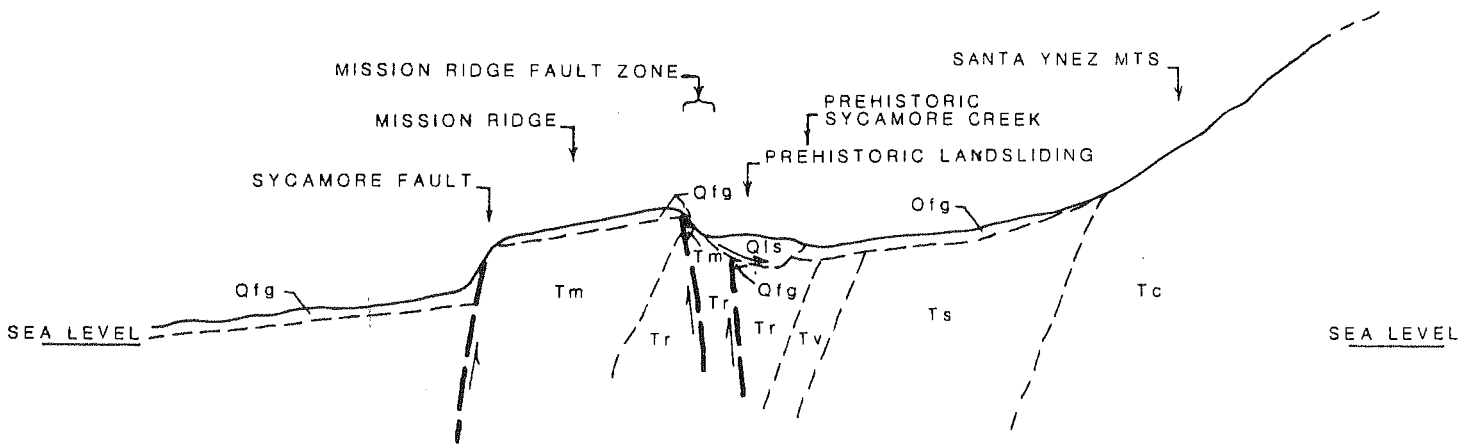
FIGURE 6
LIMITS OF GRADING
FOR VARIOUS ALTERNATIVES
V83113A APRIL, 1984



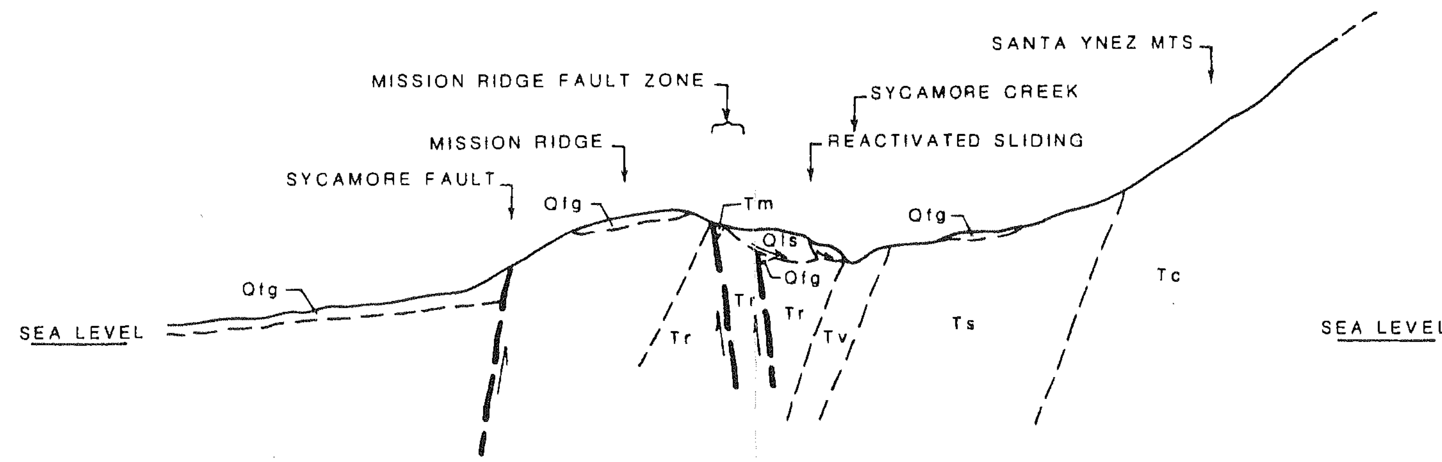
3a) MIDDLE TO EARLY PLEISTOCENE (1.0 MILLION TO 300,000 ybp)?
UPLIFT, EMERGENCE AND EROSION OF SANTA YNEZ MOUNTAINS.
DEPOSITION OF FANGLOMERATE ON LOWER SLOPES.



3b) LATE MIDDLE TO LATE PLEISTOCENE (1.0 MILLION TO 100,000 ybp)?
INITIATION OF FAULTING ON SYCAMORE FAULT AND MISSION RIDGE ZONE,
OFFSET OF FANGLOMERATE, UPLIFT OF MISSION RIDGE AND ALTERATION OF
DRAINAGE WITH DEVELOPMENT OF PRECURSOR TO SYCAMORE CREEK.



3c) LATEST PLEISTOCENE TO EARLY HOLOCENE (20,000 TO 10,000 ybp)?
LARGE SCALE LANDSLIDING ON NORTH FACING FAULT SCARP IN
RINCON FORMATION, BURIEL OF FANGLOMERATE DEPOSITS BENEATH
SLIDE DEBRIS, INITIAL NORTHWARD DEFLECTION OF SYCAMORE CREEK



3d) HOLOCENE (10,000 ybp TO PRESENT)
INCISEMENT OF SYCAMORE WITH REMOVAL OF MOST FANGLOMERATE
DEPOSITS. REACTIVATED SLIDING IN TOE AREA OF ANCIENT SLIDE DUE TO
INCISEMENT WITH FURTHER NORTHWARD DEFLECTION OF CREEK.

LEGEND

QUATERNARY
- Qls LANDSLIDE DEPOSITS
- Qfg FANGLOMERATE DEPOSITS

TERTIARY
- Tm MONTEREY FORMATION
- Tr RINCON FORMATION
- Tv VAQUEROS FORMATION
- Ts SESPE FORMATION
- Tc COLDWATER FORMATION

DIAGRAM GENERALIZED SCHEMATICS
NOT TO SCALE

FIGURE 3
QUATERNARY EVOLUTION
OF MISSION RIDGE
V83113A APRIL, 1984

ACTIVITY SEQUENCE

Phase	Activity	Comment
I	Installation of subsurface horizontal drains	Will require evaluation of effectiveness of draining the slide mass and need of additional temporary support
II	Removal of remains of residences and all unsatisfactory organic (trees) and manmade debris. Removal of existing instabilities by excavation of driving force	Will require continuous cleaning throughout entire stabilization operation, from head down to toe
III	Excavation to stable material at toe of engineered fill. Processing of engineered fill	Stockpile material. Requires drying and blending, as necessary
IV	Steplike excavation and benching of compacted fill slope. Backfill with excess material excavated from proposed cut slope.	Simultaneous operation, recompaction operations must closely follow excavation to insure stability of exposed cuts.

4.3 **Excavation.** All of the earth materials that will be encountered in the proposed grading can be excavated with conventional equipment. The deep cuts in the Rincon Formation may encounter difficult ripping near grade.

All cut slopes will require continuous observation by an engineering geologist during grading. Depths of cut slope will vary considerably and may require additional buttressing or changing the inclination of the slope as recommended by the geotechnical personnel.

4.4 **Placing and Compacting Fill.** Past laboratory testing of remolded samples of mixed slide material and weathered Rincon Formation from adjacent areas resulted in moderate shear strengths indicating that a well-mixed composite of the materials present at the study area will perform adequately as compacted fill material, where free of organics and other deleterious material. Additional sources of fill will only be required as needed to meet the final slope configuration.

Fill should be placed in thin layers, dried or watered and mixed as required, and compacted to at least 90 percent relative compaction as determined by Standard Test Method ASTM D-1557, modified to three layers. All cut and fill slopes should be protected against erosion with a lightweight, deeply rooted plant cover.

4.5 **Earthwork Factor.** Previously performed laboratory testing indicates that the Rincon Formation has natural densities ranging from 80 to 95 percent of maximum laboratory densities. However, corresponding natural densities in the slide material can vary widely from 60 to 85 percent relative compaction. A shrinkage factor of 12 to 15 percent may be used from cut to fill when compacting the earth materials to 90 percent relative compaction.

Compaction to a higher density will increase the shrinkage factor correspondingly.

4.6 **Slope Inclination.** The temporary cut slope from the toe of the fill to the top of excavation should be graded no steeper than 1-1/2 horizontal to 1 vertical. Careful examination of this latter area during excavation to evaluate ground water conditions and potential instabilities will be required.

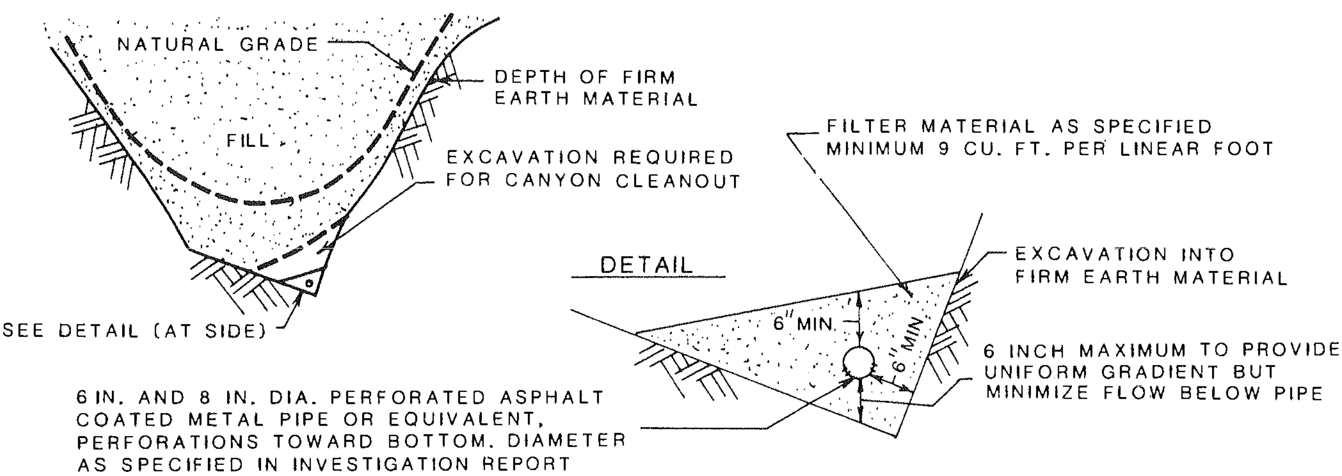
5.0 DRAINAGE

5.1 **Surface Drainage.** All permanent cut and fill slopes should be protected against erosion by directing drainage away from slopes with properly designed and constructed terraces and brow berms (as detailed on Figure 7) and revegetation of exposed faces.

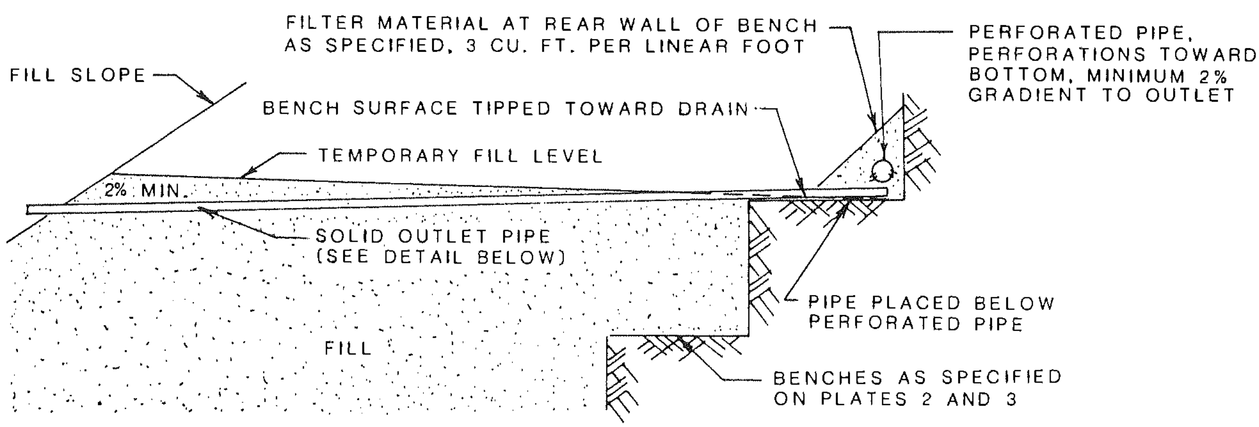
5.2 **Subsurface Drains.** Subdrains should be provided at the back of the fill at regular height intervals (approximately 20 to 30 feet) along the excavated benches prior to backfilling and compaction. The drain system should be constructed of 4-inch diameter perforated PVC, Schedule 80 pipe. Non-perforated PVC laterals should be placed at a two percent gradient to daylight, where the drains should be connected to engineered surface drains. A general subdrain installation is shown on Figure 8 - Typical Subdrains.

5.3 **Horizontal Drains.** We recommend the installation of horizontal drains to dewater slide masses in the Rincon Formation and fanglomerate deposits in order to improve slope stability. The actual number and length of pipe will be determined from information obtained during drilling the drain pipe holes. Tentative locations for the drains are shown on Figure 4. We estimate that as many as ten drain holes, each on the order of 200 feet long, should be installed.

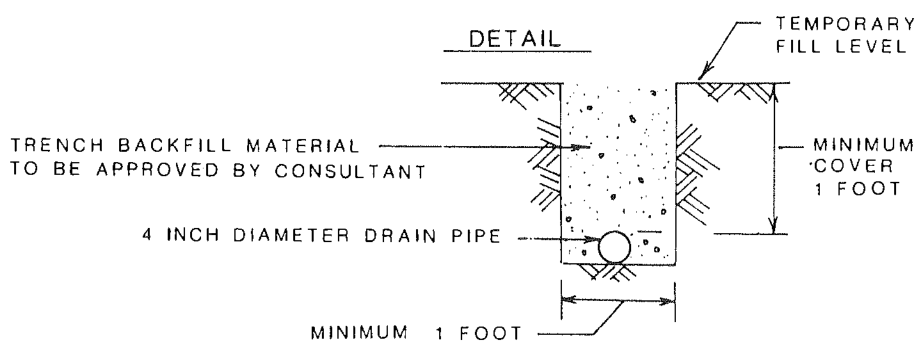
FIGURE 8
TYPICAL SUBDRAINS



A - CANYON



B - SIDEHILL FILL OR BUTTRESS FILL



The drain holes should be drilled 2 to 5 degrees up from the horizontal and should be four inches in diameter. They should be drilled at least 20 feet into fresh, unweathered bedrock. The front ten feet of the holes should be grouted around the outside of the casing. The drains should be 2-inch diameter PVC Schedule 40 perforated pipe.

It should be noted that Alternatives C, D, and E involve the installation of horizontal drains in the bottom of the removal of Slide Masses A or B. It would be desirable to collect and convey the water from these horizontal drains and other subdrains by gravity flow to Sycamore Creek. As such, this would require trenching and pipe installation across private property. Alternatively, the drainage water may be conveyed in a pipe located in a deep trench along the west side of Conejo Road or be collected in a sump system with an automatic electric pump which would pump and dispose of water in a safe area.

The entire installation of horizontal drains should be conducted under the observation of qualified geotechnical personnel.

6.0 GEOTECHNICAL OBSERVATION

Excavation and compaction operations should be performed under the observation of qualified geotechnical personnel. All fill placed should be observed and tested by a soils engineer to assure that proper compaction is being obtained. Excavation should be closely monitored by geotechnical personnel to verify adequate removal of unstable material.

The findings, recommendations, and professional opinions are presented within the limits prescribed by the client, after being prepared in accordance with generally accepted professional engineering and geologic practices. There is no other warranty either express or implied.

Respectfully submitted,
GEOTECHNICAL CONSULTANTS, INC.

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David A. Gardner
Engineering Geologist, 969

Ivar Staal

Ivar Staal
Civil Engineer, 16463

APPENDIX
SUPPORTING GEOTECHNICAL DATA

EXPLORATION

Exploration of the site was performed during the first two weeks of February 1984. The exploratory work consisted of the drilling of a total of 9 borings throughout the areas experiencing obvious distress.

Borings were drilled to a depth ranging from 55 to 110 feet with a 24-inch rotary bucket auger. Throughout the drilling, the earth materials encountered were described in detail; these descriptions are presented as Plates A-1.1 through A-1.9 - Log of Drill Hole. Elevations and locations of drill holes were determined by interpolation between plan contours and measurements from various points of reference. Locations of borings are presented on Plate 1 - Geotechnical Map. The stratification lines shown on all logs represent the approximate boundary between soil types and the transition may be gradual. A legend to the logs is presented as Plate A-2.

Undisturbed samples were obtained from the drill holes with a 3.2-inch outside diameter drive sampler which contained an 8-inch long, 2-5/8-inch inside diameter brass sleeve. The number of blows of the hammer with an approximate 12-inch drop needed to drive the sampler 12 inches was recorded as an indication of the density or consistency of the earth materials. The depth from which each sample was obtained, blow counts for each sample, and the driving weight for the hammer are shown on the log of each drill hole.

TESTING

No laboratory testing was performed on earth material samples obtained from the drill holes. Sample testing is being held in abeyance until a restorative alternative is selected.

Chemical testing of ground water obtained from Drill Hole 3 was performed and the results are included as Plate A-3.

LOG OF DRILL HOLE

JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bucket(24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 1
DRILLING DATE: 2/6/84
DATUM: MSL
REFERENCE EL.: 278 feet

ELEVATION (FEET) / DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
0				"ARTIFICIAL FILL (af)",SILTY GRAVEL (GM), gravel to ½ inch, silty matrix						
		1	1	"COLLUVIUM (Qcol)" SILTY CLAY(CL), brown to black,soft,medium stiff, moderately plastic, damp with occasional sandstone cobbles and organics						
273	++++	2	1	large sandstone boulder						
				color change to light brown						
10	++++	3	1	"FANGLOMERATE (Qfg)" SANDY CLAY (CL), fine-coarse,subangular to subrounded, orange-brown,moderately plastic, medium stiff, damp-wet with sandstone boulders						
263	++++	4	1	increase in angular-subangular sandstone cobbles; occasionally distorted lamina of silty clay, sandy silt, and silty sand						
				"RINCON FORMATION (Tr)" CLAYSTONE (R), weathered to SILTY CLAY (CL),olive-green with brown mottle, medium plasticity, medium stiff, moist						
20	++++	5	2	16 feet: slickensides - Base of Slide Mass A; becoming fresh, blocky and fractured						
				Base of Slide Mass B						
253	++++	6	6	becoming fresh, pyrolusite on bedding planes; becoming dry; color change to dark green; becoming very stiff, massive						
30	++++	7	(7)	becoming non plastic; occasionally weathered to CLAY (CL) on fractures; becoming hard						
243	++++	8	(18)							
40	++++	9	(20)							
233	++++									
50	++++	10	(32)							

LEGEND TO LOGS ON PLATE A-2

LOG OF DRILL HOLE

JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bucket(24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 1
DRILLING DATE: 2/20/84
DATUM: MSL
REFERENCE EL.: 278 feet

ELEVATION (FEET) DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING 2 4 6 8	SAMPLE	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT (%)	ATTERBERG LIMITS PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
223						"RINCON FORMATION (Tr)" CLAYSTONE (R), dark green, hard, blocky, silicious, massive, dry						
60			11	[94]								
						Bottom of drill hole at a depth of 64 feet. Ground water encountered as seepage at a depth of 10-15 feet. Drill hole backfilled and tamped.						

LEGEND TO LOGS ON PLATE A-2

LOG OF DRILL HOLE

JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bucket (24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 2
DRILLING DATE: 2/6/84
DATUM: MSL
REFERENCE EL.: 300 feet

ELEVATION (FEET)	DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING 2 4 6 8	SAMPLE	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT (%)	ATTERBERG LIMITS PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
				1	1		"COLLUVIUM (Qcol)" SILTY CLAY(CL),brown-black,medium stiff, medium plasticity, damp to moist						
295		++++		2	1		"RINCON FORMATION (Tr)" CLAYSTONE (R), weathered to SILTY CLAY (CL),olive-green with brown mottle, medium plasticity, medium stiff, damp to moist, occasionally with caliche and concretions						
	10	++++		3	1		minor seepage						
205		++++		4	1		several large concretions (up to 12") occasionally very altered						
	20	++++		5	1		minor seepage						
275		++++		6	1		becoming damp						
	30	++++		7	(2)		color change to orange-brown becoming moist and highly plastic						
265		++++					Lens of disturbed multi-colored CLAY (CH),very plastic, moist abundant large gypsum crystals slickensides and gouge 39 Feet: Base of Slide Mass B						
	40	++++		8	(4)		becoming fresh CLAYSTONE (R), dark green, hard, massive,dry becoming very fractured with slickensides abundant prismatic fractures						
245		++++		9	(4)		becoming wet on fractures minor seepage						
	50	++++		10	(40)		becoming fresh, hard, massive						

LEGEND TO LOGS ON PLATE A-2

LOG OF DRILL HOLE

JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bucket(24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 2
DRILLING DATE: 2/6/84
DATUM: MSL
REFERENCE EL.: 300 feet

ELEVATION (FEET)	DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING 2 4 6 8	SAMPLE	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT (%)	ATTERBERG LIMITS PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
235							"RINCON FORMATION (Tr)" CLAYSTONE (R), dark green, medium plasticity, medium firm, dry with occasional concretions very fractured with abundant slickensides						
	60	+ + + +	■	11	[14]		becoming fresh, massive, very firm to hard, very dry						
225		+ + + +	■	12	[84]		becoming medium firm to soft, moderately plastic, moist, altered to green with brown mottle with slikensides becoming wet becoming fractured and dry						
	70	+ + + +	■	13	[26]		color change to dark green becoming fresh CLAYSTONE (R), hard, massive, blocky						
215		+ + + +											
	80	+ + + +											
205		+ + + +											
	90						Bottom of drill hole at a depth of 90 feet. Ground water encountered as seepage at depths of 11, 19, and 48 feet. Drill hole backfilled and tamped.						

LEGEND TO LOGS ON PLATE A-2

LOG OF DRILL HOLE

JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bucket(24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 3
DRILLING DATE: 2/7/84
DATUM: MSL
REFERENCE EL.: 322 feet

ELEVATION (FEET)	DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING 2 4 6 8	SAMPLE	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT (%)	ATTERBERG LIMITS PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
	0						"ARTIFICIAL FILL (af)" SILTY GRAVEL(GM), gravel to 3/4", with brown, dry SILT(ML)						
							"FANGLOMERATE (Qfg)" SILTY SAND(SM), fine-coarse,well graded, orange-brown, loose-medium dense, moist with gravel, cobbles and boulders						
317		+ + + +											
	10	+ + + +											
							"FANGLOMERATE (Qfg)" SILTY CLAY (CL), brown, soft-medium, moderately plastic						
307		+ + + +					becoming SANDY CLAY (CL), fine to medium grained, subangular to subrounded,brown, medium firm, moderately plastic, moist-damp						
	20	+ + + +	■	1	2								
							large sandstone boulders						
							"FANGLOMERATE (Qfg)" SILTY SAND (SM),fine to medium, poorly graded, orange-brown, loose to medium dense, moist						
297		+ + + +					▼ ground water at a depth of 26 feet on 2/8/84						
	30	+ + + +					occasional gravel to 1/2"						
							color change to red-brown						
287		+ + + +					color change to orange-brown						
							becoming saturated						
	40	+ + + +											
277		+ + + +					increase in gravel, angular with occasional rounded quartzite clasts						
							"FANGLOMERATE (Qfg)" CLAYEY SILT(ML), brown, medium firm to firm, moderately plastic, moist						
	50	+ + + +											

LEGEND TO LOGS ON PLATE A-2

LOG OF DRILL HOLE

JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bucket(24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 3
DRILLING DATE: 2/7/84
DATUM: MSL
REFERENCE EL.: 322 feet

ELEVATION (FEET) DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING 2 4 6 8	SAMPLE	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT (%)	ATTERBERG LIMITS PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
267		■	2	[16]		"FANGLOMERATE (Qfg)" SANDY CLAY (CL), fine to medium grained, brown, medium firm, moderately plastic, moist						
60	++++	■	3	[16]		color change to brown with green mottle						
						"RINCON FORMATION (Tr)" CLAYSTONE (R), extremely weathered to SILTY CLAY(CL), blue-green, stiff to very stiff, moderately plastic, damp with caliche nodules.						
257	++++											
70	++++	■	4	[9]								
247	++++					color change to olive-green with brown mottle						
80	++++	■	5	(12)		becoming very stiff						
237	++++											
90	++++	■	6	(14)								
						color change to blue-green with occasional black mottle						
227	++++	■	7	[7]		Bottom of drill hole at a depth of 95 feet. Ground water encountered as free water at a depth of 26 feet. Drill hole backfilled and tamped.						
100	++++											
	++++											

LEGEND TO LOGS ON PLATE A-2

LOG OF DRILL HOLE

JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bucket(24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 4
DRILLING DATE: 2/9/84
DATUM: MSL
REFERENCE EL.: 252 feet

ELEVATION (FEET) / DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
0		1	1	"COLLUVIUM (Qcol)" CLAYEY SILT(ML), brown-black with occasional green mottle, slightly plastic, moist; becoming olive-green						
248	++++	2	1	"RINCON FORMATION (Tr)" CLAYSTONE (R),weathered to SILTY CLAY (CL), olive-green with orange-brown and black lamina, slightly plastic, moist, with occasional concretions						
10	++++	3	1							
238	++++	4	2	becoming very plastic; "FANGLOMERATE (Qfg)" CLAYEY SAND(SC),fine-coarse, subangular to subrounded, orange-brown, well graded, medium dense, moist, with abundant rounded cobbles and boulders						
20	++++			seepage 1 GPM; becoming wet; becoming saturated; Base of Slide Mass A						
228	++++	5	4	"RINCON FORMATION (Tr)" CLAYSTONE (R), weathered to SILTY CLAY (CL), olive-green, stiff, damp; slickensides and gouge; becoming dry; slickensides and gouge						
30	++++	6	(3)	slickensides and gouge; becoming less weathered						
218	++++	7	(4)							
40	++++	8	(3)	Base of Slide Mass B; becoming fresh CLAYSTONE (R), dark green, hard, blocky, dry						
208	++++	9	(8)							
50	++++									

SHEET 1 OF 2

LEGEND TO LOGS ON PLATE A-2

LOG OF DRILL HOLE

JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bucket(24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 4
DRILLING DATE: 2/9/84
DATUM: MSL
REFERENCE EL.: 252 feet

ELEVATION (FEET) DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING 2 4 6 8	SAMPLE	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT (%)	ATTERBERG LIMITS PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
198						"RINCON FORMATION (Tr)" CLAYSTONE (R), dark green, hard, blocky, dry, massive						
60												
188						Bottom of drill hole at a depth of 65 feet. Ground water encountered as seepage at a depth of 19 to 23 feet. Drill hole backfilled and tamped.						

LEGEND TO LOGS ON PLATE A-2

LOG OF DRILL HOLE

JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bucket(24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 5
DRILLING DATE: 2/10/84
DATUM: MSL
REFERENCE EL.: 267 feet

ELEVATION (FEET) / DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING (2 4 6 8)	SAMPLE	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
0						"COLLUVIUM (Qcol)" CLAYEY SILT (ML), brown-black to very dark green, slightly plastic, medium stiff, moist with occasional sandstone cobbles						
262	+ + + +					"FANGLOMERATE (Qfg)" CLAYEY SAND (SC), medium to coarse, moderately well graded, orange-brown to brown, loose, moist, with sandstone cobbles and boulders						
						"COLLUV1UM (Qcol)" SILTY CLAY (CL), olive-green with multi colored lamina, medium firm, damp with abundant cobbles						
10	+ + + +	■	1	1								
						"RINCON FORMATION (Tr)" CLAYSTONE (R), weathered to SILTY CLAY (CL), olive-green, medium firm, slightly plastic, damp						
						fractured with slickensides						
252	+ + + +	■	2	1		slickensides and gouge with abundant caliche on slickensides and fractures						
						fresh slickensides						
20	+ + + +	■	3	1								
						minor seepage via fractures at a depth of 22 feet						
						becoming fresh, hard, blocky, wet on fractures						
242	+ + + +	■	4	4								
30	+ + + +	■	5	(5)		well defined slickensides						
						gouge						
						fresh, massive, hard						
						becoming fractured with slickensides						
232	+ + + +	■	6	(3)								
40	+ + + +	■	7	(6)		becoming fresh CLAYSTONE (R), dark green, hard, dry to damp						
222	+ + + +	■	8	(10)								
						occasionally wet on fractures						
50	+ + + +											
212												

LEGEND TO LOGS ON PLATE A-2

LOG OF DRILL HOLE

JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bucket(24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 5
DRILLING DATE: 2/10/84
DATUM: MSL
REFERENCE EL.: 267 feet

ELEVATION (FEET)	DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING	SAMPLE	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
212							"RINCON FORMATION (Tr)" CLAYSTONE (R), dark green, hard, dry, massive slickensides Base of Slide Mass B (?) becoming hard to drill						
	60	++++	■	9	[30]		becoming blocky with slickenside along fractures						
202		++++					slickensides						
							slickensides						
	70	++++	■	10	[22]		slickensides						
192		++++											
							slickensides and prismatic fractures becoming fresh, hard, massive						
	80	++++					slickensides and gouge						
182		++++	■	11	11								
	90	++++	■	12	10								
							becoming weathered CLAYSTONE (R), olive-green, stiff, very stiff, moist						
172		++++					becoming more weathered color change to blue-green with brown mottle well defined slickensides						
	100	++++	■	13	[10]		abundant prismatic fractures						
162		++++					Base of Slide Mass C not apparent						
	110						Bottom of drill hole at a depth of 110 feet. Ground water encountered as seepage at a depth of 22-25 feet. Drill hole left open 60 hours. Ground water at a depth of 69 feet. Drill hole backfilled and tamped.						

LEGEND TO LOGS ON PLATE A-2

LOG OF DRILL HOLE

JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bucket(24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 6
DRILLING DATE: 2/13/84
DATUM: MSL
REFERENCE EL.: 375 feet

ELEVATION (FEET)	DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING 2 4 6 8	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT (%)	ATTERBERG LIMITS PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
	0				"ARTIFICIAL FILL (af)", asphalt cement, no base						
					"COLLUVIUM (Qal)"						
					CLAYEY SILT(ML), with fine sand, black-brown, medium stiff, slightly plastic, damp, with occasional dolostone fragments						
370		++++	1	1							
					color change to green-black						
					occasionally sandy, fine to coarse sand						
					becoming moist						
	10	++++									
					color change to dark green						
					color change to olive-green with brown mottle						
360		++++	2	2	"RINCON FORMATION (Tr)"						
					CLAYSTONE (R), weathered to SILTY CLAY(CL), olive-green with brown mottle, medium stiff, medium plasticity, moist with occasional dolostones						
					prismatic fractures, slickensides						
	20	++++	3	3	becoming fresh CLAYSTONE (R), olive-green with brown stain on fractures and bedding planes, very stiff to hard, moist on fractures, blocky						
350		++++	4	4							
					becoming highly fractured (prismatic)						
	30	++++	5	(4)							
340		++++			becoming wet						
					slickensides						
					becoming more weathered						
	40	++++	6	(3)	becoming fresh						
					becoming dark green						
					very fractured and wet with slickensides seepage (.5 GPM)						
330		++++	7	(3)							
					becoming fresh and very hard to drill						
					becoming fractured with slickensides						
	50	++++	8	(11)	becoming dry and fresh						
320											

SHEET 1 OF 2

LEGEND TO LOGS ON PLATE A-2

LOG OF DRILL HOLE

JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bucket (24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 6
DRILLING DATE: 2/13/84
DATUM: MSL
REFERENCE EL.: 375 feet

ELEVATION (FEET)	DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT (%)	ATTERBERG LIMITS PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
320			9	[14]	"RINCON FORMATION (Tr)" CLAYSTONE (R), dark green to olive-green, very stiff to hard, blocky, dry; slickensides and gouge						
	60	++++			becoming fresh						
310		++++	10	[4]							
					becoming fractured with slickensides; very plastic gray-green CLAY (CH) lens (3")						
	70	++++	11	[7]	very well defined slide plane; very plastic brown to green, moist CLAY (CH)						
					"FANGLOMERATE (Qfg)" CLAYEY SILT (ML), red-brown, medium stiff, slightly plastic, damp						
300		++++	12	(4)	71.5 Feet: Base of Slide Mass C (?); becoming SANDY SILT (ML), fine to coarse grained, sub-angular, subrounded, red-brown, medium stiff, slightly plastic						
	80	++++	13	(9)	becoming SANDY SILT (ML)						
					abundant caliche						
					abundant decomposed sandstone cobbles						
290					sandstone cobbles						
					Bottom of drill hole at a depth of 85 feet. Ground water encountered as seepage at a depth of 43 feet. Drill hole backfilled and tamped.						

SHEET 2 OF 2

LEGEND T- 'OGS ON PLATF A-2

PLATE A-1.6

LOG OF DRILL HOLE

JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bucket(24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 7
DRILLING DATE: 2/14/84
DATUM: MSL
REFERENCE EL.: 278 feet

ELEVATION (FEET)	DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING (2 4 6 8)	SAMPLE	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
	0						"ARTIFICIAL FILL (af)",asphalt and gravel SILTY GRAVEL(GM),rounded gravel to ½ inch with SILT(ML), brown, non-plastic, moist asphalt, nine 6-inch layers of asphalt						
273		++++											
							minor seepage into drill hole from between asphalt layers						
	10	++++					"COLLUVIUM (Qcol)" CLAYEY SILT (ML), green-black with brown mottle, medium plasticity, medium stiff, moist sandstone cobbles						
263		++++					"FANGLOMERATE (Qfg)" CLAYEY SAND (SC),fine-coarse grained, orange-brown,medium dense, well graded, moist with sandstone cobbles and boulders						
	20	++++					becoming wet becoming SANDY CLAY(CL) seepage 1-2 GPM color change to olive-green						
253		++++					24.5 Feet: Base of Slide Mass A "RINCON FORMATION (Tr)" CLAYSTONE (R), weathered to SILTY CLAY (CL), olive-green stiff to very stiff, wet slickensides and gouge						
	30	++++					becoming very fractured becoming damp well developed slickensides slickensides and gouge becoming dry						
243		++++					color change to orange-brown, occasionally olive-green color change to olive-green						
	40	++++					Base of Slide Mass B						
233		++++					becoming fresh CLAYSTONE(R),dark green, hard, dry, massive, blocky, occasionally weathered to blue-green CLAY (CL) on bedding and fractures becoming hard to drill very hard to drill, using core bucket						
	50	++++					switch to 18-inch bucket Practical refusal at a depth of 55 feet.						
223							Bottom of drill hole at a depth of 55 feet. Ground water encountered as seepage at a depth of 8 and 22 feet. Drill hole backfilled and tamped.						

LEGEND TO LOGS ON PLATE A-2

LOG OF DRILL HOLE

JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bucket(24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 8
DRILLING DATE: 2/21/84
DATUM: MSL
REFERENCE EL.: 321 feet

ELEVATION (FEET)	DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING	SAMPLE	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT (%)	ATTERBERG LIMITS PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
	0						"ARTIFICIAL FILL (af)", asphalt cement(4") SANDY CLAY (CL),fine-medium sand, brown, dry, medium stiff						
							"COLLUVIUM (Qcol)" CLAYEY SILT (ML), black-brown,medium stiff, slightly plastic, damp						
316													
							"FANGLOMERATE (Qfg)" CLAYEY SAND (SC), medium to coarse grained, orange-brown, loose to dense, moist with abundant subangular to subrounded sandstone gravel and cobbles						
	10						9 Feet: Base of Slide Mass C (?) "RINCON FORMATION (Tr)" CLAYSTONE (R), weathered to SILTY CLAY (CL), olive-green with brown mottle, medium stiff to stiff, damp, with caliche						
306							Very fractured with abundant slickenside surfaces at contact with fanglomerate						
							very weathered dolostone lens becoming dry						
	20						becoming more blocky with less slickensides becoming fractured						
							increasing slickensides						
396							abundant caliche						
	30						fresh massive CLAYSTONE (R), dark green, hard, dry						
286							becoming fractured with slickensides minor seepage via fractures at a depth of 36 feet						
	40						remaining fractured						
							becoming less fractured						
276							lens of very stiff dark green clay with slickensides bedding attitude: N63°E 65°S						
							becoming very hard switch to 18" bucket						
	50						Practical refusal at a depth of 51 feet.						
							Bottom of drill hole at a depth of 51 feet. Ground water encountered as seepage at a depth of 36 feet. Drill hole backfilled and tamped.						

LEGEND TO LOGS ON PLATE A-2

LOG OF DRILL HOLE

JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bukcet (24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 9
DRILLING DATE: 2/22/84
DATUM: MSL
REFERENCE EL.: 380 feet

ELEVATION (FEET) / DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING	SAMPLE	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
0						"ARTIFICIAL FILL (af)" 3" asphalt/cement SANDY SILT (ML), fine sand, brown, medium stiff, damp						
						"COLLUVIUM (Qcol)" CLAYEY SILT (ML), olive green with brown mottle, medium stiff, damp, slightly plastic, with caliche and dolostones						
375	+ + + +					occasional prismatic fractures						
						"RINCON FORMATION (Tr)" CLAYSTONE (R), weathered to SILTY CLAY (CL), olive green with brown mottle, stiff, moderately plastic, damp to moist with prismatic fractures and occasional slicken-sides						
10	+ + + +					becoming moist increasing slickensides						
365	+ + + +											
						abundant caliche on fractures and slickensides						
20	+ + + +											
355	+ + + +					becoming more blocky with less slickensides						
30	+ + + +											
						becoming fresh CLAYSTONE (R), dark green, very hard, dry						
345	+ + + +					becoming moderately weathered CLAYSTONE (R), olive green, hard, blocky, abundant caliche, few to no slickensides						
40	+ + + +											
						continuing fractured, 1 to 2" rhomboidal blocks						
335	+ + + +					becoming wet on fractures minor seepage						
						becoming fresh CLAYSTONE (R), dark green, very hard, blocky, massive, dry						
50	+ + + +					49 feet: becoming hard to drill 50 feet: change to 18-inch bucket						
325												

LEGEND TO LOGS ON PLATE A-2

LOG OF DRILL HOLE

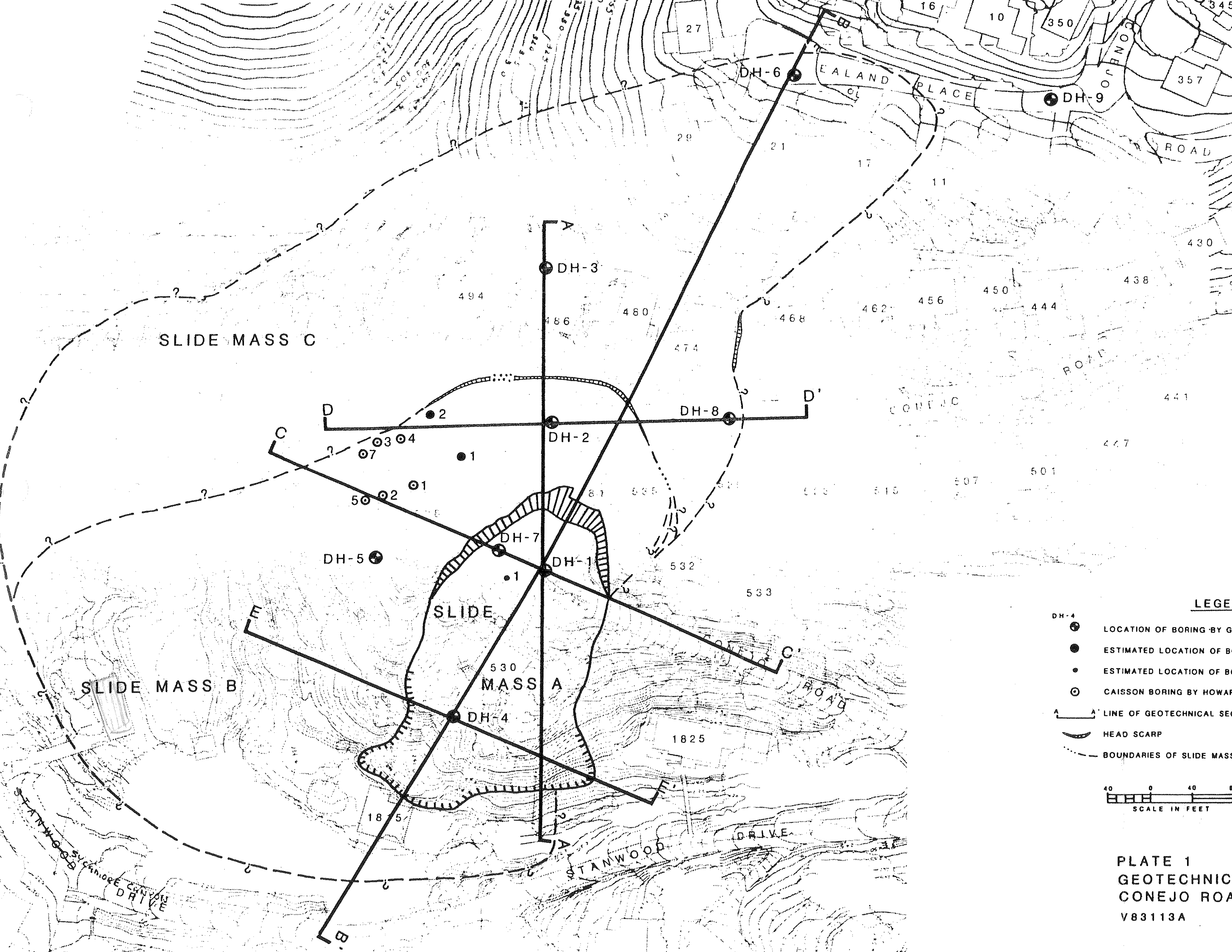
JOB NO.: V83113A
PROJECT: Conejo Road Landslide
LOCATION: Santa Barbara, California
DRILLING METHOD: Rotary Bucket (24")

LOGGED BY: MBF
CHECKED BY: DG

DRILL HOLE NO.: 9
DRILLING DATE: 2/22/84
DATUM: MSL
REFERENCE EL.: 380 feet

ELEVATION (FEET)	DEPTH	DRILLING RATE (MINUTES/FEET) AND CASING 2 4 6 8	SAMPLE	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT (%)	ATTERBERG LIMITS PLASTIC LIMIT (%)	TORVANE (PSF)	ADDITIONAL TESTS
325							"RINCON FORMATION (Tr)" CLAYSTONE (R), dark green, very hard, blocky, massive, dry						
	60	+ + + +											
							trace slickensides on fractures						
315		+ + + +											
							increasing slickensides and prismatic fractures becoming moist becoming wet lens of dolostones						
	70	+ + + +					becoming extremely hard continuing fresh with slickensides and prismatic fractures becoming dry						
305		+ + + +					abundant slickensides						
	80	+ + + +											
295		+ + + +											
							becoming moist						
	90	+ + + +					becoming fresh with no fractures or slickensides						
285		+ + + +											
							becoming damp						
	100	+ + + +					prismatic fractures with occasional weathered slickensides						
275		+ + + +					becoming fresh with occasional zones of fractures and slickensides No definite slide masses encountered, slickensides and fractures postulated to be prehistoric slides						
	110						Bottom of drill hole at a depth of 110 feet. Ground water encountered as seepage at depths of 45-50 feet Drill hole backfilled and tamped.						

LEGEND TO LOGS ON PLATE A-2



GTC

LEGEND

- DH-4 LOCATION OF BORING BY GEOTECHNICAL CONSULTANTS, INC.
- ESTIMATED LOCATION OF BORING BY BUENA ENGINEERS, 1983
- ESTIMATED LOCATION OF BORING BY HOOVER, 1979
- CAISSON BORING BY HOWARD ENGINEERING, 1983
- A — A' LINE OF GEOTECHNICAL SECTION
- HEAD SCARP
- BOUNDARIES OF SLIDE MASS, DASHED WHERE INFERRED

40 0 40 80
SCALE IN FEET

PLATE 1
GEOTECHNICAL MAP
CONEJO ROAD LANDSLIDE
V83113A APRIL, 1984

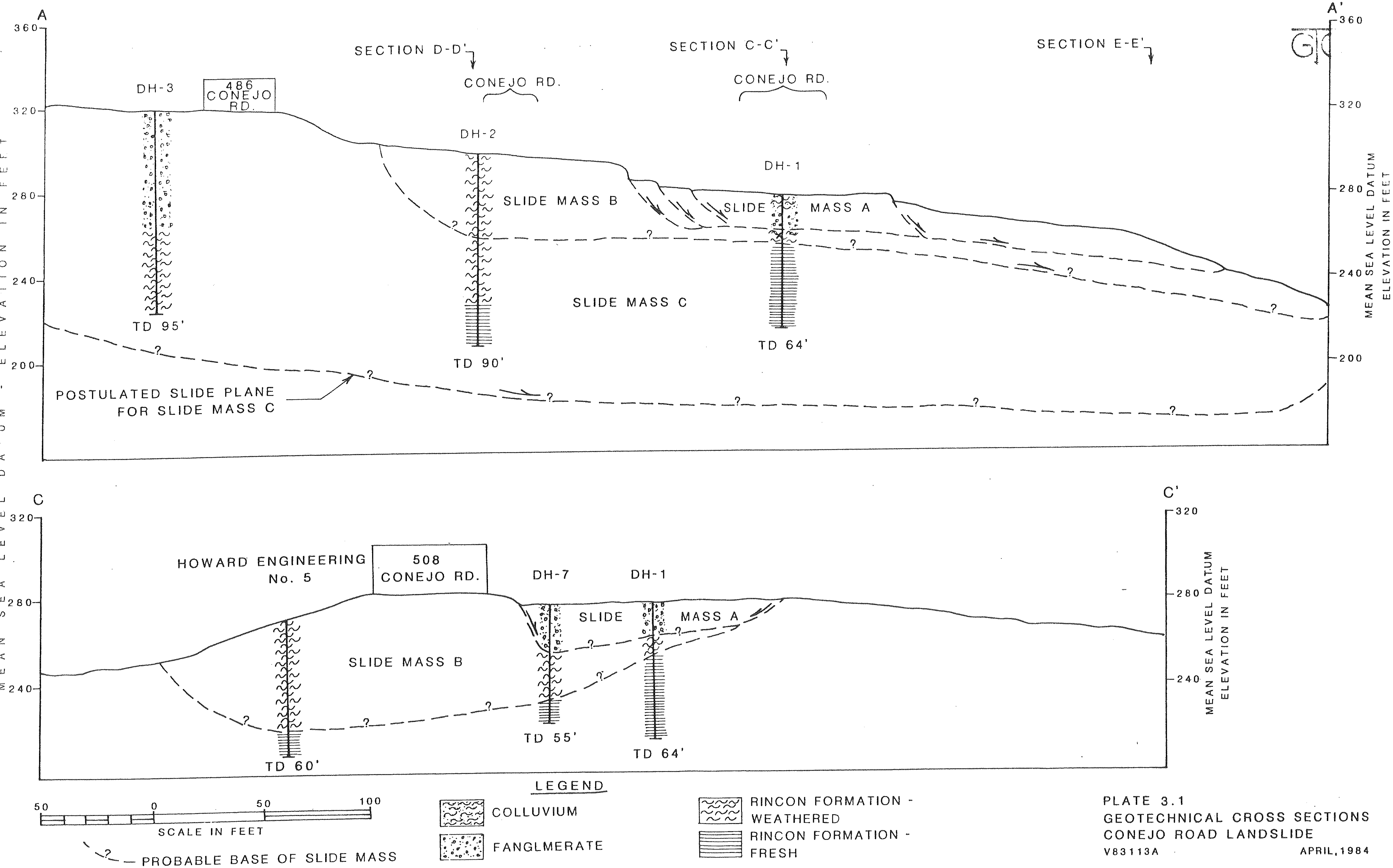


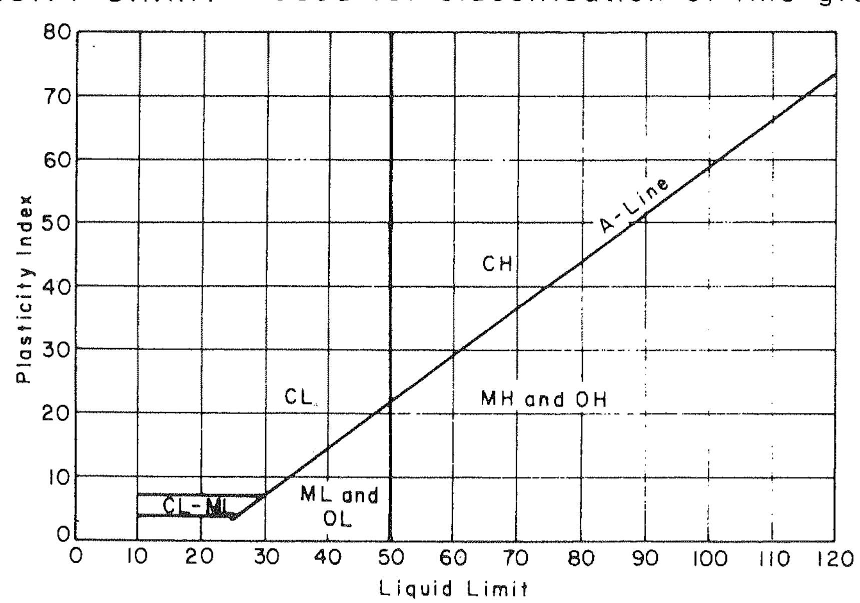
PLATE 3.1
GEOTECHNICAL CROSS SECTIONS
CONEJO ROAD LANDSLIDE
V83113A APRIL, 1984

Definition of Terms and Symbols

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISION			GROUP SYMBOL	DESCRIPTION	GRAPHIC LOG
COARSE GRAINED SOILS OVER 50% BY WEIGHT COARSER THAN NO. 200 SIEVE SIZE	GRAVELLY SOILS OVER 50% OF COARSE FRACTION LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELLY SOILS LITTLE OR NO FINES	GW	WELL GRADED GRAVELS OR GRAVEL-SAND MIXTURES	
			GP	POORLY GRADED GRAVELS OR GRAVEL-SAND MIXTURES	
		GRAVELLY SOILS WITH FINES OVER 12% FINES	GM	SILTY GRAVELS OR POORLY GRADED GRAVEL-SAND-SILT MIXTURES	
			GC	CLAYEY GRAVELS OR POORLY GRADED GRAVEL-SAND-CLAY MIXTURES	
	SANDY SOILS OVER 50% OF COARSE FRACTION SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDY SOILS LITTLE OR NO FINES	SW	WELL GRADED SANDS OR GRAVELLY SANDS	
			SP	POORLY GRADED SANDS OR GRAVELLY SANDS	
		SANDY SOILS WITH FINES OVER 12% FINES	SM	SILTY SANDS OR POORLY GRADED SAND-SILT MIXTURES	
			SC	CLAYEY SANDS OR POORLY GRADED SAND-CLAY MIXTURES	
FINE GRAINED SOILS OVER 50% BY WEIGHT FINER THAN NO. 200 SIEVE SIZE	SILTY AND CLAYEY SOILS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, OR LEAN CLAYS	
			OL	ORGANIC CLAYS OR ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	SILTY AND CLAYEY SOILS LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, OR ELASTIC SILTS	
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, OR FAT CLAYS	
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, OR ORGANIC SILTS	
HIGHLY ORGANIC SOILS			Pt	PEAT OR OTHER HIGHLY ORGANIC SOIL	

PLASTICITY CHART - Used for classification of fine grained soils



SAMPLE - Sample types are indicated as follows:

Undisturbed

Disturbed

Unsuccessful Attempt

Standard Penetration

✳ = SAMPLER TYPES

M = Modified California
S = Shelby Tube (Pushed)
PT = Pitcher Barrel
P = Hydraulic Piston

Water Level

Water Inflow

BLOW COUNT - The number of blows required to drive the indicated sampler the last 12 inches of an 18 inch drive. The notation 100/9 indicates only 9 inches of penetration were achieved in 100 blows. Hammer driving weights and drop heights are shown as indicated below:

Symbol	Driving Weight (pounds)	Drop Height (inches)
7	2600	12
(3)	1600	12
[6]	850	12
4	1150	12
5	1450	12
6		

Heavy Caving

Light Caving

ADDITIONAL TESTS-

UC : Unconfined Compression
TD : Triaxial Compression, Drained
TU : Triaxial Compression, Undrained
TDy : Triaxial Compression, Dynamic
pH : Hydrogen Ion Concentration
PA : Paleontologic Analysis
GS : Grain Size Distribution
WP : Water Pressure
PMt : Pressuremeter
SE : Sand Equivalent
GJ : Goodman Jack
SP : Specific Gravity
CP : Compaction
C : Consolidation
DS : Direct Shear
PM : Permeability
EX : Expansion
RS : Resistivity
S : Swell
CL : Chloride
SU : Sulphate

PLATE A-2
LEGEND TO DRILL HOLE LOGS

V83113A APRIL, 1984

Fruit Growers Laboratory, Inc.

P. O. BOX 272 — 853 CORPORATION STREET — PHONE (805) 525-2146
659-0910

V83113A

WATER ANALYSIS REPORT

OWNER — Geotechnical Consultants DATE SUBMITTED — February 28, 1984

SAMPLER — MBF ANALYSIS REPORTED — March 2, 1984

LAB. NO. — 65398

MATERIAL V-83113A OH-3

	MILLIGRAM EQUIVALENTS PER LITER	MILLIGRAMS PER LITER	%		MILLIGRAMS PER LITER
Calcium (Ca)	14.8	296	33.9	Boron	
Magnesium (Mg)	12.5	153	28.6	Fluoride	1.3
Sodium (Na)	16.1	370	36.8	Iron	0.7
Potassium (K)	0.3	10	0.7	Manganese	0.38
Carbonate (CO_3)	None detected			MBAS	0.1
Bicarbonate (HCO_3)	7.3	445	16.8	Copper	0.1
Chloride (Cl)	11.0	390	25.3	Zinc	0.1
Sulphate (SO_4)	24.2	1160	55.8	Arsenic	
Nitrate (NO_3)	0.9	54	2.1	Barium	
Nitrate-N (NO_3-N)		12.3		Cadmium	
Total Hardness (as $CaCO_3$)		1365		Chromium	
				Lead	
				Mercury	
				Selenium	
				Silver	
Total Dissolved Solids	1. Summation	2878		2. Residue @ 180°	2838

pH 7.8
EC X 10^{-6} @ 25° C 3417
SAR

These results were obtained by following standard laboratory procedures: the liability of the corporation shall not exceed the amount paid for this report.

Chemist ....
Ming Y. Wang

PLATE A-3

Internal summary

SUMMARY

GEOLOGICAL REPORT - CONEJO ROAD

The City has received a report of the geological investigation of the Conejo Road Landslide prepared by Geotechnical Consultants, Inc., of Ventura.

In summary, the report dated January 13, 1984, states the following:

- The most active area presently sliding encompasses approximately one acre; however, surface cracking and distress upslope of this major scarp suggests that a much larger area (up to 3½ acres) may be involved. The maximum depth of this sliding mass is not well defined but is assumed to be greater than 24 feet, as stated in Hoover's earlier report (1979).

- Initial movement probably occurred in the late 1960's. After a period of relative stability, additional movement began again in 1978 and has since continued in a series of small increments following rainy periods.

  The movements of the past couple of months have been of a much greater magnitude than the incremental slippage of the last five years.

- There is indirect evidence that the recent movement may represent reactivation of portions of a larger, ancient landslide.

- As with the 1978 movement, City water and sewer main breaks were caused by the slide movement and therefore the mains are not thought to be a major contributing factor in the initial movement itself.

- Future additional sliding is likely, especially during and after rains but could occur at any time. The landslide is likely to continue to regress upslope as future downhill movement occurs.

- Removal of slide debris behind the Ruiz residence has no significant impact on the movement of the slide.

REMEDIAL ACTION

Long Term: The most practical long-term solution would involve removal and recompaction of the unstable earth materials and installation of a subdrain system. The area involved would include that which is defined by the major headscarp, and probably some adjacent areas. Before any work could be performed, a more detailed geotechnical investigation would be required.

It is estimated that this work would cost in the neighborhood of $400,000 to $600,000. The cost for the additional geotechnical investigation would be about $25,000.

In addition to the project costs, at least four and possibly as many as ten homes may be lost. However, these homes are likely to be lost in any case if the slope is not stabilized.

Another method of long term stabilization would be the construction of a reinforced earth buttress. However, the overall cost would far exceed the cost of removal and recompaction.

Short Term: To reduce movement in the short term, it is recommended that 1 surface drainage from upslope be directed away from the landslide, 2 the surface of the landslide be regraded as conditions warrant to prevent ponding and facilitate drainage of surface water off of the slide itself, and 3 visqueen sheeting be placed over all major exposed scarps, cracks, and fissures. All surface water and runoff from the slide and visqueen should be directed downslope through pipes to minimize infiltration. Care should be taken during regrading of the landslide surface to minimize removal of vegetation and avoid transferring load to or removing support from upslope.

...ert water of slide.

...ver at least cracks.

Additional Investigation:

The scope of the above-mentioned additional geotechnical investigation would include the drilling of several borings and analysis of earth materials so that actual design of remedial measures can be accomplished. This procedure would require the consent of the affected property owners, allowing the mobilization of drilling equipment to the boring locations.

$25000.

We will attempt to clean up behind us - but some

1/84

CITY OF SANTA BARBARA

COUNCIL AGENDA REPORT

DATE: January 27, 1984

TO: Mayor and Councilmembers

FROM: Richard D. Thomas, City Administrator

SUBJECT: CONEJO ROAD LANDSLIDE AREA

RECOMMENDATION:

That Council consider funding for additional geotechnical investigation of the Conejo Road Landslide Area, as recommended by Geotechnical Consultants, Inc., pursuant to their initial geotechnical investigation.

PREPARED BY:

RJF:aw D. H. Johnson, Public Works Director

REVIEWED BY: ______Finance ______Attorney ______Personnel ______

ADVICE OF COUNCIL ACTION DIRECTED TO: ______

ACTION OF COUNCIL: ______Approved ______Disapproved ______Hearing Set ______
______Continued to ______ ______Adopted/Executed ______(Res/Ord/Contract)
______Other: ______

IRECTIONS OF ADMINISTRATOR: ______Prepare documents ______Implement as approved
______Prepare for further Council action on ______
______Prepare Progress Report by ______
______Other ______

DATE ______

AGENDA

COMMENTS:

DISCUSSION:

As directed by City Council, Public Works Engineering staff and Building and Safety staff met with the homeowners involved in the subject landslide area. The meeting was held at 7:00 P.M., January 25, 1984, at 494 Conejo Road, and was attended by approximately 50 residents. The purpose of the meeting was twofold: 1) To inform the citizens of the latest findings and recommendations made by the City's consultant, Geotechnical Consultants, Inc., of Ventura, as submitted in their report dated January 13, 1984; and 2) receive feedback from the area property owners, giving them an opportunity to voice their concerns and observations.

As a result of the meeting, Public Works staff is recommending that Council consider funding for a more comprehensive geotechnical study. This study is necessary to determine the areal extent of the instability and the depth to the slide plane. The results of this investigation would be presented in a report which would include logs of all soil borings, results of laboratory testings and descriptions of various alternatives of detailed geotechnical recommendations for stabilization. The report would be suitable for the preparation of design drawings and contract documents by others.

The cost of this additional investigation is estimated at $30,000. Sufficient funds are available in the Street Capital Program for this work.

The final solution to the problem, i.e., the actual remedial construction measures taken, should be funded by assessment district. If and when the assessment district is formed, the City would be eligible for the reimbursement of all funding for any preliminary studies and engineering costs associated with the project.

1/S2A

GEOTECHNICAL CONSULTANTS, INC.

City of Santa Barbara
Department of Public Works
630 Garden Street
Santa Barbara, California 93102

January 13, 1984

V83113

Attention: Mr. Ron Calkins
City Engineer

Subject: Conejo Road Landslide
Geotechnical Investigation

Gentlemen:

This letter-report presents the findings, conclusions, and recommendations of a geotechnical investigation conducted to evaluate the continuing movements of the landslide just east of Conejo Road in Sycamore Canyon. The scope of our services were developed through discussions with Mr. Ron Calkins, City Engineer with the City of Santa Barbara, and were outlined in Requisition No. 595 dated December 21, 1983. Work performed included the following:

1) Reviewing geologic literature (previous reports and correspondence) pertinent to the site.

2) Conducting a geologic reconnaissance mapping of the site on January 6, 1984 to determine the location, extent, and relationship of various surface cracks, scarps, and other distress related features at that time.

3) Analyzing the results of the literature review and reconnaissance mapping to determine the nature of the movements, to develop recommendations for additional study, and to evaluate possible remedial measures.

4) Preparing this letter-report which presents the findings, conclusions, and recommendations of the investigation, including hand sketched geologic cross-sections and a geologic map of the slide and proximate areas.

Previous reports and correspondence reviewed during this investigation include:

1. April 10, 1978; September 18, 1978; and October 28, 1983; Southern California Edison interoffice memoranda.

2. June 1979, "Geologic Investigation, Conejo Road Landslide"; report prepared by Michael F. Hoover, Consulting Geologist.

3. December 17, 1981 through December 1, 1983, correspondence between Messrs. James Tobin and Jim Cook of the Sycamore Terrace Homeowners and R. W. Puddicombe, Dave Johnson, Ron Calkins, and Bob Furman of the City of Santa Barbara Public Works Department (6 letters).

4. March 21, March 30, November 2, and November 15, 1983, reports and letters prepared by Buena Engineers, Inc. for the proposed residence at 500 Conejo Road.

To illustrate the geologic and distress related features of the area, we have included Plate 1 - Geotechnical Map, showing surface features evident on January 6, 1984, and Plate 2 - Geotechnical Sections, showing the estimated subsurface configuration of the landslide. Due to the desire to present this report as quickly as possible, these plates have not as yet been formally drafted.

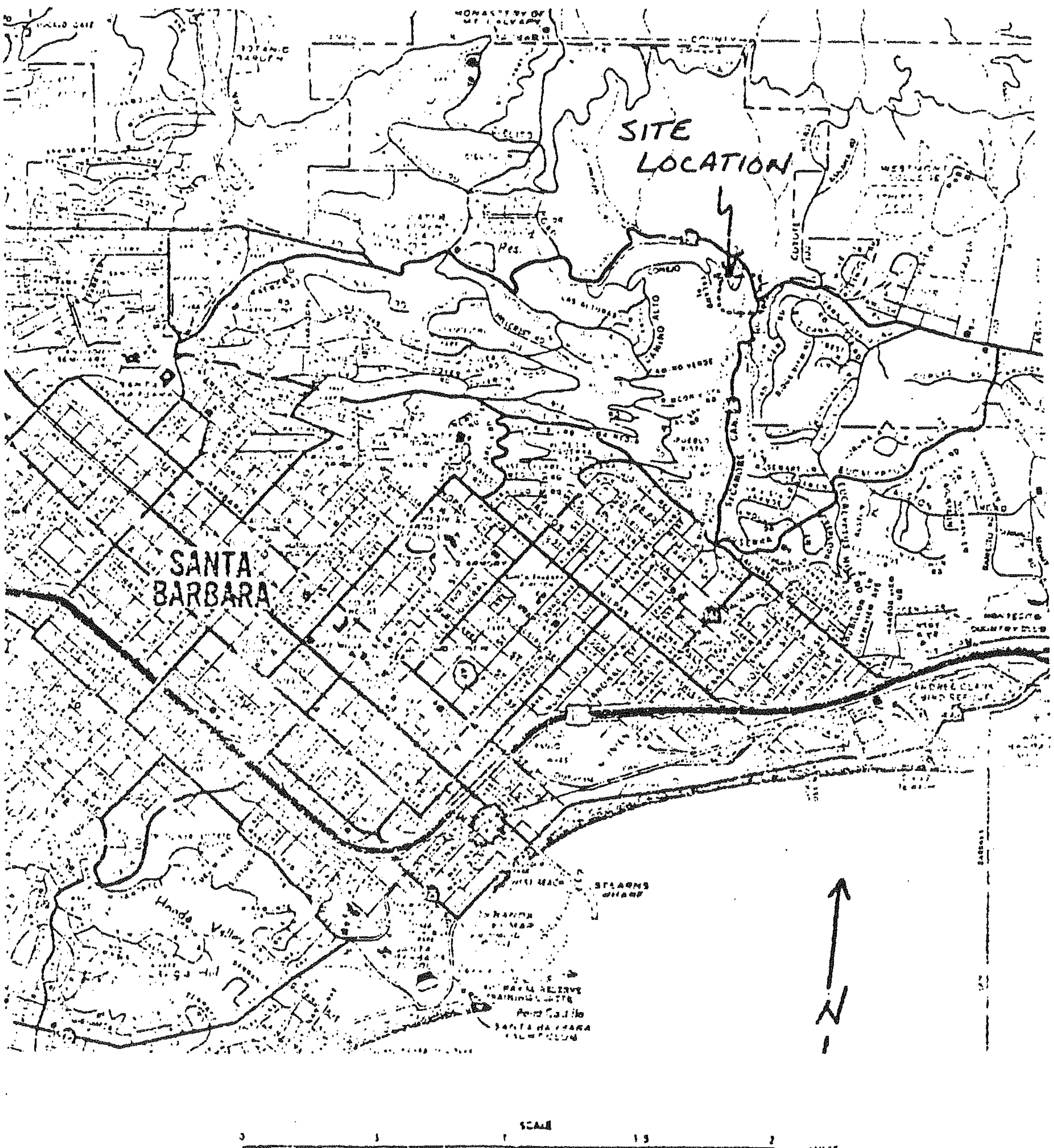
FINDINGS

SITE DESCRIPTION

As shown on Figure 1 - Location Map, the Conejo Road

FIGURE 1

LOCATION MAP



landslide is located approximately two miles northeast of City Hall in Santa Barbara on the east facing slope of Sycamore Canyon. The area has been developed into a small subdivision known as the Sycamore Terrace Tract since the late 1950's, and as such contains 20 to 30 homes within a one mile radius of the slide. The existing ground surface rises at an inclination of approimxately 2 horizontal to 1 vertical throughout the majority of the area, and Sycamore Creek flows along Sycamore Canyon Road and Stanwood Drive at the base of the slope.

LANDSLIDE DESCRIPTION

A geologic map of the Conejo Road landslide and vicinity showing distress related features is presented as Plate 1. The most apparent feature is the approximately one acre area with well defined boundaries in the center of the Plate. However, the surface cracking and distress upslope of the major scarp suggests that a much larger area (possibly up to three and one-half acres) may be involved.

The well defined area that has undergone the most significant recent movement measures approximately 325 feet from toe to head and 160 feet from flank to flank (see Plate 1). At the present there exists a 6 to 10 foot nearly vertical scarp above the head of the slide reflecting the slide's recent movements. Along the flanks there are numerous exposed slidensided surfaces, as well as areas of uplift. The foot of the slide is typically hummocky and contains many undrained depressions and areas of ponded water. The toe of the slide is against the Ruiz dwelling although the homeowner regularly removes and stockpiles the accumulated slide debris that is within 10 to 12 feet of the rear wall. Throughout the area of the slide there exists fresh transverse cracks and areas of extremely distorted ground surface.

A smaller, more recent scarp is present approximately 75 to 125 feet upslope of the major scarp. This smaller scarp is approximately six inches high and extends for a length of about 320 feet roughly concentric with the major scarp (see Plate 1). Other evidence of movement upslope of and adjacent to the major scarp includes signs of distress in the homes between the scarps and immediately upslope of the small scarp and various cracks and bulges in the ground surface (see Plate 1).

The maximum depth to the plane of sliding is not well defined. Hoover (1979) reports it to be approximately 24 feet, but Buena Engineers, Inc. report slickensides and evidence of movement to a depth of 62 feet in caissons drilled for 500 Conejo Road in 1983. It is possible that the deeper slide planes represent past movement on a larger, much older landslide, and that current movement is restricted to the shallower depths. However, the overall slide geometry suggests that the slide plane is probably deeper than the reported 24 feet. The estimated configuration of the landslide in the subsurface is shown on Plate 2 - Geotechnical Sections.

LANDSLIDE HISTORY

According to available sources, it is believed that the initial movement of the landslide was in the late 1960's after a particularly wet winter. After a period of apparent stability, additional movement began in February of 1978 and continued through July of the same year. This series of movements repeatedly severed City water and sewer services and prompted the affected homeowners to retain a geologic consultant, resulting in the investigation and report by Hoover (1979). Since that time, the slide has continued to move in a series of small increments (less than six inches at a time) following the winter and spring rains of each year.

The movements of the past month have been of a much greater magnitude than the incremental slippage of the last five years. Major movements, which occurred on December 19 and, most recently on December 25, 1983, resulted in vertical movements of two and six feet, respectively, and again severed City services and rendered a portion of Conejo Road impassable. In addition, this movement damaged the residences at 508 and 530 Conejo Road, and 1815 Stanwood Drive.

SITE GEOLOGY

Review of the literature and field observation shows that there are two geologic units underlying the area of the slide. Exposed on the surface is a fanglomerate. This fanglomerate is an unconsolidated formation consisting chiefly of sandstone boulders in a matrix of silty clay. Based on previous reports, the thickness of the fanglomerate is estimated at 15 to 25 feet in the area.

Underlying the fanglomerate is the Rincon Formation. The Rincon Formation of Miocene geologic age is a silty clay shale which weathers readily into an expansive clayey soil. Bedding within the Rincon reportedly dips 60 to 70 degrees to the southwest

(Buena Engineers, Inc., 1983). It is probable that the landslide involves both fanglomerate and the weathered clayey soil of the Rincon Formation.

The Rincon Formation characteristically exhibits unstable slopes, and there is indirect evidence that the recent movement may represent reactivation of portions of a larger, ancient landslide. Evidence for the larger feature includes the slickensides at a depth of up to 62 feet found in the caisson holes drilled for 500 Conejo Road (Buena Engineers, Inc., 1983) and the configuration of Sycamore Creek immediately downslope of the recent landslide which may indicate encroachment by the toe of the older feature.

Engineering properties of the on-site earth materials are not well defined in the literature. However, the March 21, 1983 report prepared by Buena Engineers, Inc. for 500 Conejo Road indicates that remolded samples of the weathered portion of the Rincon Formation adjacent to the landslide area exhibit a cohesion as low as 391 pounds per square foot with a friction angle of 10 degrees.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

Based on the available data, it appears that the Conejo Road landslide is a rotational type failure which may represent reactivation of a portion of a larger, much older landslide. Recent movement of up to eight feet (vertically) has occurred along the major scarp, while up to six inches of vertical movement has occurred along a secondary scarp upslope of the main scarp. These movements were probably initiated by saturation of the earth materials during recent rains, thereby increasing the weight of the landslide mass, and increasing the stress on the slide plane. The landslide moved and ruptured City water and sewer mains when the shear stresses along the slide plane exceeded the available shear strength. As with the 1978 movement (Hoover, 1979), City water and sewer main breaks were caused by the slide movement and therefore the mains are not thought to be a major contributing factor in the initial movement itself.

The primary movement has been confined to the one acre area downslope of the main headscarp. It is estimated that this involves approximately 40,000 to 60,000 cubic yards of earth material. The potentially unstable area encompassed by the secondary scarp upslope of the main headscarp may involve up to 175,000 cubic yards.

POTENTIAL FOR ADDITIONAL MOVEMENT

The landslide is presently active and is very likely to experience additional movement in the immediate future. This movement is most likely to occur during or immediately following heavy rains, but could occur at any time. The future movement will probably involve a certain area upslope and adjacent to the main headscarp as well as the area downslope which has experienced the most significant movement to date. The landslide is likely to continue to regress upslope as future downhill movement removes lateral support from the hillside. The existence of a secondary scarp 75 to 125 feet upslope of the main scarp suggests that a small amount of movement has already occurred and that future movement is likely along the secondary scarp.

Removal of slide debris behind the Ruiz residence undoubtedly removes support from the toe and to some degree contributes to additional movement of the slide. However, the magnitude of the contribution is estimated to be relatively minor, and the slide would probably continue to move regardless of whether or not the removal of slide debris continues.

Additional movement could extend downslope into the Sycamore Creek Channel. This would pose a hazard to life and property downstream by damming the creek.

REMEDIAL ACTION

The most practical long-term method of landslide stabilization would involve removal and recompaction of the unstable earth materials and installation of a subdrain system. Removal would have to extend below the depth of the slide plane to key the recompacted fill into firm, undisturbed native materials.

The area that would require stabilization is estimated to include the main area of recent movement immediately downslope of the major headscarp, and probably some additional area upslope and adjacent the area. A more detailed geotechnical investigation would be required to define the actual area that should be removed and recompacted and the depth to the slide plane. Based on the available information, it appears that on the order of 100,000 cubic yards would be involved.

The cost of the removal and recompaction will be relatively high because of the logistics involved with removing the earth materials, transporting and stockpiling them off site, processing them to achieve a workable moisture content, and recompacting them to the required density. Including the required subdrain system, we estimate that stabilization will cost on the order of $4 to $6 per cubic yard. Associated costs are thus between $400,000 and $600,000, depending on the actual area involved, depth to the slide plane, and earthmoving costs. In addition to these costs, at least four and possibly as many as ten homes may be lost, however, these homes are likely to be lost in any case if the slope is not stabilized.

Removal and recompaction will necessitate excavation into the unstable earth materials starting at the landslide toe. The inherent risk in this procedure is that the excavation removes support from the upslope earth materials and consequently these upslope earth materials have the potential to slide into the excavation. This risk can be minimized by installing wells for predrainage upslope of the excavation and/or by temporarily shoring potentially unstable slopes.

Consideration could also be given to stabilization by constructing a reinforced earth buttress to support the hillside beneath and upslope of Conejo Road and partially removing the slide debris downslope of the buttress. Although this method is technically feasible, a reinforced earth buttress would have to be built using imported granular soil, and the overall cost would far exceed the cost of removal and recompaction.

To reduce movement in the short term, it is recommended that surface drainage from upslope be directed away from the landslide, the surface of the landslide be regraded as conditions warrant to prevent ponding and facilitate drainage of surface water off of the slide itself, and visqueen sheeting be placed over all major exposed scarps, cracks, and fissures. All surface water and runoff from the slide and visqueen should be directed downslope through pipes to minimize infiltration. Care should be taken during regrading of the landslide surface to minimize removal of vegetation and avoid transferring load to or removing support from upslope.

ADDITIONAL INVESTIGATION

In order to define the areal extent of the instability and the depth to the slide plane, it is recommended that additional geotechnical investigation be undertaken. The investigation should also define the material properties of earth materials involved so that the actual design of remedial measures can be accomplished. The scope of the investigation would be as follows:

1) Drill six to eight bucket auger borings at the approximate locations shown on Plate 1. The borings would extend at least 20 feet into firm, undisturbed Rincon bedrock, and would be logged to define the location of slide planes. Samples would be obtained for laboratory testing.

2) Conduct appropriate laboratory tests to define the engineering properties of the earth materials encountered.

3) Analyze the results of the exploration and testing to determine the areal extend of the landslide, the depth of the slide plane, and the potential for movement.

4) Recommend an appropriate buttressing or stabilization scheme.

5) Present the results of the investigation in a written report. The report would include the logs of all borings, results of laboratory testing, and detailed geotechnical recommendations for stabilization. The geotechnical report would be suitable for the preparation of design drawings and contract documents by others.

6) Attend meetings and provide consultation as required.

The cost of the additional investigation is estimated at $22,000 to $24,000 depending on the level of difficulties which are encountered during drilling. Actual costs would be billed on a time and expense basis. A bucket auger drill rig should be used so that downhole logging of slide planes is possible. It may require several attempts at each drill hole location to reach the desired depths due to the presence of sandstone boulders in the fanglomerate and hard zones in the Rincon Formation.

CLOSURE

This report has been prepared for the exclusive use of the City of Santa Barbara for specific application to the Conejo Road landslide in Santa Barbara, California, in accordance with generally accepted geotechnical engineering practices. No other warranty, express or implied, is made.

Respectfully submitted,

GEOTECHNICAL CONSULTANTS, INC.

Timothy N. Dunne
Civil Engineer 32973

David A. Gardner
Engineering Geologist 969

TND:DAG:tg

CITY OF SANTA BARBARA
PUBLIC WORKS DEPARTMENT

DATE: January 3, 1984

TO: Mayor and Councilmembers

VIA: Richard D. Thomas, City Administrator

FROM: Director

SUBJECT: CONEJO ROAD - STATUS REPORT

Over the New Year holiday weekend, the main slide area moved down an additional foot or so. No damages occurred to the newly constructed above-ground sewer and storm drain. Conejo Lane is still accessible by vehicle. Approximately 100 feet uphill from the main slide area, on Conejo Road, the existing sewer has separated in two locations. City crews are currently repairing these breaks. Water service has not been affected.

Owners of the four properties of immediate concern have been properly notified regarding potential hazards to their safety.

On December 21, 1983, the City issued a Purchase Order to Geotechnical Consultants, of Ventura, to perform a geological study of the area, and complete a report by January 16, 1984. This report will include a determination of the extent of the slide, potential for additional movement, and recommendations for remedial measures.

Evidence of the instability of the soil in this area has been exhibited for several years. However, during the winter of 1977-78, appreciable movement of the land mass began taking place. Since then, sliding has occurred during periods of heavy rain. A perforated storm drain was installed by the City in 1978, in an attempt to dewater the slip plane.

The resultant ongoing problems are sewer maintenance and road maintenance. Water service has been re-routed around the most active area, and is not experiencing further damage to this date. Sewer mains continue to develop leaks, and City crews attend to them as they occur. The Street Division has been able to maintain Conejo Road accessible to vehicles up until two weeks ago, when the slide became even more active. It is now closed to through traffic. An above-ground 18-inch storm drain was installed by City crews last week, in an attempt to prevent excessive volumes of water from entering the slide area.

The City's survey crew is monitoring all land movement in the vicinity. At this time, it appears unfeasible to begin any large-scale construction until the geologist's report is completed. There is evidence that the slide area is increasing in size.

D. H. Johnson

CONEJO ROAD SETTLEMENT SURVEY
Horizontal Movement 1990-1997

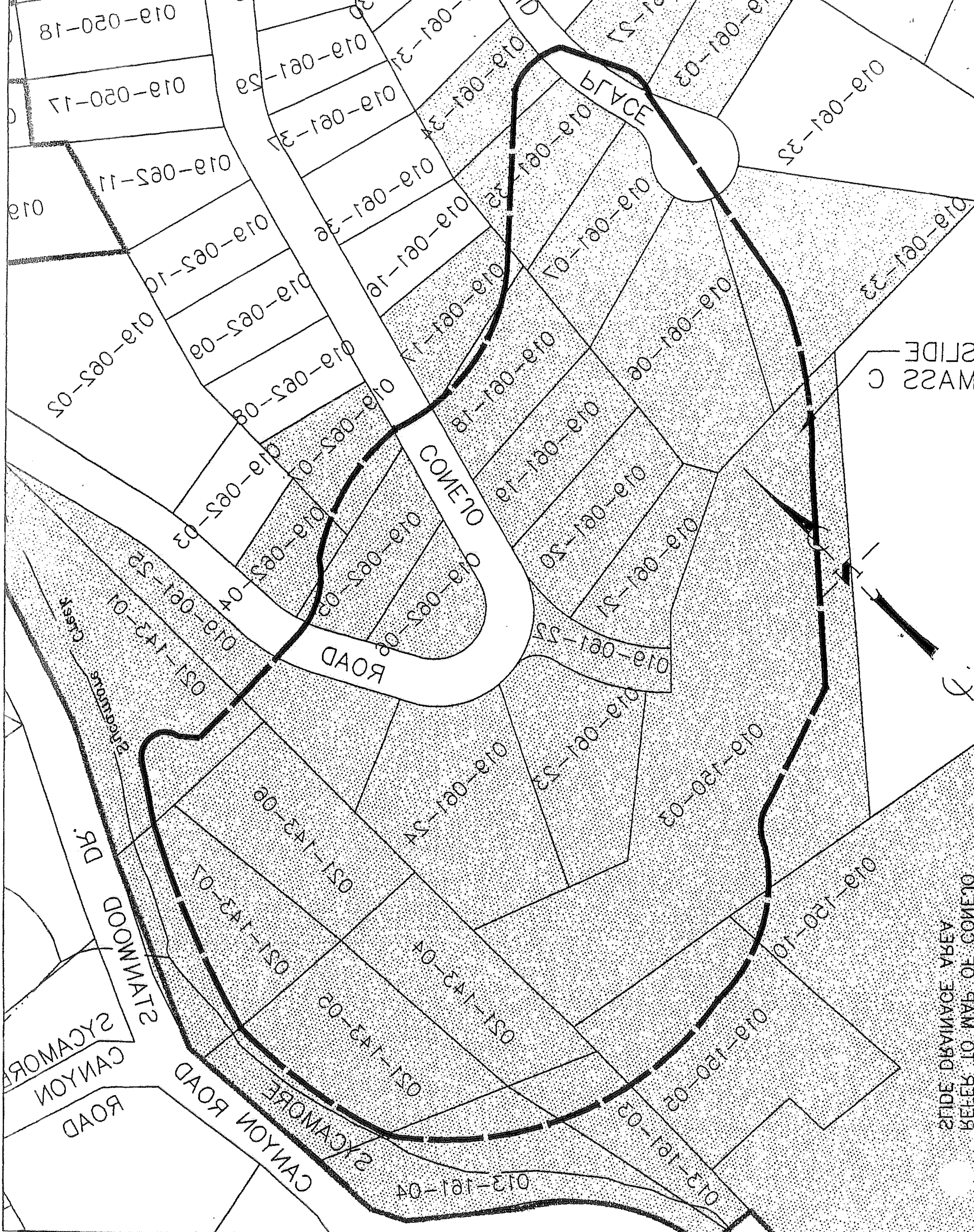
PT #	Movement Direction	Movement Distance
101	S6-35-03 W	0.11
102	Point	Destroyed
103	Point	Destroyed
105B	S44-46-06 E	1.55
106B	S54-59-13 E	0.72
107B	S48-58-54 W	0.16
108	N15-48-37 W	1.00
109	S5-31-24 W	0.36
110	N84-42-21 E	0.16

CONEJO ROAD SETTLEMENT SURVEY
Horizontal Movement 1995-1997

PT #	Movement Direction	Movement Distance
101	S89-33-01 E	0.09
105B	S49-24-15 E	0.76
106B	S49-27-15 E	0.38
107B	S27-32-36 W	0.13
108	S70-54-57 E	0.11
109	S39-08-09 E	0.22
110	S85-51 E	0.09

11/6/97

MAP OF THE
CONEJO SLIDE DRAINAGE AREA



MAP OF THE
CONEJO SLIDE AREA
11/6/97


ROAD
CONEJO
LANE
PLACE

CONEJO LANDSLIDE
RECENT MONITORING

	3/1/98 - 3/10/98		Average	3/10/98 - 3/18/98		Average	3/18/98 - 3/26/98		Average	3/26/98 - 7/13/98		Average	7/13/98 - 10/20/98		Average	10/20/98-7/22/99		Average	7/22/99-7/10/2000		Average	3/1/98-7/10/2000		Average	Point
	Direction	Distance in feet	horiz./day	Direction	Distance in feet	horiz./day	Direction	Distance in feet	horiz./day	Direction	Distance in feet	horiz./day	Direction	Distance in feet	horiz./day	Direction	Distance in feet	horiz./day	Direction	Distance in feet	horiz./day	Direction	Distance in feet	horiz./day	No.
5004	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	5004
5005	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	5005
5006	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5006
5007	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5007
5008	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	5008
5009	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	5009
5010	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	5010
5011	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5011
5012	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	*	*	*	*	*	*	149	0.16	0.0002	5012
5013	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5013
5014	110	0.12'	0.014'	100	0.11'	0.014'	97	0.13'	0.016'	102	2.50'	0.023'	99	0.34'	0.003'	102	0.20'	0.0007'	103	0.45	0.0012	103	3.93	0.0005	5014
5015	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	5015
5016	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5016
5017	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5017
5018	101	0.24'	0.028'	110	0.19'	0.024'	100	0.23'	0.029'	104	4.35'	0.040'	101	0.41'	0.004'	104	0.26'	0.0009'	102	0.76	0.0021	104	8.53	0.0090	5018
5019	*	*	*	NM	NM	NM	NM	NM	NM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5019
5020	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5020
5023	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM							5023
5024	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM							5024
5025	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM							5025
5026	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM							5026
5027	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM							5027
5030	*	*	*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM							5030
5031	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	NM	NM	NM							5031
5043	115	0.10'	0.012'	93	0.14'	0.018'	98	0.24'	0.030'	Destroyed during paving of road			-	-	-	-	-	-							5043

* = Insignificant
NM = Not Measured
Direction = The Direction of movement in degrees from the north.

Note: With regard to the surveying equipment used to provide this report, shifts less than 0.10 feet fall within the 95% confidence regions of the station coordinates and are not considered significant.

Next monitoring scheduled for July 2001

SUMMARY OF VERTICAL MOVEMENT FROM EXHIBIT "C"

Vertical movement:	3/26/98 - 7/10/00	7/22/99 - 7/10/00
Point No. 5014	-1.4	-0.20
Point No. 5018	-0.4	-0.10
Point No. 5019	-0.2	+0.20

There has been no significant vertical movement of the other monitored points.

Comments:

Movement seems to have slowed; appears to be back to the movements that were occurring before the land movement that was experienced in February 1998. Point No. 5019 has been tentatively added to the summary of vertical movement.

EXHIBIT A

CONEJO ROAD SETTLEMENT SURVEY
Horizontal Movement 1984-2000

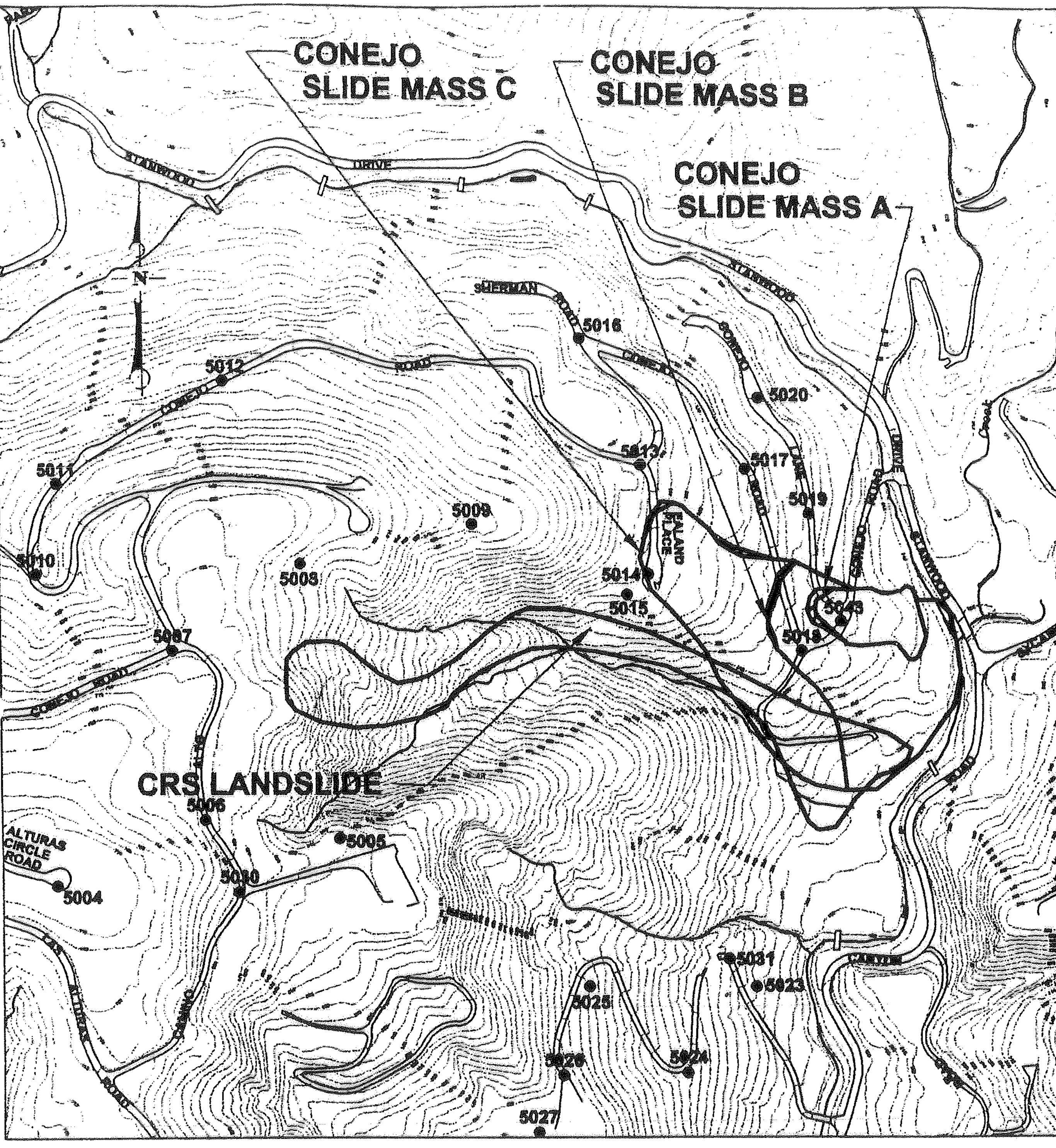
RECONCILIATION OF CONVENTIONAL & GPS SURVEYS
MOVEMENT FROM DECEMBER 1984 to JULY 2000

Orig. PT#	GPS PT#	Direction (degrees measured from North)	Distance (measured in feet)
101	5016	*	*
105B	5018	106	9.7
106B	5014	103	5.0
107B	5013	*	*
108	5010	313	1.1**
109	5007	164	0.4
110	5006	*	*

Note: * denotes insignificant measurements.
** denotes the point 108 was not monitored in 2000 due to lack of satellite coverage (movement reflects 1984-1998 only)

Notes: Monitoring points 101, 108, 109 and 110 are original points set in 1984.
Points 105B and 106B were set in 1987.
Point 107B was set in 1988.
Point 108 was last monitored in 1998.
All points 101-110 were renumbered in 1998 with the GPS point numbers indicated above.

EXHIBIT B



SURVEY MONITORING POINTS IN THE CONEJO ROAD VICINITY

1" = 400'

● GPS POINTS

DRAWING:CRSMONPT.DWG
DRAWN BY: PE/MMC
DATE: 7/6/98