R.T. Frankian & Associates, "Report of 100-Scale Plan Review, Vesting Tentative Tract Map No. 53295, Valencia, California" (March 2005)

REPORT OF

100-SCALE PLAN REVIEW

VESTING TENTATIVE TRACT MAP NO. 53295

VALENCIA, CALIFORNIA

VOLUME I OF II

FOR

NEWHALL LAND AND FARMING COMPANY

MARCH 18, 2005

JOB NO. 2004-700-21

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

RTF&A
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March 18, 2005

Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Job No. 2004-700-21

Attention: Mr. Alex Herrell
Community Manager

We are pleased to submit our 100-Scale Plan Review for Vesting Tentative Tract Map No. 53295 in Valencia, California. Vesting Tentative Tract Map 53295 includes the South Terraces, North Commercial, Tenderloin, and Castaic Junction sub areas. The scope of work for this investigation was planned with Mr. Alex Herrell of Newhall Land and outlined in our proposal dated September 7, 2004, Proposal No. P129-2004-21. The investigation was authorized by Newhall Land and Farming Company in their Project Authorization (PA) No. CI30012 dated November 9, 1999.

Alliance Land Planning & Engineering, Inc. provided us with a vesting parcel map plan for the site. The plan was prepared at a scale of 1 inch equals 100 feet.

Proposed grading will include excavation into ridges and upland areas resulting in cut slopes, and placement and compaction of engineered fill. Natural soils and uncertified fill will require removal and recompaction. Based on this investigation, the site is suitable for the proposed development as envisioned at the tentative tract stage. Assuming grading operations are performed in accordance with the recommendations in this report, the site will be safe from hazards of landslide, settlement, or slippage, and will not adversely affect adjacent properties.

For planning purposes, shallow footings are expected to be suitable for support of typical one- or two-story residential/industrial/commercial buildings. Perimeter footings should be continuous and extend beneath windows and doors. Floor slabs

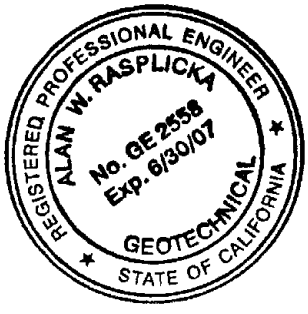
may be supported on grade. Both the footings and the floor slabs should be reinforced. Foundations for tall, especially heavy, or settlement sensitive buildings should be evaluated by site-specific investigations.

Should you have any questions regarding the information presented in this report, please contact our office.

Respectfully submitted,

R. T. FRANKIAN & ASSOCIATES

by: Douglas S. Santo
Principal Engineering Geologist



and: Alan W. Rasplicka
Geotechnical Engineer

DSS/AR/sjc

Distribution: (6) Newhall Land and Farming Company
Attn: Mr. Alex Herrell
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1- Attn: Mr. Paul Gaff
(3 for submittal to Los Angeles County)

Newhall Land and Farming Company
March 18, 2005
2004-700-21

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Newhall Land and Farming Company
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REPORT OF

100-SCALE PLAN REVIEW

VESTING TENTATIVE TRACT MAP NO. 53295

VALENCIA, CALIFORNIA

VOLUME I OF II

FOR

NEWHALL LAND AND FARMING COMPANY

MARCH 18, 2005

JOB NO. 2004-700-21

INTRODUCTION

This presents our 100-scale plan review of Vesting Tentative Tract Map 53295 (VTTM 53295) in Valencia, California. The site is west of the Golden State Freeway (I-5), south of State Route 126 (SR 126), and north of high-power transmission lines about 1700 feet south of Magic Mountain Parkway in Valencia, California. The site is shown on Figure 1.

The purpose of this investigation was to characterize surface and subsurface geologic conditions, identify geologic hazards and liquefaction potential, and develop recommendations for bulk grading, mitigation of geologic hazards, and preliminary building and utility design. The ultimate goal was to determine if the site is suitable for the proposed development as envisioned at the tentative tract stage. Environmental conditions including the presence or absence of contaminants in the soil and groundwater were not investigated as part of this work.

Recommendations herein are based on review of previous work completed on site and the results of our current field exploration, laboratory testing, and engineering and geologic analyses. Logs of exploratory borings and laboratory test sheets are included in the appendices of this report.

This work was performed in accordance with generally accepted professional engineering geology and geotechnical engineering principles and practice in southern California at the present time. We make no other warranty either express or implied. This report was prepared for Newhall Land and Farming Company and their design consultants to be used solely in design and filing of a tentative tract map for the site. The report was not prepared for use by other parties, and may not contain sufficient information for other purposes at other times. Additional studies will be required to develop recommendations for final grading plans.

SCOPE OF WORK

The scope of work for this investigation included:

- Research and review of published and unpublished technical reports and documents including data available from the California Geological Survey, California Division of Oil, Gas, and Geothermal Resources, US Geological Survey, and private consultants;

- Review and analysis of stereo-paired aerial photographs to identify geomorphic features suggestive of landslide or fault hazards (see References);

- Compilation of previous field exploration and laboratory testing completed on site by R. T. Frankian & Associates (RTF&A) and other consultants;

- Reconnaissance geologic mapping to verify results of our literature review and imagery analysis, identify the type and areal distribution of geologic units, and collect structural information for bedrock formations;

- Preparation of geologic maps and cross sections;

- Subsurface exploration that included drilling, sampling, and geologic logging of four exploratory borings using a track-mounted bucket auger drill rig;

- Geotechnical laboratory testing of representative samples of earth materials;

- Engineering and geologic analyses to develop recommendations for design and construction of the project appropriate for the tentative tract phase of development, and

- Preparation of this report and accompanying illustrations.

PROPOSED DEVELOPMENT

VTTM 53295 was prepared by Alliance Land Planning & Engineering, Inc. and is dated December 28, 2004. The plan shows the site and sub area boundaries, proposed lots, roadways, cut and fill slopes and pad elevations. The plan was used as the base for the attached Geotechnical Map, Figures 3.1 through 3.5.

The site covers a total area of 813 acres and includes 638 lots with a total estimated earthwork quantity of 9.5 million cubic yards. The site is divided into 15 planning areas, boundaries of which are shown on Figure 1.

- Planning Area 1 includes 24 commercial lots covering about 82 acres, 4 condominium lots with 408 dwelling units covering about 18 acres, and 29 open space lots covering about 237 acres.

- Planning Area 2 includes 1 commercial lot covering 9.7 acres.

- Planning Area 3 includes 9 commercial lots covering about 38 acres, 1 water quality basin covering 4.3 acres, and 8 open space lots covering about 11.6 acres.

- Planning Areas 4 through 14 include 430 single family residential lots with 688 dwelling units covering 89.6 acres, 30 condominium/townhome lots with 1,134 dwelling units covering 56.2 acres, 1 commercial lot covering 3.4 acres, 1 recreational lot covering 1.7 acres, 22 street lots covering 35.2 acres, and 48 open space lots covering 138.3 acres.

- Planning Area 15 includes 3 condominium lots with 325 dwelling units covering 8.5 acres, 6 parking structure lots covering 11.1 acres, 10 mixed use lots with 615 dwelling units covering 23.8 acres, 8 street lots and public right of way covering 37.8 acres, 1 drainage filter site covering 3 acres, and 3 open space lots covering 4.3 acres.

Development will include extensions to Magic Mountain Parkway, Westridge Parkway and construction of numerous interior streets and associated utilities.

PREVIOUS INVESTIGATIONS

Several investigations have been completed on or adjacent to the site. We previously investigated Planning Area 1 and presented results in a geotechnical reconnaissance report (RTF&A, 1998) and a geotechnical investigation report (RTF&A, 2001a). We previously investigated the proposed relocation of the Chevron Service Station at the southwest corner of The Old Road and Magic

Mountain Parkway and investigated an ancillary haul road to be created as part of the relocation (RTF&A, 1997, 2003, 2004a, and 2004b).

Allen E. Seward Engineering Geology, Inc. (AES) completed an investigation of Planning Areas 2 through 15 and presented results in their report dated May 25, 2000 (AES, 2000b) AES performed a fault investigation for Planning Area 15 and presented results in their report dated 8/15/00. AES completed two investigations for grading of the oil well pad located in the eastern portion of Planning Areas 4 through 14 and presented results in their reports (AES, 2000c and 2000d). AES completed an investigation for the Mesas East Project, Vesting Tentative Tract Map 61105, located at the west boundary of VTTM 53295. We were provided maps, sections, and boring logs from this report, but nothing else. AES performed a fault investigation for the Airport Mesa area of VTTM 61105 and presented results in their report AES, 2004a.

Field exploration, laboratory testing, and portions of the engineering and geologic analyses from reports listed above are incorporated in this report and form a part of the basis of the findings and recommendations presented herein. All references used in this work are presented at the end of the text.

SITE CONDITIONS

The project site is an irregular shaped parcel located at the north margin of the Santa Susana Mountains at the confluence of the Santa Clara River and Castaic Creek. The south half of the site consists of two major north-draining canyons that divide mountainous areas of low relief. The middle of the site consists of an undissected, north-sloping, alluvial fan surface. The north half of the site consists of

the Santa Clara River valley and bordering fluvial terraces. The Magic Mountain Entertainment Complex is located in the center of the project area, but is not included in the current development. The bulk of the site is undeveloped and vacant of structures. Natural vegetation consists of a nearly continuous cover of grasses and weeds, with isolated patches of brush. Oak trees are common. Some portions of Planning Areas 4 through 15 were formerly used for agriculture. Planning Areas 4 through 14 are crossed by dirt roads placed for oilrig access. Access road construction involved cuts up to 45 feet tall and placement of relatively large masses of undocumented fill. Maximum fill depth is estimated to be around 25 feet. The access roads lead to drill pads of various size and configuration. The pads are generally flat and level and often consist of areas of cut and areas of fill. Buried sumps for the collection of wastewater or drilling spoils may be present, though not currently visible, at each drill pad.

ABANDONED OIL WELLS

Review of the California Division of Oil, Gas, and Geothermal Resources (DOGGR) Honor Rancho Map 252 (February 3, 1996) shows 14 abandoned oil wells on or immediately adjacent to the site. Abandoned oil well locations are shown on Figure 2. We researched DOGGR files to collect information on these wells. This information is summarized in Table 1. We understand another consultant is locating these wells in the field and investigating them for potential re-abandonment.

Table 1. Abandoned Oil Well Summary.

Well	API No.	Location			DOG	Last Produced/Injected				DOG Req's for	DOG Surface Abandonment
		Sec	T	R	Abandon Approval	Date	Oil (b/d)	Water (b/d)	Gas (mcf/d)	Concrete Plugs (depth bgs)	Requirements
NL&F 30	037-16500	19	4N	16W	11/8/1995	1/95	34	53	na	10,570'-10,325' 7,100'-7,000' 3,900'-3,800' 795'-0'	Cut casing @ 5' bgs. Weld plate w/identifier. Clean location
NL&F 31	037-16501	19	4N	16W	9/21/1994	4/86	9	34	50	10,658'-10,306' 812'-692' 100'-0'	Cut casing @ 5' bgs. Weld plate w/identifier. Clean location
NL&F 35	037-16505	19	4N	16W	10/17/1986	5/69	2.5	12.3	1	4,770'-4,400' 790'-650' 30'-5'	Install steel plate over wellhead. Cover with dirt.
NL&F 36	037-06353	19	4N	16W	9/21/1994	6/76	Na	na	na	11,275'-10,690' 803'-703' 100'-0'	Cut casing @ 5' bgs. Weld plate w/identifier. Clean location
NL&F 38	037-16506	19	4N	16W	12/4/1992	86	6	250	45	10,872'-10,480 780'-0'	Cut casing @ 5' bgs. Weld plate w/identifier. Clean location
NL&F 37	037-13506	19	4N	16W	2/13/1979	8/68	41	55	14	3,650'-3,550' 828'-728' 50'-0'	Remove wellhead. Restore surface.
NL&F 43	037-16510	19	4N	16W	11/8/1995	3/94	83	17	na	10,988'-10,650' 805'-795' 100'-0'	Cut casing @ 5' bgs. Weld plate w/identifier. Clean location
NL&F 44	037-06354	19	4N	16W	11/9/1990	4/67	24	10	188	10,993'-10,573' 1,200'-1,210' 60'-5'	Cut casing @ 5' bgs. Weld plate. Break up cellar & clean location.
NL&F 47	037-06355	19	4N	16W	2/16/1994	1/86	Na	150	na	11,308'-10,689' 802'-702' 100'-0'	Cut casing @ 5' bgs. Weld plate w/identifier. Clean location
NL&F 48	037-16513	19	4N	16W	12/4/1992	6/86	0.5	15	15	10,920'-9,700' 805'-0'	Cut & cap casing @ 5' bgs. Clean location. Remove flowlines.
NL&F 49	037-16514	19	4N	16W	5/8/1996	12/88	Na	1200	na	10,928'-10,639' 803'-703' 100'-0'	Cut casing @ 5' bgs. Weld plate w/identifier. Clean location
NL&F 51	037-13527	19	4N	16W	11/8/1995	6/94	Na	na	na	11,363'-0,724' 777'-677' 60'-0'	Cut casing @ 5' bgs. Weld plate w/identifier. Clean location
NL&F6 52-19	037-16536	19	4N	16W	5/15/1981	na	Na	na	na	100'-0'	Weld 1/2" plate
NL&F 62	037-16524	18	4N	16W	2/13/1979	na	Na	na	na	13,270'-12,921' 7,800'-7,100' 4,310'-4,210' 846'-746' 50'-0'	Remove wellhead. Restore surface.

SUBSURFACE EXPLORATION

Subsurface exploration for this investigation was performed in January, 2005 and consisted of excavation, sampling, and logging 4 bucket auger borings. These borings were located to evaluate proposed cut slopes near the south and southeast portions of Planning Areas 4 through 14. Relatively undisturbed samples and bulk samples for laboratory testing were obtained from the borings. Exploratory boring information is summarized in Table A-1, in Appendix A, and summary boring logs are in Appendix A. Boring locations are shown on the Geotechnical Map, Figures 3.1 through and 3.5.

Previous subsurface exploration is significant and included 10 bucket auger borings, 61 test pits, 4 hollow stem auger borings, 38 Cone Penetration Tests (CPTs) soundings, and 6 rotary wash borings. Previous exploration is included in Appendix B and summarized in Table A-1.

LABORATORY TESTS

Laboratory tests were performed on selected samples obtained from the borings to aid in the classification of the soils and to determine their pertinent engineering properties. The results of the laboratory tests we performed as part of the current investigation and pertinent tests performed by others are presented in Appendix B. Complete laboratory testing from the previous investigations are presented in the referenced reports.

GEOLOGY

REGIONAL GEOLOGY

VTTM 53295 is located at the eastern end of the Ventura basin within the Transverse Ranges geomorphic province of California. The Ventura basin consists of a narrow, elongate sedimentary trough that generally coincides with the Santa Clara River Valley. The Ventura basin has been an area of subsidence and sediment accumulation since the beginning of the Tertiary period, with the present trough-like form developing near the beginning of the Miocene epoch (Winterer and Durham, 1962).

SITE GEOLOGY

Geologic Materials: Geologic materials observed within VTTM 53295 include the Saugus Formation, terrace deposits, alluvium, and engineered and non-engineered fill. The areal extent of the various geologic units are depicted on the Geotechnical Maps. Interpreted subsurface conditions are shown on the Geotechnical Cross Sections (Figure 4). Following is a brief description of the earth materials with emphasis on their engineering geologic characteristics.

Saugus Formation (TQs): The Plio-Pleistocene age Saugus Formation underlies the entire site, and outcrops in Planning Areas 3 and 4 through 14. The Saugus Formation was observed in outcrop and exploratory borings. The Saugus Formation consists of massive to well bedded, fine to coarse sandstone interbedded with matrix supported coarse sand and gravel conglomerate. Sandy siltstone is encountered locally. The rock is generally weakly cemented with alkaline earth

carbonates, and is friable. The rock is generally unjointed. The color is tan to light brown.

Terrace Deposits (Qt): Pleistocene age terrace deposits cap the Saugus Formation over most of Planning Areas 3 and 4 through 14. Terrace deposits consist of massive to poorly bedded sand, gravel and silt. Cobbles and boulders are common, with clast size ranging from 3 to 12 inches in diameter. The unit is loose and poorly consolidated. The color is yellowish brown to brown.

Alluvium (Qal): Holocene age alluvial deposits are present in the central portion of the site in Planning Areas 1, 2, and 15. Alluvial deposits consist loose and poorly consolidated mixtures of sand, silt, and gravel. Some alluvial areas have been disturbed by past farming activities and these areas are designated as undifferentiated artificial fill and alluvium (map unit "af/Qal").

Artificial Fill (af): Large masses of artificial fill are located in Planning Areas 4 through 14. These fill masses were placed for access roads and drill pads for oil exploration. It appears the fill was generated on site by road cuts. The method of placement and quality of these materials is unknown. They will have to be removed and recompacted during tract grading. Other smaller masses of fill were likely placed during past agricultural, construction, and investigative activities.

Certified Engineered Fill (cef): Engineered fill was placed during construction of the extension of Magic Mountain Parkway between Planning Areas 15 and 4 through 14. The characteristics of this material are not known.

Slopewash and Residual Soil: Slopewash blankets slopes in the southern portion of the site. Slopewash deposits are generally less than 5 feet thick. The material consists of loose sand, gravel, and silt. Residual soil mantles upland areas in

the southern portion of the site and is similar in compositional characteristics to that of slopewash. Residual soil is generally less than 3 feet thick. Slopewash and residual soil are shown on the geologic maps.

Surficial Slope Failures (Qsf): Surficial slope failures have been mapped on the natural slopes in Planning Areas 4 through 14. These failures include weathered bedrock, terrace materials, and slopewash. They are limited in lateral extent and have a maximum thickness of 15 feet near the toe.

Geologic Structure: Saugus Formation has been warped into a northwest striking homoclinal structure with northeast dips between 4° to 20°.

Bedding: Bedding planes within the Saugus Formation vary from diffuse and gradational to sharp and planar. A daylighted bedding condition may be present in east and northeast facing slopes.

Faults: Faults in southern California are classified active, potentially active, and inactive, based on their most recent activity. Fault activity is defined by California law and interpreted by the California Geological Survey (CGS) (Hart, 1999) for the Alquist-Priolo Earthquake Fault Zone program. A fault can be considered active if it has demonstrated movement within the Holocene epoch, or approximately the last 11,000 years. Faults that have demonstrated Quaternary movement (last 1.6 million years), but lacking strong evidence of Holocene movement, are classified as potentially active. Faults that have not moved since the beginning of the Quaternary period are deemed inactive.

San Gabriel Fault Zone: The active San Gabriel fault zone, located approximately 1.5 miles northeast of the site, consists of a northwest-trending zone of imbricate steeply north-dipping faults. Throughout most of its extent the fault has

strong geomorphic expression characterized by displaced geologic units, deflected drainages, strike valleys, notched ridges, subparallel faulting, fracturing and folding (Oakeshott, 1958; Wentworth and Yerkes, 1971). According to Oakeshott (1958), the zone of faulting ranges in width from a single plane with no more than a few inches of gouge, to a half-mile wide area of several fault planes, zones of brecciation, and complex steep-limbed folds

Holser Fault: The Holser fault consists of a south dipping, sharply folded reverse fault (Winterer and Durham, 1962) trending east-southeast from near Piru Creek to at least Castaic Junction, and possibly continuing farther southeastward. According to AES (AES, 1989a), the Holser fault represents a major structural feature of the Ventura basin, and is associated with over a mile of offset of the basal contact of the Saugus Formation. Weber (1979) states that there is no clear evidence of Holocene activity along the fault, but "plentiful evidence" that activity has occurred in the past 100,000 years. Consequently, based on CGS criteria, the fault is considered potentially active.

The location of the Holser fault on site, or absence thereof, has been established by previous subsurface investigations completed by AES. This work is documented in AES reports (AES, 1999a, 1999b, 2000a, and 2000c.) The result of this work is a 160-foot structural setback trending through the west portion of Planning Area 1. No other active faults have been identified on site.

Faults of the Airport Mesa Area: An investigation by AES (AES, 2004a) for VTT 61105 located adjacent to the subject site on the west identified two lineaments subsequently determined to be faults. These features were named the Airport Mesa Fault and the Saddle Fault by AES. Structural setback zones were established. The

faults and associated setback zones project into VTTM 53295 south of Planning Area 2 and north of Planning Area 15. The faults do not affect any currently proposed development on the subject site.

GROUNDWATER

Planning Areas 1 and 2: Groundwater levels in Planning Areas 1 and 2 are relatively high due to the proximity of the Santa Clara River and Castaic Creek. Exploration for Planning Area 1 was completed by RTF&A (RTF&A, 1998, 2001a,) groundwater was encountered from 6 to 15 feet below ground surface. Exploration for Planning Area 2 was completed by AES (AES, 2000b) groundwater was encountered from 3 to 7 feet below ground surface. Groundwater data is summarized in Table A-1 in Appendix A.

Hydrologic data on file at the County of Los Angeles Flood Control District (LACFCD), indicates one well located near VTTM 53295. This is well no. 6995D located offsite north of the intersection of The Old Road and Henry Mayo Drive. Surface elevation for this well is 1,017 feet. Historic high water is at ground surface in February 1971.

Planning Areas 3 through 15: Exploration completed in these planning areas shows that groundwater is generally deeper than 40 feet below ground surface. The exception is the two large canyons that drain the southern portion of the site. At the time of field exploration groundwater was not encountered in these canyons, but during winter season these canyons may experience intermittent surface flow and high groundwater elevations.

DEBRIS FLOW HAZARD

Debris flows, consisting of a moving mass of heterogeneous debris lubricated by water, are generated by shallow soil slips in response to heavy rainfall. Whereas landslides depend on deep percolation of groundwater and may not respond to the effects of heavy rainfall until long after a storm, debris flows "occur during, and only during, heavy rainfall" (Campbell, 1975). According to Campbell (1975), damage from debris flows is due chiefly to inundation by, or high-velocity impact of the debris mass. Campbell identifies three conditions for debris flow potential:

- a mantle of colluvial soil or a wedge of colluvial ravine soil;
- a slope angle ranging from 27 to 56 degrees (slopes steeper than 56 degrees generally do not have a continuous mantle of colluvium and are most commonly bare bedrock); and
- soil moisture equal to or greater than the colluvial soil's liquid limit.

Debris flows hazards are possible in Planning Areas 4 through 14; however, proposed grading will mitigate against this potential phenomenon.

SLOPE STABILITY ANALYSES

GENERAL

Five major cut slopes are proposed near the southern boundary of the site in Planning Areas 4 through 14. These are numbered CS-1 through CS-5 on the Geotechnical Map. Engineering geologic conditions for each cut are summarized in Table 1. Cut slope heights will be 65 feet or less. Slope ratios will be 2:1

(horizontal:vertical) or less. Geologic sections were completed through large cut-slopes (generally over 50 feet in height).

Table 1. Cut Slope Summary.

Slope No	Max Height	Length of Cut	Slope Ratio (horz:vert)	Geologic Material	Geologic Comments
CS-1	~55'	~650'	2:1	Saugus	Northwest to northeast facing cut that will expose Saugus formation along its entire length and height. Bedrock in this area is sandstone and conglomerate. Bedding plane failures are unlikely given the nature of the materials present. Cut is geologically stable, but out-of-slope bedding is likely in the eastern third of the cut. Cut will require a stabilization fill to limit surficial erosion.
CS-2	~45'	~700'	2:1	Saugus	Northwest to northeast facing cut that will expose Saugus formation along its entire length and height. Bedrock in this area is sandstone and conglomerate. Bedding plane failures are unlikely given the nature of the materials present. Cut is geologically stable, but out-of-slope bedding is likely in the eastern quarter of the cut. Cut will require a stabilization fill to limit surficial erosion.
CS-3	~38'	~300'	2:1	Saugus	Southeast facing cut that will expose Saugus formation along its entire length and height. Bedrock in this area is sandstone and conglomerate. Bedding plane failures are unlikely given the nature of the materials present. Cut is geologically stable, and bedding planes are neutral.
CS-4	~60'	~800'	2:1	Saugus	Northwest to northeast facing cut that will expose Saugus formation along its entire length and height. Some terrace deposits will also be exposed. Bedrock in this area is sandstone. Bedding plane failures are unlikely given the nature of the materials present. Cut is geologically stable, but out-of-slope bedding is likely. Cut will require a stabilization fill to limit surficial erosion in terrace and rock.
CS-5	~65'	~1,000'	2:1	Saugus	West to north facing cut that will expose Saugus formation along its entire length and height. Bedrock in this area is sandstone and conglomerate. Bedding plane failures are unlikely given the nature of the materials present. Cut is geologically stable, but out-of-slope bedding is likely. Cut will require a stabilization fill to limit surficial erosion.

GEOLOGIC FACTORS

Cut slopes proposed for the site are primarily underlain by bedrock of the Saugus Formation. The Saugus Formation can range from massive to thinly bedded sedimentary rock units of sandstone, conglomerate, siltstone, and claystone/mudstone. Bedding planes within the Saugus Formation are poorly to moderately-well developed, and can constitute significant planes of weakness, particularly where sandstone/conglomerate beds are in contact with siltstone or claystone. Where bedding is adversely oriented, or "daylighted", with respect to natural or cut slopes, potential for bedding plane, or "block-glide", failure exists.

STABILITY ANALYSES

Slope stability analyses were performed using the program Slope/W by GEO-SLOPE International Ltd., which utilized Bishop's Simplified Method or Spencer's Method.

SHEAR STRENGTH PARAMETERS

As part of the evaluation of shear strength parameters to be used in slope stability calculations, the referenced reports concerning the subject site were reviewed. The shear strength parameters used for slope stability analyses were based on laboratory testing performed for the feasibility evaluation (AES, 2003a), the Chevron Service Station relocation project (RTF&A, 2003, 2004a, and 2004b), the Geotechnical Investigation report (RTF&A, 2001), and additional tests performed by our office as part of the current investigation.

Presented below are the recommended shear strengths for use at the subject site. The shear test results are considered to be effective values; that is, they require hydrostatic pressures be considered in a stability analysis. A description of the testing procedures is included in Appendix B and the direct shear test results for the current investigation are presented in Figures B-1.1 through B-1.4.

SUMMARY OF SHEAR STRENGTH PARAMETERS

MATERIAL	Static Cohesion (psf)	Static Ø(degrees)
Landslide Failure Plane Material	200	18
Terrace Deposit Material	450	27
Saugus Cross-Bedding	400	30
Saugus Along Bedding (static)	250	22
Saugus Along Bedding (Pseudostatic)	300	30
Compacted Fill	250	29
Alluvium	100	38

GEOTECHNICAL SECTIONS AND ASSUMED CRITICAL FAILURE SURFACE

The analyses were based on subsurface conditions as depicted on the Geotechnical Cross Sections, Figure 4. The existing ground surface, proposed grading scheme, and subsurface geologic structure are shown on the sections. For analyses, where the location of weak bedding planes is unknown or uncertain, one is assumed to be located exactly at the critical location, typically near the toe of the slope. The slope stability analyses did not include the presence of any recommended stability

fills which is conservative. The Geotechnical Cross Sections and Slope Stability Analyses and calculations are presented in Figure 4 and Appendix C, respectively.

RESULTS OF STABILITY CALCULATIONS

Slope stability calculations were performed for CS-1, CS-4 and for the proposed compacted fill slope illustrated in Cross Section L-L', Figure 2. The results of the slope stability calculations are discussed below.

Presently, the grading plan does not reflect drainage terraces for the proposed 2:1 cut slopes. All slopes, both cut and fill, proposed at a gradient of 2:1 and exceeding a height of 30 feet, should include drainage terraces. The terraces should be designed and constructed in accordance with the current requirements of Los Angeles County.

Terrace deposits occur at some locations at the site. Though not anticipated, should Terrace deposits be exposed in cut slopes, stability fills may be needed to control erosion and decrease the potential for sloughing of cobbles and boulders.

Cut Slope CS-1: Proposed cut slope CS-1 is illustrated in Geotechnical Cross Section C-C', Figure 4. Stability analyses performed for potential failure along the daylighted bedding depicted on Section C-C' indicate that the proposed cut slope meets the requirements for grossly stable slopes. The slope stability calculations are presented in Appendix D. It is recommended that a stability fill be constructed for this cut slope to reduce the potential for surficial erosion.

Cut Slope CS-4: The proposed configuration of Cut slope CS-2 is illustrated on Geotechnical Cross Section K-K', Figure 4. Stability analyses performed for potential failure along the daylighted bedding depicted on Section K-K' indicate that

proposed cut slope CS-4 meets the requirements for grossly stable slopes. The slope stability calculations are presented in Appendix D. It is recommended that a stability fill be constructed for this cut slope to reduce the potential for surficial erosion.

Fill Slopes: Section L-L' on Figure 4 is representative of the highest proposed 2:1 fill slope. Slope stability calculations for the proposed fill slope shown on Section L-L indicate that proposed cut slope CS-4 meets the requirements for grossly stable slopes. The slope stability calculations are presented in Appendix D.

LIQUEFACTION POTENTIAL

Liquefaction may occur when saturated, loose to medium dense, cohesionless soils are densified by ground vibrations. The densification results in increased pore water pressures if the soils are not sufficiently permeable to dissipate these pressures during and immediately following an earthquake. When the pore water pressure is equal to or exceeds the overburden pressure, liquefaction of the affected soil layers occurs. For liquefaction to occur, three conditions are required:

- ground shaking of sufficient magnitude and duration;
- a ground water level at or above the level of the susceptible soils during the ground shaking; and
- soils that are susceptible to liquefaction.

Even if some soil layers do liquefy, the affects of the liquefaction will not be observed on the ground surface if a sufficient thickness of non-liquefiable soils overlies the liquefiable soils.

Ground settlement may occur during seismic shaking of an area. The settlement can be caused by liquefaction of loose granular soils and by consolidation of soft, but not necessarily liquefiable, soils. Lateral spreading can occur when a site is sloped or is adjacent to a free face.

Analyses: The liquefaction potential within Planning Area 1 was previously evaluated by this firm in our geotechnical investigation report (RTF&A, 2001). The liquefaction potential in Planning Areas 2 through 15 were evaluated by AES as presented in their feasibility evaluation report (AES, 2000b). The liquefaction evaluation and calculations performed by AES for Planning Areas 2 through 15 are presented in Appendix E. The analyses for Planning Area 1 is discussed below.

Planning Area 1: From our ground motion study we obtained a Peak Ground Acceleration (PGA) of 0.60g with an earthquake magnitude of 7.5 for use in the liquefaction analyses. For our analyses, we assumed that the groundwater level would rise to within 5 feet of the existing ground surface. Liquefaction analyses were performed on the CPT data using the methodology presented by Robertson and Fear (1996). Seismically induced settlements were estimated using the procedure developed by Tokimatsu and Seed (1987). The results of our liquefaction analyses are presented in Appendix D.

Conclusions: The conclusions regarding liquefaction potential of the site obtained from the referenced reports (RTF&A, 2000a) and (AES, 2000) are summarized below. Planning Area 1 which was evaluated by this firm and the remainder of the Planning Areas at the subject site were evaluated by AES.

Planning Area 1: Based on the results of our analyses using the CPT data, some sandy soil layers beneath the site may liquefy in the event of a large earthquake

on a nearby fault that produces the design-level ground motions. However, due to the proposed increase in the existing site grades shown on the attached Geotechnical Maps, the potentially liquefiable soil layers will be overlain by sufficient thicknesses of non-liquefiable soils so that surface expression of liquefaction (such as sand boils or ground cracks) would not be expected to occur. The recommended grading of the site includes removal of the upper soils, and their replacement with properly compacted fill. The recommended removals and the proposed site grades will mitigate the potential for surface expression of liquefaction. Some settlement of the ground surface is expected as a result of seismic shaking. Additional subsurface investigation should be performed as part of the rough grading plan review to further define the potential for seismic settlement across the site within Planning Area 1.

Lateral spreading can occur when a site is sloped or is adjacent to a free face. The site is essentially level, currently sloping at 30:1 or flatter towards the Santa Clara River. Except at the western end of the site, where the potential for liquefaction of the underlying soils occurring is low, the bank of the river does not currently present a free face to the site. Development of the site will result in an approximately 25-foot high slope inclined at 4:1 along the river. The proposed slope will consist entirely of compacted fill and bank protection will be buried within the slope. If the site is graded as recommended, soils that could potentially liquefy and result in lateral spreading will be removed and replaced with compacted fill. The potential for lateral spreading should be further evaluated once bank protection plans are produced and rough grading plans are available.

Planning Areas 2 through 15: The liquefaction potential and evaluation of earthquake induced settlements performed by AES is presented in Appendix E

(AES, 2000b). AES concluded that some isolated liquefaction-prone soils exist at the site at various depths. However, the thickness of the liquefiable soils below the water table are considered to be very thin layers. The total earthquake-induced settlements ranged between approximately 0 and 0.6 inches and AES recommended that a conservative maximum differential cyclic settlement of 0.4 inches would be appropriate for design use.

CONCLUSIONS

GEOLOGIC CONSIDERATIONS

General: We have reviewed geologic data and reports previously developed by AES for VTTM 53295 (AES, 2000b) and adjacent areas (AES, 1986; 1997a; 1997b; 1997c; 1999a; 1999b; 2000a; 2000b; 2000c; and 2004), particularly as it pertains to the location of the Holser fault. We concur with the AES findings, conclusions, and recommendations relative to the geologic aspects and conditions within VTTM 53295. The AES geologic data has been utilized in preparation of the Geotechnical Map and Geotechnical Sections, and their relevant findings have been incorporated into our conclusions and recommendations.

Erosion Potential: Friable sandstone beds are common within the Saugus Formation and are present at the site. If exposed in graded slopes, these beds could be subject to erosion and rilling due to the lack of cementation. Under most circumstances, the erosion can be controlled by adhering to the provisions of the grading code and establishing vegetative cover upon completion of grading. The presence of erosion-susceptible beds should be determined during rough grading. Extensive or thick deposits of the friable beds may warrant the construction of

stabilization fills during rough grading, though not necessarily during the mass grading phase.

Rippability: Grading operations can be performed using conventional grading equipment. Heavy ripping may be needed when excavating well-cemented sandstone or conglomerate beds.

Sewage Disposal: Sewage disposal is expected to be by sewers.

RESTRICTED USE AREAS

A 160-foot wide Building Setback has been established for the South Branch of the Holser fault. The area falling within the setback constitutes a Restricted Use Area (RUA) and should be shown on the recorded Final Map. Habitable structures should not be sited within the RUA. A habitable structure is defined as "any structure used or intended for supporting or sheltering any use or occupancy, which is expected to have a human occupancy rate exceeding 2,000 person-hours a year."

RECOMMENDATIONS

GRADING

General: The following sections present recommendations for treatment of cut and fill slopes, and grading. The applicability of the preliminary recommendations given in the following sections for foundation and retaining wall design should be confirmed at the completion of grading. Paving studies and soil corrosivity tests should be performed at the completion of rough grading to develop detailed recommendations for protection of utilities, structures, and for construction of the proposed roads.

Site Preparation: Prior to performing earthwork, the existing vegetation and any deleterious debris should be removed from the site. Existing utility lines should be relocated or properly protected in-place. All unsuitable soils and uncertified fills in the areas of grading receiving new fill should be removed to competent earth materials and replaced with engineered fill. The depth of removal and recompaction of unsuitable soils is noted on the Geotechnical Map. Any fill required to raise the site grades should be properly compacted.

All existing uncertified fill soils should be removed and recompacted prior to placement of additional fill. Removal of the exposed natural soils should extend to at least the depths indicated on the Geotechnical Map. After excavation of the upper natural soils on hillsides and in canyons, further excavation should be performed, if necessary, to remove slope wash or other unsuitable soils.

Removal Depths: The required depth of removal and recompaction of the existing compacted fill or natural soils are indicated on the Geotechnical Map. Deeper removals will be required if disturbed or unsuitable soils are encountered. After excavation of the upper natural soils on hillsides and in canyons, further excavation should be performed, if necessary, to remove slope wash or other unsuitable soils. Additional removals will also be required for transition lots and where expansive bedrock occurs.

The Geotechnical Consultant of Record may require that additional shallow excavations be made periodically in the exposed bottom to determine that sufficient removals have been made prior to recompacting the soil in-place. Deeper removals may be recommended by RTF&A based on observed field conditions during grading. During grading operations, the removal depths should be observed by a

representative of RTF&A and surveyed by the Project Civil Engineer for conformance with the recommended removal depths shown on the grading plan.

Material for Fill: The on-site soils, less any debris or organic matter, may be used in the required fills. Any expansive clays should be mixed with non-expansive soils to result in a mixture having an expansion index less than 30 if they are to be placed within the upper 8 feet of the proposed rough grades.

Rocks or hard fragments larger than 8 inches may not be placed in the fill without special treatment. Rocks or hard fragments larger than 4 inches shall not be clustered or compose more than 25% by weight of any portion of the fill or a lift. Soils containing more than 25% rock or hard fragments larger than 4 inches must be removed or crushed with successive passes (e.g., with a sheepsfoot roller) until rock or hard fragments larger than 4 inches constitute less than 25% of the fill or lift.

Oversized Material: Rock or material greater than 8 inches in diameter, but not exceeding 4 feet in largest dimension shall be considered oversize rock. The oversize rocks can be incorporated into deep fills where designated by the Geotechnical Consultant. Rocks should be placed in the lower portions of the fill and should not be placed within the upper 15 feet of compacted fill, or nearer than 15 feet to the surface of any fill slope. Rocks between 8 inches and 4 feet in diameter shall be placed in windrows or shallow trenches located so that equipment can build up and compact fill on both sides. The width of the windrows shall not exceed 4 feet. The windrows should be staggered vertically so that one windrow is not placed directly above the windrow immediately below. Rocks greater than 1 foot in diameter shall not exceed 30% of the volume of the windrows. Granular fill shall be placed on the windrow, and enough water should be applied so that soil can be

flooded into the voids. Fill should be placed along the sides of the windrows and compacted as thoroughly as possible. After the fill has been brought to the top of the rock windrow, additional granular fill should be placed and flooded into the voids. Flooding is not permitted in fill soils placed more than 1 foot above the top of the windrowed rocks.

Where utility lines or pipelines are to be located at depths greater than 15 feet, rock shall be excluded in that area. Excess rock that cannot be included in the fill, or that exceeds 4 feet in diameter, should be stockpiled for export or used for landscaping purposes.

Import Material: Import material should consist of relatively non-expansive soils with an expansion index less than 30. The imported materials should contain sufficient fines (binder material) so as to be relatively impermeable and result in a stable subgrade when compacted. The import material should be free of organic materials, debris, and rocks larger than 8 inches. A bulk sample of potential import material, weighing at least 25 pounds, should be submitted to the Geotechnical Consultant at least 48 hours in advance of fill operations. All proposed import materials should be approved by the Geotechnical Consultant prior to being placed at the site.

Compaction: After the site is cleared and excavated as recommended, the exposed soils should be carefully observed for the removal of all unsuitable material. Next, the exposed subgrade soils should be scarified to a depth of at least 6 inches, brought to above optimum moisture content, and rolled with heavy compaction equipment. The upper 6 inches of exposed soils should be compacted to at least 90%

of the maximum dry density obtainable by the ASTM D 1557-91 Method of Compaction.

After compacting the exposed subgrade soils, all required fills should be placed in loose lifts, not more than 8 inches in thickness, and compacted to at least 90% of their maximum density. For fills placed at depths greater than 40 feet below proposed finish grade a minimum compaction of 93% of the maximum dry density is required. The moisture content of the fill soils at the time of compaction should be above the optimum moisture content. Compacted fill should not be allowed to dry out before subsequent lifts are placed.

Rough grades should be sloped so as not to direct water flow over slope faces. Finished exterior grades should be sloped to drain away from building areas to prevent ponding of water adjacent to foundations.

Temporary Slopes: For purposes of construction, the soils encountered at the site should not be expected to stand vertically for any significant length of time in cuts 4 feet or higher. Where the necessary space is available, temporary unsurcharged embankments may be sloped back at a 1:1 gradient without shoring, up to a height of 45 feet in competent bedrock with favorable bedding. Where any cut slope exceeds a height of 50 feet within competent bedrock, a bench at least 10 feet wide should be located at mid-height. Within alluvial or compacted fill material, temporary excavations may be made at a 1¼:1 cut to a height of 25 feet. If the temporary construction embankments are to be maintained during the rainy season, berms are recommended along the tops of the slopes where necessary to prevent runoff water from entering the excavation and eroding the slope faces.

Where sloped embankments are used, the tops of the slopes should be barricaded to prevent vehicles and storage loads within five feet of the tops of the slopes. A greater setback may be necessary when considering heavy vehicles, such as concrete trucks and cranes; we should be advised of such heavy vehicle loads so that specific setback requirements can be established.

All applicable safety requirements and regulations, including OSHA regulations, should be met.

Permanent Slopes: Permanent cut and fill slopes may be inclined at 2:1 or flatter. The current bulk grading plan indicates that the steepest slope to be constructed at the site during grading will be 2:1.

Proposed Cut Slopes: Cut slopes proposed for the rough grading of the subject site have been designated as shown on the Geotechnical Map. Each cut slope is discussed with specific recommendations presented in the "Slope Stability Analyses" section of this report. All grading should conform to the minimum recommendations presented in this report. If these slopes are modified from those that are discussed in this report, the modifications should be reviewed by RTF&A to ascertain the applicability of our recommendations. The cut slope designation, gradient, and proposed mitigation are summarized in Table 2.

Fill Slopes: Where the toe of a fill slope terminates on natural, fill, or cut, a keyway is required at the toe of the fill slope. The fill slope keyway should be a minimum width of 12 feet, be founded within competent material, and should extend a horizontal distance beyond the toe of the fill to the depth of the keyway. The keyway should be sloped back at a minimum gradient of 2% into the slope. The width of fill slopes shall be no less than 8 feet and under no circumstances should the

fill widths be less than what the compaction equipment being used can fully compact. Benches should be cut into the existing slope to bind the fill to the slope. Benches should be step-like in profile, with each bench not less than four feet in height and established in competent material. Compressible or other unsuitable soils should be removed from the slope prior to benching. Competent material is defined as being essentially free of loose soil, heavy fracturing, or erosion-prone material and is established by the Geotechnical Consultant during grading.

Where the top or toe of a fill slope terminates on a natural or cut slope and the natural or cut slope is steeper than a gradient of 3:1, a drainage terrace with a width of at least 6 feet is recommended along the contact. As an alternative, the natural or cut portion of the slope can be excavated and replaced as a stability fill to provide an all-fill slope condition. Where the contact between the face of the fill slope and the face of a lower natural or cut slope is inclined at 45 degrees or steeper, a drainage terrace would not be required.

When constructing fill slopes, the grading contractor shall avoid spillage of loose material down the face of the slope during the dumping and rolling operations. Preferably, the incoming load shall be dumped behind the face of the slope and bladed into place. After a maximum of four feet of compacted fill has been placed, the contractor shall backroll the outer face of the slope by backing the tamping roller over the top of the slope, thoroughly covering all of the slope surface with overlapping passes of the roller. The foregoing should be repeated after the placement of each four-foot thickness of fill. As an alternative, the fill slope can be over built and the slope cut back to expose a compacted core. If the required compaction is not obtained on the fill slope, additional rolling will be required prior

to placement of additional fill, or the slope shall be overbuilt and cut back to expose the compacted core.

Stability Fills: Stability fills have been recommended at specific locations to mitigate erosion, drainage, or surficial stability problems. Stability fills should extend for the length and height of slope as recommended in the "Slope Stability Analyses" section of this report. Additional stability fills may be required during grading due to changed field conditions. The minimum stability fill keyway widths should conform to those shown on Figure 4, but should not be less than 12 feet. The width of stability fills may taper uniformly to no less than 8 feet at the top of the slope or terrace drain. Under no circumstances should the fill widths be less than what the compaction equipment being used can fully compact. Backdrains should be provided at the backcut as described in the following section and indicated in the Stability Fill Details for Grossly Stable Slopes, Figure 5. All stability fills should be keyed and benched into competent earth materials as recommended in this report or determined by the Geotechnical Consultant during construction. Stability fills should be constructed in accordance with the recommendations for keyway, benching, and backdrain details shown in Figure 5.

Stability Fill Backdrains: Backdrains should be installed at the backcut of the stability and buttress fills with outlets at vertical intervals not exceeding 15 feet and horizontal intervals not exceeding 100 feet, and under the direction of the Geotechnical Consultant. Backdrain outlets should consist of non-perforated pipe. The gradient should be at least 2% to the discharge end. The exact location of the backdrains should be determined in the field by the Geotechnical Consultant

after the backcut has been made, so that it can be best positioned to intercept potential seepage.

The exact location of the subdrains should be determined in the field by the Geotechnical Consultant after the backcut has been made, so that they can be best positioned to intercept potential seepage.

Slope Planting: In order to reduce the potential for erosion, all cut and fill slopes should be seeded or planted with proper ground cover as soon as possible following grading operations in accordance with Section 7019 of the County of Los Angeles 1999 Building Code. The ground cover should consist of drought-resistant, deep-rooting vegetation. A landscape architect should be consulted for ground cover recommendations, plant selection, installation procedures, and plant care requirements.

DRAINAGE

Subdrains: Canyon subdrains are recommended to intercept and remove groundwater within canyon fill areas. All subdrains should extend up-canyon, with the drain inlet carried to within 15 feet of final pad grade. Specific subdrain locations and recommendations should be provided as part of the future rough grading plan review.

EXPANSIVE BEDROCK

It is anticipated that Saugus Formation bedrock materials exposed at pad grade may contain expansive claystone beds that could cause differential expansion. Therefore, within building areas at locations where expansive Saugus Formation units

are exposed at pad grade, it is recommended that the bedrock be removed and recompacted to a depth of at least eight feet below the proposed final pad elevations or five feet below the bottom of proposed footings, whichever is greater. It is also recommended that the bedrock be removed and recompacted to a depth of at least three feet below proposed soil subgrade in exposed Saugus Formation areas receiving pavement or hardscape improvements. The soils generated by these over-excavations should be mixed with non-expansive soils to yield a relatively non-expansive mixture. Should the resulting fill soil still be expansive, special construction techniques such as pad subgrade saturation or post-tensioned slabs may be required to reduce the potential for expansive soil related distress.

TRANSITION LOTS

Proposed building pads located in a cut and fill transition zone may experience cracking and movement of the footings and slab due to differing compressibility of the fill, as compared to the bedrock material. To reduce the potential for cracking and differential settlement, the portion of the lot in bedrock should be over-excavated to a depth of at least five feet below the proposed finished pad elevation; or three feet below the bottom of proposed footings, whichever is greater. The over-excavation should extend at least five feet laterally beyond the building limits. Where removal and recompaction for potentially expansive soils or bedrock is also required, it is recommended that the eight-foot removals be performed as described in the "Expansive Bedrock" section of this report.

Foundation and floor slabs for structures located within a transition zone should also contain special reinforcement as designed by the Project Structural

Engineer. Continuous footings located across the transition zone and 20 feet on either side of the contact should incorporate a minimum of two No. 4 bars, one at the top and one at the bottom.

Floor slabs located across the transition zone and 20 feet on either side of the contact should have a minimum slab thickness of at least 4 inches and should contain as a minimum No. 4 bars spaced a maximum of 18 inches on center. As an alternative, post-tensioned floor slabs may be used.

FOUNDATIONS

General: Residential buildings up to three stories in height may be supported on continuous or individual spread footings established in properly compacted fill. The following recommendations should be considered preliminary since fill will be used in some lots to raise the site grade and the final design values will depend upon the engineering characteristics of the fill soil. The preliminary design values are based upon this investigation, our experience with the soils in the area, and with the site preparation and grading recommendations for this project.

Bearing Capacity: It is assumed that the proposed residential buildings will be founded at approximately final planned grades, with column loads less than 100 kips, and have normal floor loads with no special requirements. Individual column pads or wall footings for residential buildings should have a width of at least 12 inches and be placed at a depth of at least 18 inches below the lowest final adjacent grade.

Residential structures may be placed on spread footings designed using a bearing value of 2,000 pounds per square foot (psf). The recommended bearing value

is a net value, and the weight of concrete in the footings may be taken as 50 pounds per cubic foot (pcf). The weight of soil backfill may be neglected when determining the downward loads from the footings. A one-third increase in the bearing value may be used when considering wind or seismic loads.

While the actual bearing value of the fill placed at the site will depend on the materials used and the compaction methods employed, the quoted bearing value will be applicable if acceptable soils are used and are compacted as recommended. The bearing value of the fill should be confirmed during grading.

Lateral Resistance: Lateral loads may be resisted by soil friction and by the passive resistance of the soils. A coefficient of friction of 0.4 applied to the dead loads may be used between the footings, floor slabs, and the supporting soils. The passive resistance of properly compacted fill soils may be assumed to be equal to the pressure developed by a fluid with a density of 250 pcf. The frictional resistance and the passive resistance of the soils may be combined without reduction in determining the total lateral resistance.

Settlement: Provided that light residential structures are founded in compacted fill soils as recommended, we estimate that the maximum settlement will be less than one inch, and that differential settlements will be less than ¾ inch within a horizontal distance of 30 feet.

Foundation Observations: To verify the presence of satisfactory soils at foundation design elevations, the excavations should be observed by the Geotechnical Consultant. Excavations should be deepened as necessary to extend into satisfactory soils. Where the foundation excavations are deeper than four feet, the sides of the excavations should be sloped back at ¾:1 or shored for safety.

Inspection of foundation excavations may also be required by the appropriate reviewing governmental agencies. The contractor should be familiar with the inspection requirements of the reviewing agencies.

SITE COEFFICIENT

Under the Earthquake Design regulations of Chapter 16, Divisions IV and V of the 1997 Uniform Building Code (UBC), the following coefficients and factors apply to lateral-force design for structures at the site.

SEISMIC ZONE	$Z = 0.4$
SOIL PROFILE TYPE	S_D, Stiff Soil
Near-Source Factor N_a	1.3
Near-Source Factor N_v	1.6
Seismic Coefficient C_a	0.57
Seismic Coefficient C_v	1.02

Fault Type	Distance (km)
A	>15
B	<2

RETAINING WALLS

General: Backfill placed behind retaining walls should be compacted to a minimum of 90% of the maximum dry density as determined by ASTM D 1557-91. When backfilling behind walls, it is recommended the walls be braced and heavy compaction equipment not be used closer to the back of the wall than the height of the wall.

Lateral Earth Pressures: For design of non-building retaining walls, where the surface of the backfill is level and the retained height of soils is less than 15 feet, it may be assumed that drained, non-expansive soils will exert a lateral pressure equal to that developed by a fluid with a density of 30 pcf. Where the surface of the backfill is inclined at 2:1, it may be assumed that drained soils will exert a lateral pressure equal to that developed by a fluid with a density of 45 pcf.

In addition to the recommended earth pressures, the walls should be designed to resist any applicable surcharges due to any nearby foundations, walls, storage or traffic loads. A drainage system, such as weepholes or a perforated pipe should be provided behind the walls to prevent the development of hydrostatic pressure. Recommendations for wall drains are presented as follows.

If a drainage system is not installed, the walls should be designed to resist an additional hydrostatic pressure equal to that developed by a fluid with a density of 60 pcf against the full height of the wall. In addition to the recommended earth and hydrostatic pressures, the upper 10 feet of walls adjacent to vehicular traffic areas should be designed to resist a uniform lateral pressure of 100 psf. This pressure is based on an assumed 300 psf surcharge behind the walls due to normal traffic. If the traffic is kept back at least 10 feet from the walls, the traffic surcharge may be neglected.

Wall Drainage: A drainage system should be provided behind all retaining walls or the walls should be designed to resist hydrostatic pressures. Retaining wall backfill may be drained by a perforated pipe installed at the base and back side of the wall. The perforated pipe should be at least 4 inches in diameter, placed with the perforations down, and be surrounded on all sides by at least 6 inches of gravel. The

pipe should be installed to drain at a gradient of between 0.5 to 1% and should be connected to an outlet device. The gravel should be "burrito-wrapped" with filter fabric such as Mirafi 140 or equivalent. Alternatively, the filter fabric and gravel may be omitted when using a continuous slotted pipe and graded sand which conforms to LACFCD "F1 " Designated Filter Material.

The backside of the wall should be waterproofed. A 6-inch vertical gravel chimney drain, Miradrain, or equivalent, should be placed behind retaining walls and extend to within 18 inches below the top of the wall backfill to provide a drainage path to the perforated pipe. The top of the vertical drain should be capped with 18 inches of onsite soils.

The drainage system should be observed by the Geotechnical Consultant prior to backfilling the retaining wall. Inspection of the drainage system may also be to required by the reviewing governmental agencies.

CHANNEL LINING

General: The proposed development includes a proposed soil cement channel liner. Plans for the soil cement channel liner are not yet available and will be geotechnically reviewed in a future report. The following preliminary recommendations can be used in the planning of the proposed bank protection. The grading recommendations presented in the preceding sections are also applicable to the proposed channel lining. Overexcavation of the natural soils is not expected to be required for the lining, though existing fill soils should be excavated and replaced with compacted fill. The backcut for the channel lining may be sloped back at 1¼:1.

Concrete lined and soil-cement channel liners may be inclined at 1½:1 or flatter. Grouted and ungrouted rip-rap liners may be inclined at 2:1 or flatter.

Soil Cement: It is expected that portions of the on-site alluvial soils will be suitable for use as aggregate in soil-cement. For estimating purposes, a cement content of 8 to 10%, by weight, may be used. To determine the actual required cement content, the granular soils that are to be used in a soil-cement channel lining should be stockpiled. Representative samples of the stockpiled material should be mixed with varying amounts of cement, compacted, and cured for different time intervals. Based on the results of unconfined compression tests on the samples of the soil-cement mixtures, the actual cement content to be used during construction can be determined.

The soil-cement should be placed in layers not more than 8 inches in thickness and should be compacted to at least 95% of the maximum dry density at a moisture content of no more than 2% over optimum for the soils. The placement of the soil-cement should be performed under the observation of the Geotechnical Consultant, who should perform sieve analyses, compaction, unconfined compression, and moisture-density tests.

GEOTECHNICAL OBSERVATION

The grading operations should be observed by the Geotechnical Consultant. The Geotechnical Consultant's representative should have at least the following duties:

- observe the excavation so that any necessary modifications based on variations in the soil/rock conditions encountered can be made;

- observe the exposed subgrade in areas to receive fill and in areas where excavation has resulted in the desired finished subgrade. The representative should also observe proof-rolling and delineation of areas requiring overexcavation;

- evaluate the suitability of on-site and import soils for fill placement; collect and submit soil samples for required or recommended laboratory testing where necessary;

- observe the fill and backfill for uniformity during placement;

- test fill for field density and compaction to determine the percentage of compaction achieved during fill placement;

- geologic observation of all cut slopes, keyways, backcuts and geologic exposures during grading to ascertain that conditions conform to those anticipated in the report;

- observe benching operations; observe canyon cleanouts for subdrains, and subdrain installation; and

- observe removal of all landslide debris where specified.

The governmental agencies having jurisdiction over the project should be notified prior to commencement of grading so that the necessary grading permits can be obtained and arrangements can be made for required inspection(s). The contractor should be familiar with the inspection requirements of the reviewing agencies.

111 STATEMENT

Based on the results of our geotechnical investigation and review of the plans furnished to us, it is our finding that the site will be safe from hazards of landslide, settlement, or slippage, and will not adversely affect adjacent properties in compliance with the Los Angeles County Code, provided our recommendations and the provisions of the Los Angeles County Code are followed.

GEOTECHNICAL CONSULTANT OF RECORD

This report has been prepared assuming that RTF&A will perform all geologic and geotechnically-related field observations and testing. If the recommendations presented in this report are to be utilized, but observation of the grading activities is performed by others, the parties performing the work must review this report and assume responsibility for recommendations contained herein or provide their own recommendations. That party would then assume the title "Geotechnical Consultant of Record" for the project.

A representative of the Geotechnical Consultant of Record should be present to observe all grading operations as well as test compacted fills. A report presenting the results of these observations and related testing should be issued upon completion of these operations. All footing excavations should be observed by a representative of the Geotechnical Consultant of Record, prior to placing steel or pouring concrete into the excavations.

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The following are attached and complete this report:

Volume I

- References
- Site Location Map - Figure 1
- Oil Well Location Map – Figure 2
- Geotechnical Maps – Figures 3.1 through 3.5 (in pocket)
- Geotechnical Cross Sections - Figure 4 (in pocket)
- Stability Fill Detail for Grossly Stable Slopes - Figure 5

Volume II

- Appendix A - Explorations
  - Explorations
  - Table A-1, Exploration Summary
  - Unified Soil Classification System - Figure A-1
  - Current Borings Logs, B-1 - B-4
  - Boring Logs From RTF&A March 23, 1998, WB-1 - WB-4
  - Boring Logs From AES May 25, 2000, RW-1 through RW-3, B-40E, B43E, B47E, B60E, B61E, HS-1 through HS-10
  - Trench Logs From RTF&A December 30, 2003
  - Trench Logs From AES May 25,2000, T-1 through T-67
- Appendix B - Laboratory Testing
  - Laboratory Tests
  - Current Direct Shear Test Data (B-1.1 through B-1.4)
  - Laboratory Data From RTF&A December 3,2001 (6 pages)
  - Laboratory Data From AES May 25, 2000 (25 pages)
- Appendix C - Slope Stability Analyses (30 pages)

Volume II

- Appendix C - Slope Stability Analyses (30 pages)
- Appendix D - Cone Penetration Test Data
  CPT Soundings From RTF&A December 3, 2001
  CPT Soundings from RTF&A March 23, 1998
  CPT Soundings From AES May 25, 2000
- Appendix E - Liquefaction Evaluation From AES May 25, 2000

Respectfully submitted,

R. T. FRANKIAN & ASSOCIATES

by: Douglas S. Santo
Principal Engineering Geologist

and: Alan W. Rasplicka
Geotechnical Engineer

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

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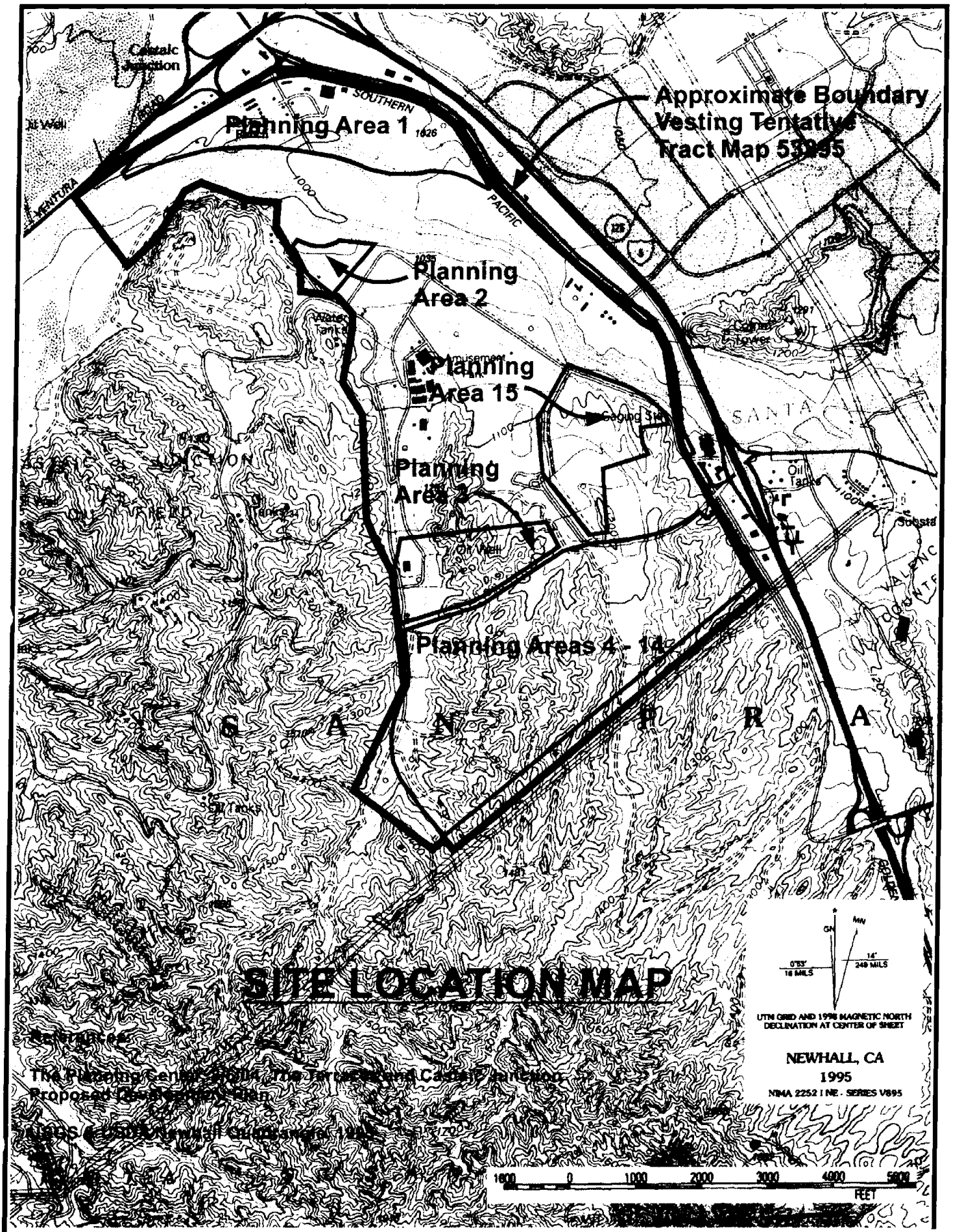
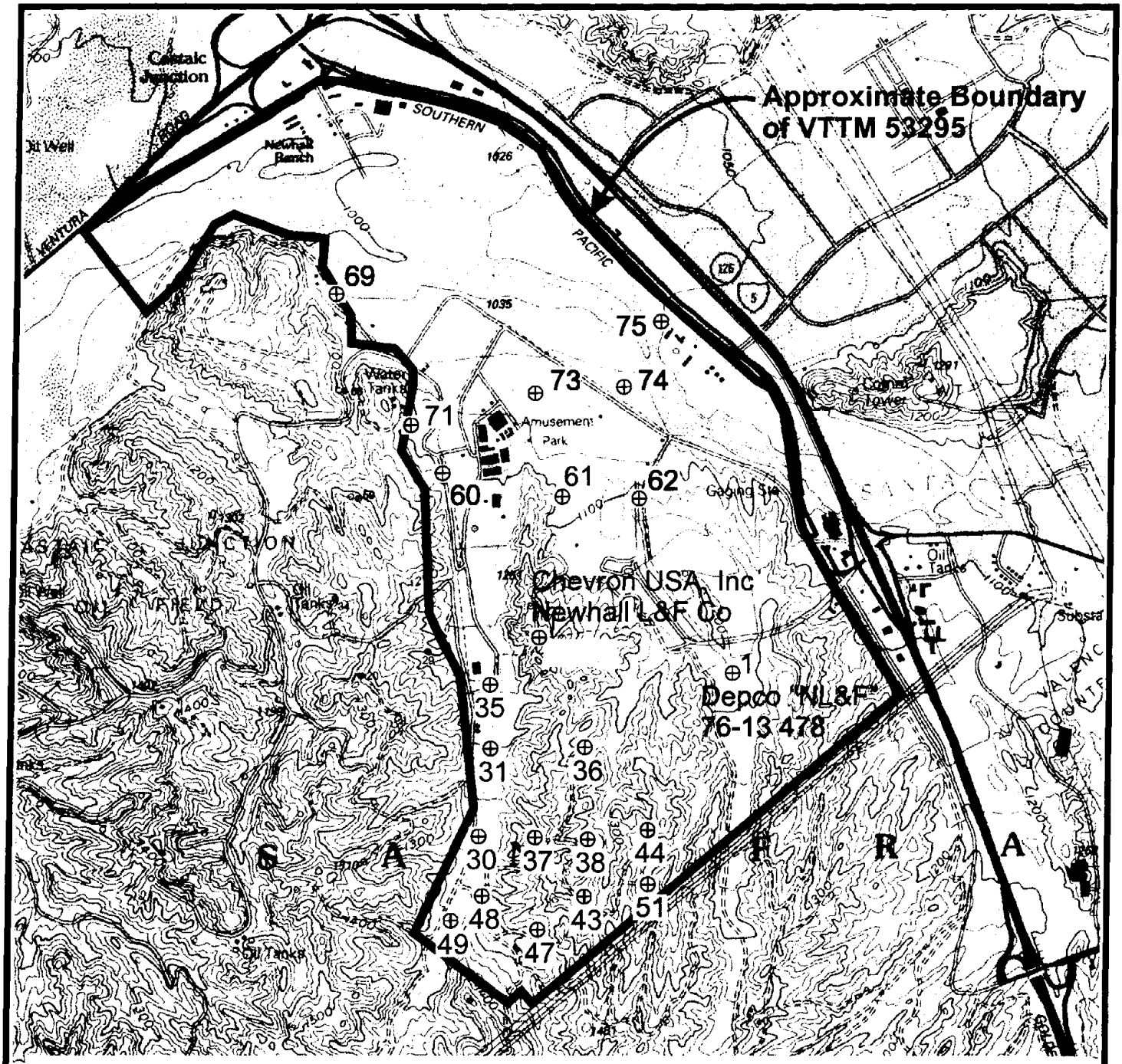
Aerial Photos Reviewed

Year	Flight	Frame	Scale	Source
1928	E	120, 121, 122	1" = 2,000'	Fairchild
1952	AXJ-2K	140, 141, 142	1" = 650'	USDA



R.T. FRANKIAN & ASSOCIATES
FIGURE 1



OIL WELL LOCATION MAP

EXPLANATION

⊕49 Plugged and abandoned oil well, showing DOG well number, well name, year drilled, and total depth when available.

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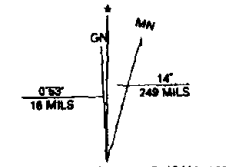


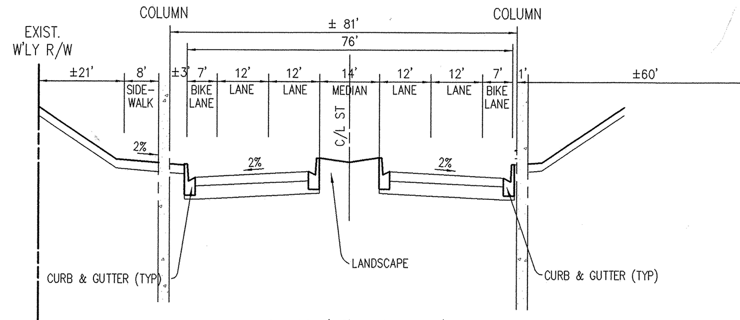
UTM GRID AND 1998 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

NEWHALL, CA
1995
NIMA 2252 I NE - SERIES V895

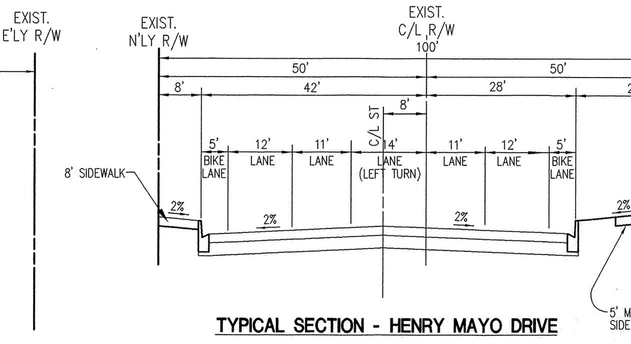
1000 0 1000 2000 3000 4000 5000
FEET

TYPICAL TURNAROUND DETAIL
NOT TO SCALE

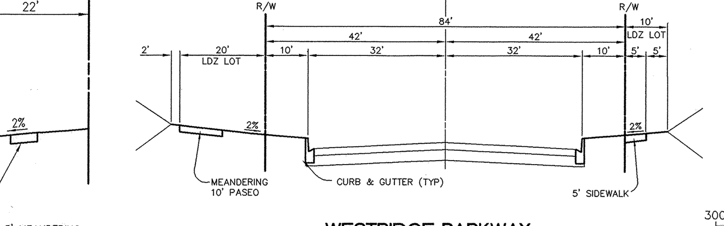
SECTION - THE OLD ROAD (C-C)
NOT A PART



OLD ROAD (SECTION A-A)
NOT A PART



TYPICAL SECTION - HENRY MAYO DRIVE
NOT A PART



WESTRIDGE PARKWAY
NOT A PART

FEET 300 150 0 300 600
INCHES 1 1/2 0 1 2

SURVEY NOTES:

VERTICAL DATUM:
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS BENCHMARK DESCRIBED AS FOLLOWS: LACDPW L5402 RND HD SPK IN LOWER CONC HDWL @ N END 24 FT W/O C/L THE OLD RD (W RDWY) AND 0.6 MI S/O HENRY MAYO DR @ MI MKR #6.25 NEWHALL QUAD, 1995 ADJUSTMENT (NAVD 1988) ELEVATION = 1031.951

THERE IS APPROXIMATELY 2.3 FEET DIFFERENCE BETWEEN PREVIOUS COUNTY OF LOS ANGELES DATUMS BASED UPON NAVD 1929 AND NAVD 1988 (NAVD 1988 IS 2.3 FEET HIGHER THAN NAVD 1929).

AERIAL PLANIMETRY:
THIS SURVEY WAS PREPARED BY PHOTOGRAMMETRIC PROCESSES, UTILIZING AERIAL PHOTOGRAPHY DATED SEPTEMBER 10, 1999. THE OUTLINE OF BUILDINGS AND OTHER ROOFED IMPROVEMENTS, MAY INCLUDE EAVES, CANOPIES AND BALCONIES, SINCE BUILDINGS BELOW THESE ITEMS ARE NOT VISIBLE TO THE CAMERA.

BY PHOTOGRAMMETRIC PROCESSES FROM LIDAR IMAGING DATED JUNE 24–26, 1998, AND COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS.

CONTOUR INTERVAL:
10 FOOT, UNLESS OTHERWISE NOTED.

GENERAL NOTES:

1. GRADE ELEVATIONS SHOWN ON THE VTTM ARE APPROXIMATE. THE ELEVATIONS MAY CHANGE BY 10 FEET. ELEVATION CHANGES MAY BE GREATER THAN 10 FEET BUT ONLY IF DETERMINED BY DPW AND DRP THAT THE REVISIONS ARE CONSISTENT WITH THE INTENT OF THE SUBDIVISION MAP APPROVAL.
2. LOT LINES CAN BE ADJUSTED PROVIDED NO ADDITIONAL LOTS ARE CREATED (EXCEPT FOR OPEN SPACE LOTS). THE DEGREE OF ADJUSTMENT IS WITHIN THE DISCRETION OF THE SUBDIVIDER PROVIDED SUCH ADJUSTMENTS ARE CONSISTENT WITH THE STATE SUBDIVISION MAP ACT.
3. ALIGNMENT AND GEOMETRICS OF STREETS ARE APPROXIMATE. ADJUSTMENTS CAN BE MADE PROVIDED DPW AND DRP DETERMINE THAT THE ADJUSTMENTS ARE CONSISTENT WITH THE INTENT OF THE SUBDIVISION APPROVAL.
4. BUILDING FOOTPRINTS THAT ARE SHOWN ON THE SUBDIVISION MAP OR ACCOMPANYING EXHIBIT MAP ARE ONLY FOR ILLUSTRATIVE PURPOSES. ACTUAL BUILDING LOCATIONS AND FOOTPRINTS MAY VARY AND WILL BE REVIEWED DURING PLOT PLAN APPROVAL AND SHALL BE GRANTED PROVIDED THE PROPOSED BUILDING SATISFIES ALL EXISTING CODES AND ORDINANCES. THIS MINOR CHANGE DOES NOT, HOWEVER, INCLUDE THE CHANGE IN PROPOSED LAND USE OR RESIDENTIAL HOUSING PRODUCT.
5. PERMISSION IS REQUESTED TO FILE "LARGE LOT" PARCEL MAPS OF 20 ACRES OR MORE (WITHOUT IMPROVEMENTS) OR 5 ACRES OR MORE (WITH IMPROVEMENTS) AS SPECIFIED IN THE COUNTY SUBDIVISION CODE.
6. THE RECORDATION OF A "LARGE LOT" PARCEL MAP SHALL NOT REQUIRE THE OBLIGATION OF FEES, DEDICATIONS (E.G., RIGHTS-OF-WAY OR PARKS), EXACTIONS, OR INFRASTRUCTURE AS MAY BE OTHERWISE REQUIRED FOR THE SUBDIVISION, EXCEPT AS MAY BE REQUIRED BY CHAPTER 21.32 OF THE SUBDIVISION CODE.
7. THE RECORDATION OF A "LARGE LOT" PARCEL MAP SHALL BE CONSIDERED THE FILING OF THE FIRST UNIT FOR THE PURPOSE OF TIME EXTENSIONS PURSUANT TO THE SUBDIVISION MAP ACT.
8. PERMISSION IS GRANTED FOR UNIT PHASING.
9. PERMISSION IS GRANTED TO COMBINE LOTS.
10. PERMISSION IS GRANTED TO RECORD ADDITIONAL OPEN SPACE LOTS.
11. TRAIL LOCATIONS CAN BE RE-LOCATED THROUGH AN INFORMATION ONLY MAP.
12. THE LOCATIONS OF APPURTENANT STRUCTURES (e.g., WATER WELLS, PASEOS, PEDESTRIAN BRIDGES, TRANSIT SHELTERS, WATER QUALITY BASINS, ETC.) MAY BE RELOCATED THROUGH AN INFORMATION ONLY MAP.
13. TOPOGRAPHY IS BASED ON CONTROLLED TOPO WITH CONTOUR INTERVALS OF 2 FEET. DATE OF AERIAL: SEPTEMBER 1999.
14. DEVELOPMENT IS LOCATED IN FIRE ZONE___.
16. COMMERCIAL DRIVEWAYS TO BE DESIGNATED AS "PRIVATE DRIVEWAYS AND FIRE LANE".
17. ALL SLOPES OVER 5 FEET IN HEIGHT ARE TO BE LANDSCAPED AND IRRIGATED WITH COUNTY APPROVED PLANTS AND GROUND COVER.
18. RECIPROCAL PARKING EASEMENTS TO BE RESERVED FOR ALL COMMERCIAL LOTS.
19. BOUNDARY LINE DIMENSIONS ARE TAKEN FROM RECORD DATA. LOT AREAS SHOWN IN TABLE HEREON ARE GROSS ACREAGE.
20. PERMISSION IS REQUESTED TO ABANDON ALL OF THE COUNTY EASEMENTS FOR DRAINAGE PURPOSES (IF ANY) BY THE FINAL MAP PURSUANT TO SECTION 66599.20 1/2 OF THE STATE GOVERNMENT CODE.
21. REQUEST PERMISSION TO MASS GRADE. PROPOSED BORROW SITE AND HAUL ROUTES PER VICINITY MAP.
22. ALL DIMENSIONS SHOWN ARE APPROXIMATE.
23. REQUEST PERMISSION TO HAVE NO STREET FRONTAGE FOR CERTAIN LOTS AS INDICATED ON THE VTTM.
24. ALL EXISTING STRUCTURES LOCATED ON-SITE WILL BE REMOVED.
25. ALL NOTES ON THE TITLE SHEET OF THE VTTM ARE ADOPTED AS CONDITIONS OF APPROVAL.
26. PERMISSION IS REQUESTED TO RECORD ADDITIONAL UTILITY LOTS PROVIDED MAINTENANCE EASEMENTS ARE GRANTED TO THE SATISFACTION OF THE DRP AND DPW.
27. PERMISSION TO RECORD JOINT ACCESS EASEMENTS (20' WIDE) AS LOTS REQUESTED.
28. PROPOSED STREET GRADING IS APPROXIMATE ONLY AND SUBJECT TO ADJUSTMENTS PENDING DETERMINATION OF FINAL DEVELOPMENT LAYOUT AND PLANS.
29. MODIFIED STREET CROSS-SECTIONS AS SHOWN ON VESTING TENTATIVE TRACT MAP

ARE REQUESTED. HOWEVER, PERMISSION IS SOUGHT TO CONSTRUCT STANDARD AND ALTERNATE STREET CROSS-SECTIONS AT THE DISCRETION OF THE SUBDIVIDER.

SPECIAL NOTES:

1. WATER QUALITY BASINS AND CDS UNITS WILL PROVIDE FOR TREATMENT OF STORM WATER RUN OFF
2. THE WATER QUALITY BASINS SHALL BE DEDICATED TO THE COUNTY WHEN COMPLETED AND ACCEPTED.
3. PROPOSED RECLAIMED WATER LINES WILL BE LOCATED IN PUBLIC STREETS AND TRAILS.

LEGEND:

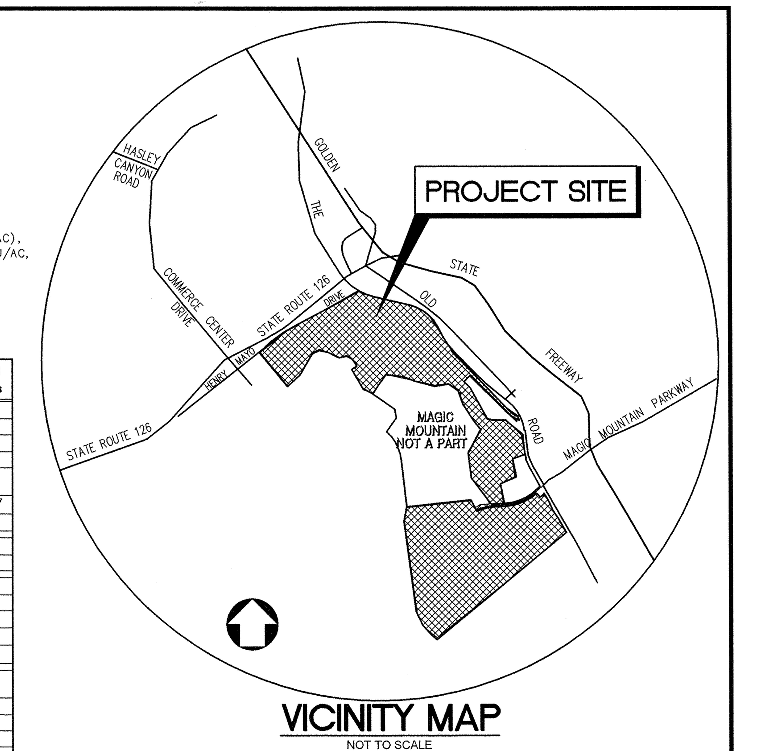
Lot 1 — LOT NO.
10,000 SF — LOT AREA (SQUARE FEET)
FF=1010.0 — FINISH FLOOR ELEVATION
PROJECT BOUNDARY
EXISTING RIGHT OF WAY
PROPOSED RIGHT OF WAY
PROPOSED UTILITY EASEMENT
EXISTING EASEMENT
FUTURE RIGHT OF WAY
1000 — PROPOSED CONTOUR
DAYLIGHT LINE
R — RIDGE LINE
SD — STORM DRAIN
SS — SANITARY SEWER
W — WATER
CMP INLET
CATCH BASIN
SD — EXISTING STORM DRAIN LINE
SS — EXISTING SEWER LINE
W — EXISTING WATER LINE
EXISTING OIL LINE
G — EXISTING GAS LINE
OHT — EXISTING OVERHEAD COMMUNICATION LINE
UGT — EXISTING UNDER COMMUNICATION LINE
OHE — EXISTING OVERHEAD POWER LINE
EXISTING POWER POLE
SEA — SEA, RIVER CORRIDOR
FEMA — FEMA
Q50 — Q-CAP
404_1603
PEDESTRIAN/BIKING TRAIL AND CHANNEL ACCESS
BURIED BANK STABILIZATION
EQUESTRIAN/HIKING TRAIL
FIRE LANE
SIGHT DISTANCE LINE
PSOMAS COMBINED OIL WELL LOCATION, FILES DATED: 08/01/01

ac — ACRES
APWA — AMERICAN PUBLIC WORKS ASSOCIATION
P.C.C. — PORTLAND CEMENT CONCRETE
EX — EXISTING
FF — FINISH FLOOR
FM — FORCE MAIN
HP — HIGH POINT
L — LENGTH
MIN — MINIMUM
GB — GRADE BREAK
PROP — PROPOSED
R — RADIUS
SF — SQUARE FOOT
SD — STORM DRAIN
SS — SANITARY SEWER
FW — FIRE WATER
W — WATER
STD — STANDARD
R/W — RIGHT OF WAY

PROJECT SUMMARY:

GROSS AREA: 812.8 Acres
TOTAL LOTS: 638
TOTAL D.U.: 3,230 DU
EXISTING ZONING: M-1.5, A-2-5, C-3 AND SP
PROPOSED ZONING: M-1.5-DP, RPD, C-2-DP AND SP
GENERAL PLAN LAND USE: M – INDUSTRY, W – FLOODWAY/FLOODPLAIN, HM – HILLSIDE MANAGEMENT, N1 – NONURBAN (0.5 DU/AC), U1 – URBAN (LOW DENSITY RESIDENTIAL) 1.1 – 3.3 DU/AC, C – COMMERCIAL, AND SIGNIFICANT ECOLOGICAL AREA
PROPOSED LAND USE: M, C, U2, U3 AND U4
ESTIMATED EARTHWORK 9,500,000 CY

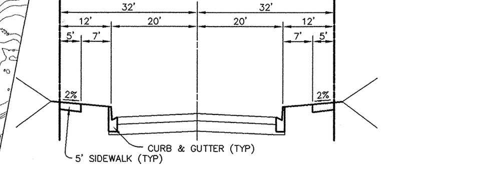
Lot Numbers	No. of Lots	Type (Use)	Dwelling Units	Commercial SF	Total Acres
Planning Area 1					
1–23, 25	24	Commercial		1,553,018	81.9
26	1	Open Space			0.1
28–30, 32	4	Condominium	408		17.7
24, 27, 31, 33–37	8	Open Space			6.7
38–55	18	Open Space (River)			222.7
56	1	Open Space			7.8
Planning Area 2					
57	1	Commercial		115,214	9.7
Planning Area 3					
58–66	9	Commercial		388,300	37.6
67	1	Water Quality Basin			4.3
68–69, 71–75	7	Open Space			11.3
70	1	Open Space (LDZ Lot)			0.2
Planning Areas 4 thru 14					
76–82	7	PA-4 Courtyard SF	153		22.0
83–214	132	PA-5 SF 46'x100' Min.	132		18.3
215–335	121	PA-6 SF 50'x110' Min.	121		18.5
336–501	166	PA-7 SF 40'x90' Min.	166		18.5
502–505	4	PA-8 SFA Duplex	116		12.3
506–512	7	PA-9 Story Condominium	261		11.5
513–516	4	PA-10 3&4 Story Condominium	273		6.7
517–523	7	PA-11 2&3 Story 16-Plex Condominium	280		13.0
524–528	5	PA-12 2&3 Story 12-Plex Condominium	144		10.4
529–535	7	PA-13 2&3 Story Townhomes/flats	176		14.6
536	1	PA-14 Commercial		28,475	3.4
537	1	Recreational Area			1.7
538–557	20	Private Drive			28.6
558–605	48	Open Space			138.3
606	1	Private & Future Street			5.5
607	1	Future Street			1.1
Planning Area 15					
608, 614, 627	3	4 Story Condominium	325	7,900	8.5
609–610	2	Residental Above Parking Structure	60		3.6
611–613	3	Parking Structure			5.9
615–616, 625–626	4	4 Story Mixed Use (Condo above Retail)	615	78,800	12.7
617, 619, 621, 624	4	5 Story Mixed Use (Commercial/Office)		831,100	9.4
620, 623	2	4 Story Mixed Use (Commercial/Office)		82,200	1.7
622	1	4 Story Parking Structure			1.6
618, 637–638	3	Open Space			4.3
629–636	8	Private Drive			13.3
628	1	Drainage Filter Site			3.0
		Public Street R/W			24.5
Total	638		3230	3,085,007	812.8



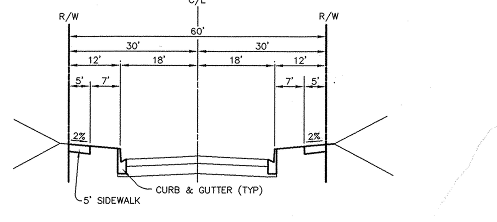
VICINITY MAP
NOT TO SCALE

EXPLANATION

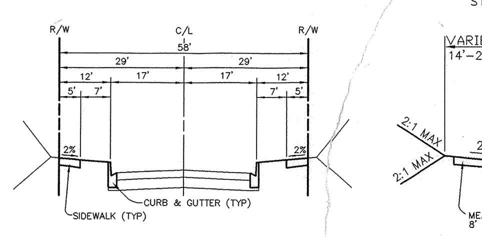
cef — Certified Engineered Fill
af — Artificial Fill
af/Qal — Artificial Fill over Alluvium
Qal — Alluvium
Qsf — Surficial Failure
Qt — Terrace Deposits
TQs — Saugus Formation
Geologic Contact
Fault
Geologic Section Line
Bedding Attitude
Attitude of Shear Surface
B-4 — Bucket Boring, RTF&A Current Investigation
CPT-19 — Cone Penetration Test Sounding RTF&A 96-115-21 Dated 12-03-01
CPT-13(P) — Cone Penetration Test Sounding with Piezometer RTF&A 96-115-21 Dated 12-03-01
CPT-6 — Cone Penetration Test Sounding RTF&A 96-115-21 Dated 3-23-98
WB-4 — Rotary Wash Boring RTF&A 96-115-21 Dated 3-23-98
TP-3 — Test Pit, RTF&A 96-149-21 Dated 12-30-03
TP-5 — Test Pit, RTF&A 96-149-F Dated 12-30-03
R=10' — Recommended Minimum Depth of Removal and Recompaction
(af*) — Designates Complete Removal of **(af)**
(Qsf*) — Designates Complete Removal of **(Qsf)**
CPT-18 — Cone Penetration Test Sounding, AES 5-25-00
RW-2 — Rotary Wash Boring, AES 5-25-00
HS-10 — Hollow Stem Boring, AES 5-25-00
B-62E — Bucket Boring, AES 5-25-00
T-64 — Test Pit, AES 5-25-00



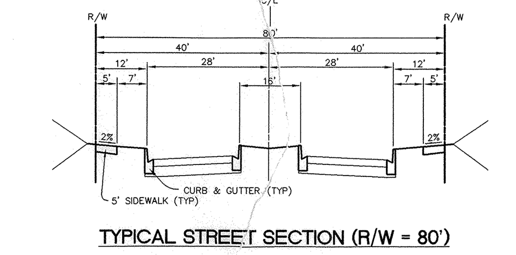
RESIDENTIAL COLLECTOR (R/W = 64')



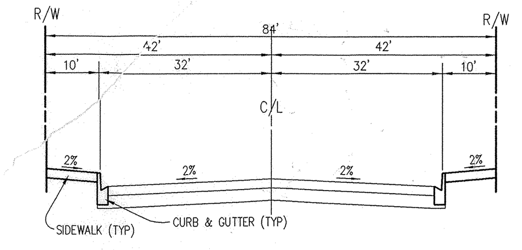
RESIDENTIAL LOCAL (R/W = 60')



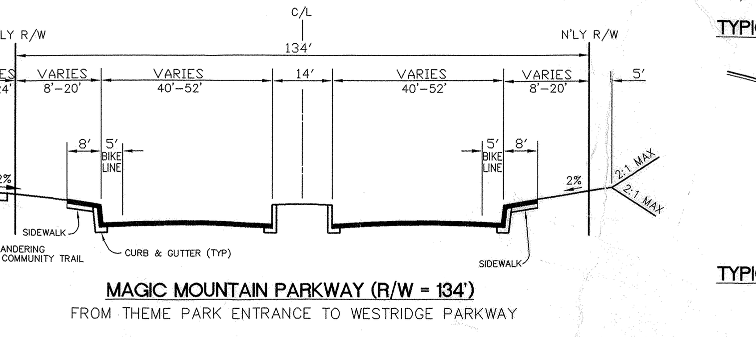
RESIDENTIAL CUL DE SAC (R/W = 58')



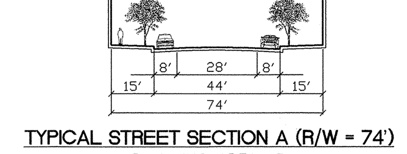
TYPICAL STREET SECTION (R/W = 80')



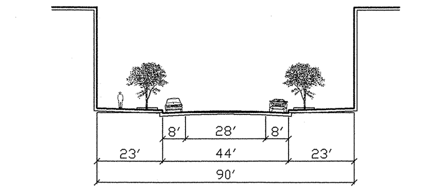
BOSKOVITCH DRIVE (R/W=84')
PLANNING AREA 1



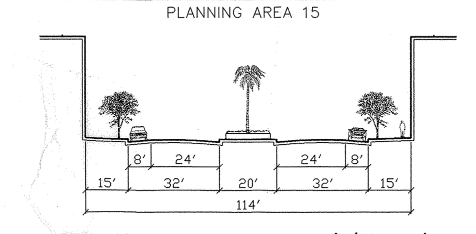
MAGIC MOUNTAIN PARKWAY (R/W = 134')
FROM THEME PARK ENTRANCE TO WESTRIDGE PARKWAY



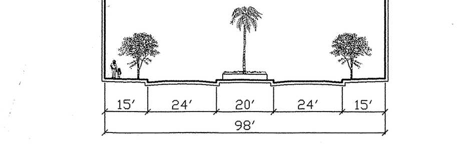
TYPICAL STREET SECTION A (R/W = 74')
PLANNING AREA 15



TYPICAL STREET SECTION B (R/W = 90')
PLANNING AREA 15



TYPICAL STREET SECTION C (R/W = 114')
PLANNING AREA 15



TYPICAL STREET SECTION D (R/W = 98')
PLANNING AREA 15

R.T. FRANKIAN & ASSOCIATES

Geotechnical Map

PREPARED FOR
Newhall Land & Farming Company
Vesting Tentative Tract Map No. 53295
Valencia, California

SCALE	DRAWN BY	CHECKED BY
AS SHOWN	MN	AWR/DS
DATE 3-18-05	Figure 3.1	JOB NO. 2004-700-21

REV: ________
DATE: 12/28/04

ALLIANCE LAND PLANNING & ENGINEERING INC.
5962 LAPLACE COURT SUITE 130 CARLSBAD, CA 92008
TEL: (760) 431-9896 FAX: (760) 431-8802
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

PLANS PREPARED FOR:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE : ALEX HERRELL

PLANS PREPARED BY:
ALLIANCE LAND PLANNING & ENGINEERING INC.
5962 LAPLACE COURT, SUITE 130
(760) 431-9896
PLANS PREPARED UNDER THE DIRECTION OF:
PAUL E. GAFF R.C.E. 53239 DATE

REGISTERED PROFESSIONAL ENGINEER PAUL E. GAFF NO. 53239 EXP 6-30-07 CIVIL STATE OF CALIFORNIA

BENCHMARK:
DESCRIPTION:
LOCATION:
RECORDED FROM:
ELEVATION:

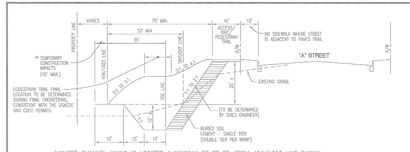
LEGAL DESCRIPTION:
THAT PORTION OF RANCHO SAN FRANCISCO, IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, AS SHOWN ON MAP RECORDED IN BOOK 1 PAGES 521 PAGES 522 OF PATENTS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

NO.	DATE	REVISIONS	BY	APPR

SHEET 1 COUNTY OF LOS ANGELES 5 SHEETS

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 53295
COUNTY CASE NO.
LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

CJ041-01.dwg 3-18-05 2004-700-21



TYPICAL SECTION - BANK STABILIZATION

NOT TO SCALE

LOT SUMMARY

LOT NUMBERS / PAYMENT	LOT AREA SQ. FEET	LOT AREA ACRE	TOTAL BUILDING AREA (SF)	BUILDING FOOTPRINT AREA (SF)	PARKING SPACE PROVIDED	TYPE BUILDING USED
1	186,329	4.35	92,200	23,989	232	OFFICE
2	126,917	2.93	63,600	21,800	153	
3	204,814	4.70	80,780	29,920	281	
4	148,268	3.43	59,400	29,700	301	
5	184,498	3.78	86,400	25,800	299	
6	113,561	2.60	51,600	25,800	153	
7	142,578	3.27	84,000	26,200	260	
TOTAL 1, 092, 481		*25.03*	*533,650*	*203,189*	*1,709*	
8	86,330	2.05	38,200	23,200	113	INDUSTRIAL
9	95,983	2.20	44,193	38,193	131	
10	235,879	5.42	106,318	88,318	306	
11	84,417	1.94	26,025	24,147	58	
12	71,793	1.65	32,100	22,100	90	
13	83,656	1.48	71,600	17,600	81	
14	66,885	1.54	16,500	16,500	86	
15	139,339	3.20	53,876	35,276	201	
16	125,141	2.87	72,516	36,258	306	
17	195,736	4.43	45,904	30,644	211	
19	277,784	6.38	128,049	98,049	397	
20	265,506	6.10	138,462	108,462	440	
25	463,637	10.64	214,505	164,505	485	
TOTAL 2, 121, 053		*48.68*	*948,088*	*705,760*	*2,908*	
18	148,453	3.41	35,501	35,501	211	COMMERCIAL
21	99,689	2.29	20,860	20,860	182	
22	43,972	0.88	3,130	3,130	31	
23	47,149	1.08	5,755	5,755	76	
24	103,118	2.37	5,024	5,024	9	
TOTAL	*441,379*	*10.14*	*70,270*	*70,270*	*509*	
		DWELLING UNITS				
28	272,287	6.25	120			RESIDENTIAL
29	247,770	5.69	144			
30	175,268	4.02	120			
32	80,957	1.86	24			
TOTAL	*776,282*	*17.82*	*408*			
26	3,430	0.08				OPEN SPACE
27	10,495	0.24				
31	7,118	0.16				
33	66,215	1.52				
34	74,337	1.71				
35	4,930	0.11				
36	8,877	0.20				
37	8,879	0.20				
38	176,845	4.06				
39	334,771	7.69				
40	113,633	2.61				
41	72,697	1.67				
42	72,896	1.67				
43	71,705	1.65				
TOTAL	*1,020,417*	*23.43*				
ROADWAY RIGHT OF WAY	354,484	8.14				STREETS
GRAND TOTAL	5,804,008	133.24	1,553,018	976,651	5,184	

COMMENTS:

BOUNDARY LINES . . . . . WERE DEVELOPED BASED ON RECORD INFORMATION PROVIDED IN THE FORM OF REFERENCED TITLE REPORT AND RECORD OF SURVEY BOOK 148 PAGES 48-50 PREPARED BY STAMAD ENGINEERING. A FIELD SURVEY WAS NOT PERFORMED.

EASEMENTS . . . . . PLOTTABLE EASEMENTS ARE SHOWN FROM AN OWNER SUPPLIED TITLE REPORT AS NOTED HEREON. THE SURVEYOR MAKES NO CLAIM TO BE AN EXPERT "EFFECT OF" BECAUSE OUR SERVICE IS LIMITED TO REPORTING ON EASEMENTS PLOTTABLE FROM INFORMATION GIVEN. NO OPINION IS TO BE RETAINED TO REPORT ON TITLE PAPERS IN THESE ENTIRETY.

TITLE REPORT . . . . . CHICAGO TITLE COMPANY PRELIMINARY TITLE REPORT NO. 2010200442-450 DATED JUNE 15, 2009 (RANCHO MOUNTAIN 24)

◇ - INDICATES TITLE REPORT EXCEPTION NO.

BASIS OF BEARINGS . . . . . THE BEARING NORTH 09°50' 17" WEST ALONG THE PROPOSED CENTERLINE OF SOLEDAD CANYON ROAD AS SHOWN ON CSB AND RD. 6574-3 ON FILE IN THE OFFICE OF THE COUNTY SURVEYOR, WAS TAKEN AS THE BASIS OF BEARINGS FOR THIS SURVEY.

BASED UPON RECORD BEARINGS AND DISTANCES AS SHOWN HEREON, THE GROSS AREA IS:

AERIAL SURVEY . . . . . THIS SURVEY WAS PREPARED BY PHOTOGRAMMETRIC PROCESSES, UTILIZING AERIAL PHOTOGRAPHY AND FIELD SURVEY CONTROL. THE LOCATION OF BUILDINGS AND OTHER MAPPED IMPROVEMENTS MAY INCLUDE STAIRS, CANOPIES AND BALCONIES, SINCE BUILDINGS BELOW THESE ITEMS ARE NOT VISIBLE TO THE CAMERA.

TOPOGRAPHY . . . . . BY PHOTOGRAMMETRIC PROCESSES FROM AERIAL PHOTOGRAPHY DATED NOVEMBER 20, 1998. CONTOUR INTERVAL 2 FEET. TOPOGRAPHIC MAP ACCURACY STANDARDS FOR NSS SCALE MAPPING AND SMALLER.

ORTHOPHOTO . . . . . PRODUCED FROM AERIAL PHOTOGRAPHY DATED NOVEMBER 20, 1998. PHOTOGRAPHY RECTIFIED AT GROUND LEVEL ONLY SUITABLE FOR NO SCALE AND SMALLER MAPPING PURPOSES.

CONTOUR INTERVAL . . . TWO FOOT

PROJECT SUMMARY:

GROSS AREA: 133.24 Acres

TOTAL LOTS: 43

TOTAL D.U.: 408

EXISTING ZONING: M-1-1/2 AND A-2-5

PROPOSED ZONING: M-1-1/2-DP, RPD

GENERAL PLAN LAND USE: M - INDUSTRY AND B/S - FLOODWAY/FLOODPLAIN AND SIGNIFICANT ECOLOGICAL AREA

GROSS DENSITY: -

NET DENSITY: -

SURVEY NOTES:

VERTICAL DATUM:

BENCHMARK: LOS ANGELES COUNTY NO. 1 2967 (NEWHALL QUAD) BRASS TAG IN C.B. MOUNT CARBON NO. 45 FT. E/O C/L SR 126 & 1 FT. N/O BCR & RD FT. N/O C/L ESPUELLA DR.

ELEV.: 1184.535 FT. ADJUSTMENT: 1.289'

DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

NOTE: HAVE BEEN MYAR APPROXIMATELY 100M (2.5 FT) EQUAL PHOTOGRAMMETRIC SYSTEM. FOR MORE ACCURATE SOLUTIONS AT INDIVIDUAL BENCH MARKS REFER TO PREVIOUS PUBLICATIONS.

ABBREVIATIONS

ac	ACRES
APWA	AMERICAN PUBLIC WORKS ASSOCIATION
P.C.C.	PORTLAND CEMENT CONCRETE
EX	EXISTING
FF	FINISH FLOOR
FM	FORCE MAIN
HP	HIGH POINT
L	LENGTH
MIN	MINIMUM
GB	GRADE BREAK
PROP	PROPOSED
R	RADIUS
SF	SQUARE FOOT
SD	STORM DRAIN
SS	SANITARY SEWER
FW	FINE WATER
W	WATER
STD	STANDARD
R/W	RIGHT OF WAY

UTILITIES AND SERVICES

1. WATER	VALENCIA WATER COMPANY
2. SEWER	LOS ANGELES SANITATION DISTRICT 32
3. GAS	SOUTHERN CALIFORNIA GAS COMPANY
4. ELECTRIC	SOUTHERN CALIFORNIA EDISON COMPANY
5. TELEPHONE	PACIFIC BELL
6. CABLE TV	STEVENSON RANCH CABLEVISION

UTILITY INFORMATION AND PLAN INDEX

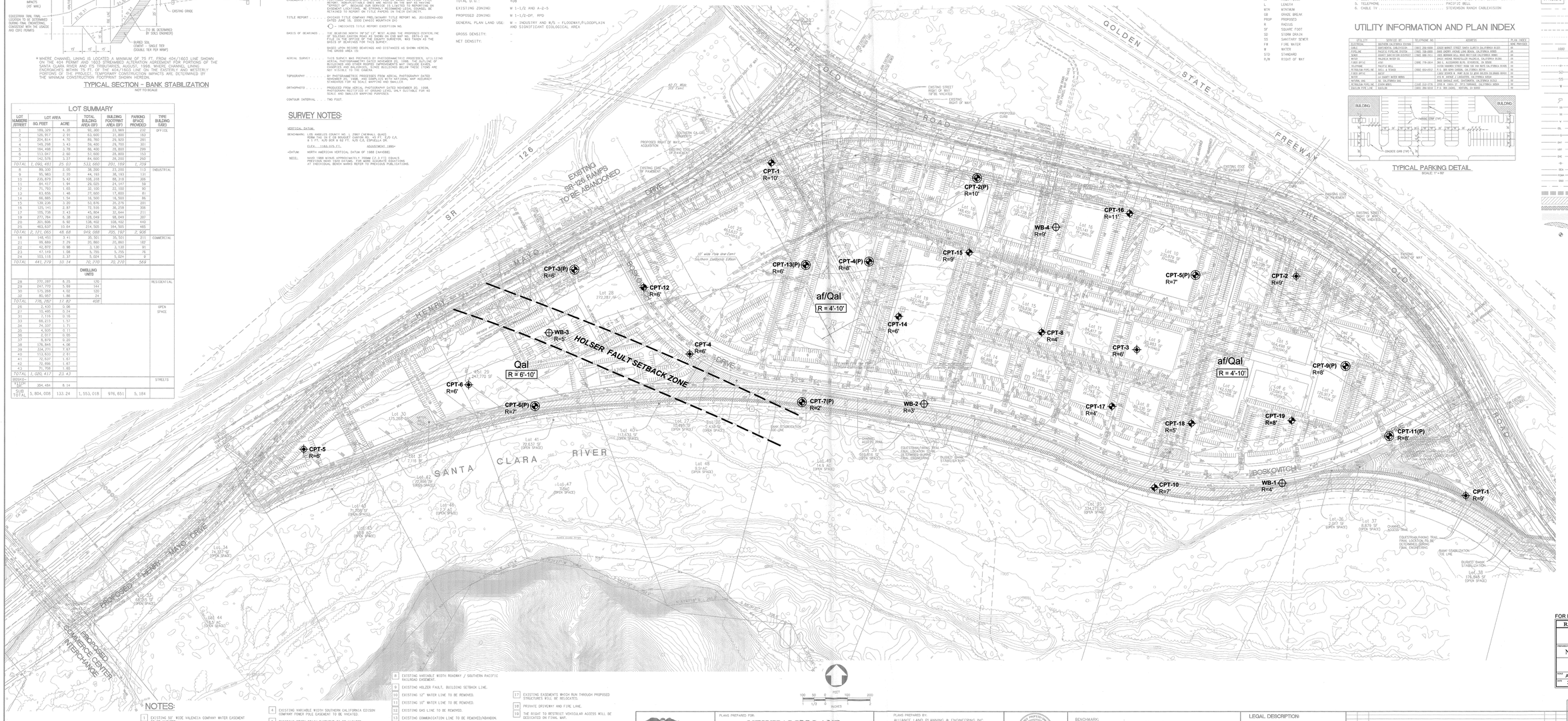
UTILITY	SERVICE BY	TELEPHONE NO.	ADDRESS	PLAN INDEX
ELECTRICITY	SOUTHERN CALIFORNIA EDISON			SCE PROFILES
CABLE	CHARTER/TIME WARNER/COX	(661) 298-5888	25600 MARKET STREET SANTA CLARITA CALIFORNIA 91321	10
PHONE	PACIFIC PUBLIC SERVICE	(760) 256-2800	3900 AIRPORT DRIVE SAN BERNARDINO CALIFORNIA 92408	10
GAS	SOUTHERN CALIFORNIA GAS COMPANY	(760) 999-7311	1981 SAN MARCOS BLVD. SAN MARCOS CALIFORNIA 92078	10
SEWER	VALENCIA WATER CO.		24631 AVENCIA AVENUE, MOUNTAIN VALENCIA, CALIFORNIA 91355	10
T.V/INTERNET	AT&T	(888) 378-2355	284 E. ALESSANDRO BLVD. RIVERSIDE, CA 92508	10
TELEPHONE	PACIFIC BELL		31709 HANKINS STREET 9508 100 NW NORTH LOS ANGELES	10
NATURAL GAS/LINE	SOCAL GAS/SEMPRA	(800) 655-4555	1981 SAN MARCOS BLVD. SAN MARCOS CALIFORNIA 92078	10
FIBER OPTIC	AT&T		13400 RAMONA AVE. SUITE 510 JOHN WALKER CALIFORNIA 91752	10
WATER	LA COUNTY WATER WORKS		415 W. AVENUE I LANCASTER, CALIFORNIA 93534	10
NATURAL GAS	SO. CALIFORNIA GAS		1981 SAN MARCOS BLVD. SAN MARCOS, CALIFORNIA 92078	10
PETROLEUM PIPELINE	EXXON MOBIL	(310) 212-1776	2596 W 190th ST 90249 TORRANCE, CALIFORNIA 90504	10
SEWER PIPELINE	SANITATION	(800) 366-1616	P.O. BOX 54000, MODEL, CA 90053	10

TYPICAL PARKING DETAIL

SCALE: 1" = 40'

LEGEND:

- Lot 1 / 10,000 SF / FF=1000.0 — LOT NO. / LOT AREA (SQUARE FEET) / FINISH FLOOR ELEVATION
- PROJECT BOUNDARY
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- PROPOSED UTILITY EASEMENT
- EXISTING EASEMENT
- FUTURE RIGHT OF WAY
- 1000 — PROPOSED CONTOUR
- DAYLIGHT LINE
- RIDGE LINE
- STORM DRAIN
- SS — SANITARY SEWER
- W — WATER
- CMP — CMP OUTLET
- CATCH BASIN
- SD — EXISTING STORM DRAIN LINE
- SS — EXISTING SEWER LINE
- W — EXISTING WATER LINE
- OIL — EXISTING OIL LINE
- G — EXISTING GAS LINE
- OHC — EXISTING OVERHEAD COMMUNICATION LINE
- UGC — EXISTING UNDER COMMUNICATION LINE
- OHE — EXISTING OVERHEAD POWER LINE
- EXISTING POWER POLE
- SEA — SEA, RIVER CORRIDOR
- FEMA — FEMA
- 0-CAP — 0-CAP
- ADA-1652
- PEDESTRIAN/BIKING TRAIL AND CHANNEL ACCESS
- BURIED BANK STABILIZATION
- EQUESTRIAN/HIKING TRAIL
- FIRE LANE
- SIGHT DISTANCE LINE
- PSOMAS COMBINED OIL WELL LOCATION, FILED DATED 09/01/81



NOTES:

1. EXISTING 50' WIDE VALENCIA COMPANY WATER EASEMENT TO BE VACATED.
2. EXISTING 40' WIDE SOUTHERN CALIFORNIA EDISON COMPANY POWER POLE EASEMENT TO BE VACATED.
3. EXISTING 10' WIDE SOUTHERN CALIFORNIA EDISON COMPANY POWER POLE EASEMENT TO BE VACATED.
4. EXISTING VARIABLE WIDTH SOUTHERN CALIFORNIA EDISON COMPANY POWER POLE EASEMENT TO BE VACATED.
5. EXISTING STORM DRAIN EASEMENT TO BE VACATED.
6. EXISTING 10' WIDE SOUTHERN CALIFORNIA GAS COMPANY EASEMENT TO BE VACATED.
7. EXISTING UNKNOWN WIDTH PACIFIC TELEPHONE AND TELEGRAPH EASEMENT TO BE VACATED.
8. EXISTING VARIABLE WIDTH ROADWAY / SOUTHERN PACIFIC RAILROAD EASEMENT.
9. EXISTING HOLSER FAULT, BUILDING SETBACK LINE.
10. EXISTING 12" WATER LINE TO BE REMOVED.
11. EXISTING 16" WATER LINE TO BE REMOVED.
12. EXISTING GAS LINE TO BE REMOVED.
13. EXISTING COMMUNICATION LINE TO BE REMOVED/ABANDON.
14. EXISTING EDISON OIL LINE TO BE REMOVED.
15. EXISTING MOBIL OIL LINE TO BE REMOVED.
16. EXISTING OAK TREE TO BE REMOVED.
17. EXISTING EASEMENTS WHICH RUN THROUGH PROPOSED STRUCTURES WILL BE RELOCATED.
18. PRIVATE DRIVEWAY AND FIRE LINE.
19. THE RIGHT TO RESTRICT VEHICULAR ACCESS WILL BE DEDICATED ON FINAL MAP.
20. RIGHT TURN ONLY.
21. CDS UNIT
22. PROPOSED UTILITY FACILITY ACCESS EASEMENT

FEET 100 50 0 100 200
1/2 0 1/2 1 2
INCHES

ALLIANCE LAND PLANNING & ENGINEERING INC.
5962 LAPLACE COURT, SUITE 130, CARLSBAD, CA 92008
TEL (760) 431-9696 FAX (760) 431-1569
(DBA: ALLIANCE/RICK ENGINEERING COMPANY)

PLANS PREPARED FOR:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE: ALEX HERRELL

PLANS PREPARED BY:
ALLIANCE LAND PLANNING & ENGINEERING INC.
5962 LAPLACE COURT, SUITE 130
(760) 431-9696
PLANS PREPARED UNDER THE DIRECTION OF:
PAUL E. GAY R.C.E. 53139 DATE

REGISTERED PROFESSIONAL ENGINEER PAUL E. GAY NO. 53139 EXP. 6-30-07 CIVIL STATE OF CALIFORNIA

BENCHMARK:
DESCRIPTION:
LOCATION:
RECORDED FROM:
ELEVATION:

LEGAL DESCRIPTION:
THAT PORTION OF RANCHO SAN FRANCISCO, IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, AS SHOWN ON MAP RECORDED IN BOOK 1 PAGES 521 PAGES 522 OF PATENTS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

NO.	DATE	REVISIONS	BY	APP'D

FOR EXPLANATION SEE FIGURE 3.1

R.T. FRANKIAN & ASSOCIATES

Geotechnical Map

PREPARED FOR: Newhall Land & Farming Company

Vesting Tentative Tract Map No. 53295
Valencia, California

SCALE	DRAWN BY	CHECKED BY
AS SHOWN	MN	AWR/DS
DATE	FIGURE	JOB NO.
3-18-05	Figure 3.2	2004-700-21

REV. DATE: 12/28/04

SHEET 2 OF LOS ANGELES SHEETS 5

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 53295

COUNTY CASE NO.

LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

3-18-05 2004-700-21

LEGEND:

Lot 1	LOT NO.	EX	EXISTING
1,000 SF	LOT AREA (SQUARE FEET)	FM	FORCE MAIN
1010.0	PAD ELEVATION	HP	HIGH POINT
		L	LENGTH
	PROJECT BOUNDARY	MIN	MINIMUM
	EXISTING RIGHT OF WAY	GB	GRADE BREAK
	PROPOSED RIGHT OF WAY	PROP	PROPOSED
	PROPOSED UTILITY EASEMENT	R	RADIUS
	EXISTING EASEMENT	SF	SQUARE FOOT
	FUTURE RIGHT OF WAY	SD	STORM DRAIN
1000	PROPOSED CONTOUR	SS	SANITARY SEWER
	DAYLIGHT LINE	STD	STANDARD
	RIDGE LINE	R/W	RIGHT OF WAY
SD	STORM DRAIN	W1	WATER ZONE – 1
SS	SANITARY SEWER	W2	WATER ZONE – 2
W	WATER	W3	WATER ZONE – 3
	STORM DRAIN INLET	RW	RECLAIMED WATER
	CATCH BASIN	CLWA	CASTAIC LAKE WATER AGENCY
SD	EXISTING STORM DRAIN LINE	PVT	PRIVATE DRIVE
SS	EXISTING SEWER LINE	P & F	PRIVATE AND FUTURE STREET
W	EXISTING WATER LINE	REC	RECREATION
	EXISTING POWER POLE	O. S.	OPEN SPACE
SEA	SEA, RIVER CORRIDOR	RUA	RESTRICTED USE AREA
FEMA	FEMA		
1000	C=CAT		
	404,1603		

SURFED BANK STABILIZATION

ABANDONED OIL WELL

EXISTING OAK TREE
DRIPLINE WITH NUMBER AND (SIZE)

COMMERCIAL

LOT No. 57	
Lot Acreage	*9.7 Acres*
Building S.F.	*115,214*
Parking Required	*576 Spaces*
Parking Provided	*576 Spaces*

COMMERCIAL

LOT No. 58-66	
Lot Acreage	*37.6 Acres*
Building S.F.	*388,900*
Parking Required	*2,367 Spaces*
Parking Provided	*2,367 Spaces*

FOR EXPLANATION SEE FIGURE 3.1

R.T. FRANKIAN & ASSOCIATES

Geotechnical Map

PROPERTY OF: Newhall Land & Farming Company

Vesting Tentative Tract Map No. 53295
Valencia, California

SCALE	DRAWN	CHECKED	JOB NO.
AS SHOWN	MN	AWR/DS	2004-700-21
DATE 3-18-05	Figure 3.3		

FEET 100 50 0 100 200
INCHES 1 1/2 0 1 2

ALLIANCE LAND PLANNING & ENGINEERING INC.
5962 LAPLACE COURT, SUITE 150
LOS ANGELES, CA 90045
TEL (310) 417-5000
FAX (310) 417-5001
CIVIL ENGINEERING / LAND PLANNING / RECORD MAPPING / SURVEYING

PLANS PREPARED FOR:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE: ALEX HORRELL

PLANS PREPARED BY:
ALLIANCE LAND PLANNING & ENGINEERING INC.
5962 LAPLACE COURT, SUITE 150
(760) 431-9696

PLANS PREPARED UNDER THE DIRECTION OF:

PAUL E. CAFF R.C.E. 53139 DATE

BENCHMARK:
DESCRIPTION:
LOCATION:
RECORDED FROM:
ELEVATION:

LEGAL DESCRIPTION

THAT PORTION OF RANCHO SAN FRANCISCO, IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, AS SHOWN ON MAP RECORDED IN BOOK 1 PAGES 523 PAGES 522 OF PATENTS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

NO.	DATE	REVISIONS	BY	APP'D

REV. DATE: 12/28/04

SHEET 3 | COUNTY OF LOS ANGELES | 5 SHEETS

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 53295
COUNTY CASE NO.
LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

3-18-05 2004-700-21

© Alliance Land Planning & Engineering Inc. Drawing #2004-700-21 Date: 3/18/05 Time: 3:48:25 PM