UPDATE PRELIMINARY GEOTECHNICAL REPORT
PARCEL A, SYCAMORE AVENUE AND HOT SPRINGS WAY
VISTA, CALIFORNIA

(A.P.N. 219-010-75)

I. INTRODUCTION

Conceptual plans in support of development at the above-referenced property have recently been completed by Land Surveying Consultants, Inc. A copy of the plan which also depicts the site location is enclosed with this report as Plate 1. The property is a large, level site that was initially created in 1988-89 by cut-fill grading. Later, Parcel A and adjacent areas were studied by this office who issued the following report of site geotechnical conditions:

"Preliminary Geotechnical Investigation
Parcels A, E and D, Sycamore Avenue
(Near) Melrose Drive, City of Vista, California"
Report dated March 29, 1999

A copy of the above-referenced report is included with this transmittal as Appendix A.

The purpose of this work was to update the referenced report to current codes and standards. Our efforts also included a recent site inspection and a review of the above-referenced preliminary report.

II. PROPOSED DEVELOPMENT

The development scheme proposed for the project site is depicted on Plate 1. Final grades are not indicated. However, we understand that little or no grade alterations over existing levels is proposed. As shown, the site will support large attached commercial/industrial buildings with surrounding paved parking and travelway surfaces. Construction details are unknown. The use of continuous strip and isolated pier foundations with slab-on-grade floors is assumed.

III. SEISMIC

For design purposes, site specific seismic parameters were determined as part of this investigation in accordance with the Uniform Building Code. The following parameters are consistent with the indicated project seismic environment and may be utilized for project design work:

TABLE 1

Site Soil Profile Type	Seismic Zone	Seismic Zone Factor	Seismic Source Type	Seismic Response Coefficients					
				Na	Nv	Ca	Cv	Ts	To
SB	4	0.4	B	1.0	1.0	0.40	0.40	0.400	0.080
According to Chapter 16A, Divisions IV & V of the 2001 California Building Code.									

A site specific probabilistic estimation of peak ground acceleration was also performed using the FRISKSP (T. Blake, 2000) computer program. Based upon Boore et al (1997) attenuation relationship, a 10 percent probability of exceedance in 50-years was estimated to produce a site specific peak ground acceleration of 0.18g (Design-Basis Earthquake, DBE). The results were obtained from the corresponding probability of exceedance versus acceleration curve.

IV. SITE CORROSION ASSESSMENT

In support of the site corrosion assessment the following laboratory tests were conducted on a representative sample of Soil Type 2. The soil sample was obtained from selected locations at the subject property by our project geologist during our recent site visit:

1. **pH and Resistivity Test:** pH and resistivity of a representative sample of Soil Type 2 was determined using "Method for Estimating the Service Life of Steel Culverts," in accordance with CTM 643. The test result is presented in Table 2.

TABLE 2

Sample Location	Soil Type	Minimum Resistivity (OHM-CM)	pH
Pad Areas	2	7840	7.2

2. **Sulfate Test:** A sulfate test was performed on a representative sample of Soil Type 2 in accordance with CTM 417. The test result is presented in Table 3.

TABLE 3

Sample Location	Soil Type	Amount of Water Soluble Sulfate (SO_4) In Soil (% by Weight)
Pad Areas	2	0.002

3. **Chloride Test:** A chloride test was performed on a representative sample of Soil Type 2 in accordance with CTM 422. The test result is presented in Table 4.

TABLE 4

Sample Location	Soil Type	Amount of Water Soluble Chloride (cl) In Soil (% by Weight)
Pad Areas	2	0.005

A site is considered to be corrosive to foundation elements, walls and drainage structures if one or more of the following conditions exist:

* Sulfate concentration is greater than or equal to 2000 ppm (0.2% by weight).
* Chloride concentration is greater than or equal to 500 ppm (0.05 % by weight).
* pH is less than 5.5.

For structural elements, the minimum resistivity of soil (or water) indicate the relative quantity of soluble salts present in the soil (or water). In general, a minimum resistivity value for soil (or water) less than 1000 ohm-cm, indicates the presence of high quantities of soluble salts and a higher propensity for corrosion. Appropriate corrosion mitigation measures for corrosive conditions should be selected depending on the service environment, amount of aggressive ion salts (chloride or sulfate), pH levels and the desired service life of the structure.

Laboratory test results performed on selected representative site samples indicated that the minimum resistivity is more than 1000 ohm-cm suggesting presence of low quantities of soluble salts. Test results further indicated pH greater than 5.5, sulfate concentration less than 2000 ppm and chloride concentration less than 500 ppm. Based on the results of the corrosion analyses, the project site is considered non-corrosive.

The project site is not located within 1000 feet of salt or brackish water.

V. CONCLUSIONS

The site remains substantially unchanged from the original geotechnical investigation and subsequent referenced report. A Geologic Cross-Section depicting subsurface relationships is enclosed as Plate 2.

Based on our review of the enclosed map (Plate 1) and from a geotechnical engineering point of view, the proposed development is feasible from a geotechnical standpoint. The conclusions and recommendations put forth in the referenced preliminary report remain valid and should be implemented herein during the construction phase except where superceded in the following sections.
The following comments are also appropriate and should be considered and/or incorporated into the final plans where appropriate and applicable:

* All grading should be conducted per the referenced geotechnical investigation. The geotechnical investigation report should be considered a part of the project foundation plans.

* All grading operations including removals, suitability of earth deposits used as compacted fill, and compaction procedures, should be continuously inspected and tested by the project geotechnical consultant and presented in the final as-graded compaction report. The nature of finished subgrade soils should also be confirmed in the final compaction report at the completion of grading.

* Final foundation plans may also be reviewed by the project geotechnical consultant for conformance with the requirements of the referenced geotechnical investigation report. More specific recommendations may be necessary and should be given when final grading and architectural/structural drawings are available.

* Graded cut slopes mark the south and east perimeter of the graded site. In 1999, the slopes were found mantled by a thick cover of loose soil generated from earlier blasting and grading operations. Recommendations were provided in the referenced report for moisture conditioning and track-walking the impacted slopes in connection with site development. However, run-off erosion during the previous 6 years has effectively removed the loose soil mantle and the need for remedial compaction efforts. The slopes presently support a healthy growth of vegetation and do not evidence instability. Additional grading of project cut slopes is therefore not warranted.

VI. RECOMMENDATIONS

The following recommendations are consistent with very low (expansion index less than 21) gravelly silty sand (SM/GM) foundation bearing soil and site specific geotechnical conditions. Additional recommendations may be required and should be given at the

plan review phase. All design recommendations should also be further confirmed and/or revised at the completion of remedial grading based on the expansion characteristics of the foundation bearing soils and as-graded site geotechnical conditions, and presented in the final as-graded compaction report:

A. Engineering Inspections

All grading operations including removals, suitability of earth deposits used as compacted fills, and compaction procedures should be continuously inspected and tested by the project geotechnical consultant and presented in the final as-graded compaction report. The nature of finished subgrade soils should also be confirmed in the final compaction report at the completion of remedial grading.

Geotechnical engineering inspections shall include but not limited to the following:

* Initial Inspection - After the grading / brushing limits have been staked but before grading / brushing starts.

* Bottom of keyway/over-excavation inspection - After the natural ground or bedrock is exposed and prepared to receive fill but before fill is placed.

* Excavation inspection - After the excavation is started but before the vertical depth of excavation is more than 5 feet. Local and Cal-OSHA safety requirements for open excavations apply.

* Fill / backfill inspection - After the fill / backfill placement is started but before the vertical height of fill / backfill exceeds 2 feet. A minimum of one test shall be required for each 100 lineal feet maximum, with the exception of wall backfills where a minimum of one test shall be required for each 25 lineal feet maximum. Wall backfills shall also be mechanically compacted to at least 90% compaction levels unless otherwise specified. Finish rough and final pad grade tests shall be required regardless of fill thickness.

* Foundation trench inspection - After the foundation trench excavations but before steel placement.

* Foundation bearing / slab subgrade soils inspection - Prior to the placement of concrete for proper moisture and specified compaction levels.

* Foundation / slab steel inspection - After steel placement is completed but before the scheduled concrete pour.

* Subdrain / wall back drain inspection - After the trench excavations but during the actual placement. All material shall conform to the project material

specifications and approved by the project soils engineer.

* Underground utility / plumbing trench inspection - After the trench excavations but before placement of bedding or installation of the underground facilities. Local and Cal-OSHA safety requirements for open excavations apply. Inspection of pipe bedding may also be required by the project geotechnical engineer.

* Underground utility / plumbing trench backfill inspection - After the backfill placement is started above the pipe zone but before the vertical height of backfill exceeds 2 feet. Testing of the backfill within the pipe zone may also be required by the governing agencies. Pipe bedding and backfill materials shall conform to the governing agencies' requirements, and project soils report if applicable. All trench backfills shall be mechanically compacted to a minimum of 90% compaction levels unless otherwise specified. Plumbing trenches more than 12 inches deep maximum under the interior floor slabs should also be mechanically compacted and tested for a minimum of 90% compaction levels. Flooding or jetting techniques as a means of compaction method shall not be allowed.

* Pavement/improvements subgrade and basegrade inspections - Prior to the placement of concrete or asphalt for proper moisture and specified compaction levels.

B. Foundations and Slab-on-Grade Floors

1. Continuous strip wall foundations and turned-down footings should be sized at least 15 inches wide and 18 inches deep for single-story and two-story structures, and 18 inches wide and 24 inches deep for three-story structures. Spread pad footings should be at least 24 inches square and 18 inches deep. Specified depths are measured from the lowest adjacent ground surface, not including the sand/gravel layer beneath floor slabs. Exterior continuous footings should enclose the entire building perimeter.

2. Continuous interior and exterior stem wall foundations should be reinforced with a minimum of four #4 reinforcing bars. Place 2-#4 bars 3 inches above the bottom of the footing and 2-#4 bars 3 inches below the top of the footing. Turned-down footings should be reinforced with a minimum of 2-#4 bars at the top and 2-#4 bars at the bottom. Reinforcement details for spread pad footings should be provided by the project architect / structural engineer.

3. All interior slabs should be a minimum of 4 inches in thickness reinforced

with #3 reinforcing bars spaced 16 inches on center each way, placed mid-height in the slab. Slabs should be underlain by 4 inches of clean sand (SE 30 or greater) which is provided with a well performing moisture barrier/vapor retardant (minimum 10-mil plastic) placed mid-height in the sand.

4. Interior slabs should be provided with "softcut" contraction/control joints consisting of sawcuts spaced 15 feet on centers (not to exceed 20 feet maximum) each way. Cut as soon as the slab will support the weight of the saw, and operate without disturbing the final finish which is normally within 2 hours after final finish at each control joint location or 150 psi to 800 psi. The softcuts should be a minimum of 1-inch in depth but should not exceed 1¼ inches deep maximum. Anti-ravel skid plates should be used and replaced with each blade to avoid spalling and raveling. Avoid wheeled equipment across cuts for at least 24 hours.

5. Provide re-entrant corner reinforcement for all interior slabs. Re-entrant corners will depend on slab geometry and / or interior column locations. Plate 3 may be used as a general guideline.

6. Foundation trenches and slab subgrade soils should be inspected and tested for proper moisture and specified compaction levels and approved by the project geotechnical consultant prior to the placement of concrete.

7. Foundation bearing and slab subgrade soils should not be allowed to dry below the as-graded moisture contents prior to pouring the concrete or additional ground preparations and moisture reconditioning will be required as directed in the field.

C. General Recommendations

1. Adequate staking and grading control are critical factors in properly completing the recommended remedial and site grading operations. Grading control and staking should be provided by the project grading contractor or surveyor/civil engineer, and is beyond the geotechnical engineering services. Inadequate staking and/or lack of grading control may result in unnecessary additional grading which will increase construction costs.

2. Based upon the result of the tested soil sample, the amount of water soluble sulfate (SO_4) was found to be 0.002 percent by weight which is considered negligible according to the California Building Code Table No. 19-A-4. Portland cement Type II may be used.

3. Table 5 is appropriate based on the pH-Resistivity test result:

TABLE 5

Design Soil Type	Gage	18	16	14	12	10	8
pad areas	**Years to Perforation of Steel Culverts**	33	42	52	72	92	112

4. Open or backfilled trenches parallel with a footing shall not be below a plane having a downward slope of 1-unit vertical to 2 units horizontal (50%) from a line 9 inches above the bottom edge of the footing, and not closer than 18 inches from the face of such footing.

5. Where pipes cross under footings, the footings shall be specially designed. Pipe sleeves shall be provided where pipes cross through footings or footing walls, and sleeve clearances shall provide for possible footing settlement but not less than 1-inch all around the pipe.

VII. LIMITATIONS

The conclusions and recommendations provided herein have been based on available data obtained from the review of pertinent reports and plans, subsurface exploratory excavations as well as our experience with the soils and formational materials located in the general area. The materials encountered on the project site and utilized in our laboratory testing are believed representative of the total area; however, earth materials may vary in characteristics between excavations.

Of necessity we must assume a certain degree of continuity between exploratory excavations and/or natural exposures. It is necessary, therefore, that all observations, conclusions, and recommendations be verified during the grading operation. In the event discrepancies are noted, we should be contacted immediately so that an inspection can be made and additional recommendations issued if required.

The recommendations made in this report are applicable to the site at the time this report was prepared. It is the responsibility of the owner/developer to ensure that these recommendations are carried out in the field.

It is almost impossible to predict with certainty the future performance of a property. The future behavior of the site is also dependent on numerous unpredictable variables, such as earthquakes, rainfall, and on-site drainage patterns.

The firm of VINJE & MIDDLETON ENGINEERING, INC., shall not be held responsible for changes to the physical conditions of the property such as addition of fill soils, added cut slopes, or changing drainage patterns which occur without our inspection or control.

The property owner(s) should be aware that the development of cracks in all concrete surfaces such as floor slabs and exterior stucco are associated with normal concrete shrinkage during the curing process. These features depend chiefly upon the condition of concrete and weather conditions at the time of construction and do not reflect

detrimental ground movement. Hairline stucco cracks will often develop at window/door corners, and floor surface cracks up to c-inch wide in 20 feet may develop as a result of normal concrete shrinkage (according to the American Concrete Institute).

This report should be considered valid for a period of one year and is subject to review by our firm following that time. If significant modifications are made to your tentative development plan, especially with respect to the height and location of cut and fill slopes, this report must be presented to us for review and possible revision.

Vinje & Middleton Engineering, Inc., warrants that this report has been prepared within the limits prescribed by our client with the usual thoroughness and competence of the engineering profession. No other warranty or representation, either expressed or implied, is included or intended.

Once again, should any questions arise concerning this report, please do not hesitate to contact this office. Reference to our Job #05-389-P will help to expedite our response to your inquiries.

We appreciate this opportunity to be of service to you.

VINJE & MIDDLETON ENGINEERING, INC.

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Distribution: Addressee (5)

Enclosures: Plates 1, 2, 3
Appendix A

c/jt/myfiles/updates.05/05-389-P

TABLE OF CONTENTS

REFERENCES

Job #05-389-P

September 14, 2005

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UPDATE PRELIMINARY GEOTECHNICAL REPORT, PARCEL A, SYCAMORE AVENUE AND HOT SPRINGS WAY, VISTA, CALIFORNIA (A.P.N. 219-010-75)

Pursuant to your request, Vinje and Middleton Engineering, Inc., has completed the Update Geotechnical Report for the subject site.

The following report summarizes the results of our review of pertinent technical reports, site reconnaissance, and includes additional laboratory analyses and conclusions. The report provides recommendations for the proposed development as understood. From a geotechnical engineering standpoint, it is our opinion that the site is suitable for the planned condominium development provided the recommendations presented in the original report, and this update report are incorporated into the design and construction of the project.

The conclusions and recommendations provided are consistent with the site geotechnical conditions and are intended to aid in preparation of final development plans and allow more accurate estimates of development costs.

If you have any questions or need clarification, please do not hesitate to contact this office. Reference to our Job #05-389-P will help to expedite our response to your inquiries.

We appreciate this opportunity to be of service to you.

VINJE & MIDDLETON ENGINEERING, INC.

Dennis Middleton
CEG #980
DM/jt

Update Preliminary Geotechnical Report
Parcel A, Sycamore Avenue
and Hot Springs Way, Vista, California

(A.P.N. 219-010-75)

September 14, 2005

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