DRAFT ENVIRONMENTAL IMPACT REPORT

Marina del Rey

Oceana Retirement Facility & Holiday Harbor Courts

Marina del Rey Land Use Plan Parcels OT and 21

State Clearinghouse Number 2007021133

Volume II of II

Los Angeles County Project Numbers:

Parcel OT R2006-01510/RCDP200600002/RCUP200600115/RENV200600109/RPA200600109/RPKP200600009
Parcel 21 R2006-02726/RCDP200600003/RCUP200600223/RENV200600177/RPA200600010/RPKP200600015

Lead Agency:

Los Angeles County
Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012
Attn: Michael Tripp

Prepared By:

Envicom Corporation
28328 Agoura Road
Agoura Hills, CA 91301

August 2009

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for the
OCEANA RETIREMENT FACILITY AND
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SECTION

A. Initial Study, NOP, NOP Comment Letters, Conceptual Design Approvals, Scoping Meeting Transcript, and County Agency Screencheck DEIR Comments

B. Geotechnical Engineering Reports and Amendment Letter

C. Drainage Concept/Hydrology Study/SUSMP Reports

D. URBEMIS 2007 Model Output (Air Quality Analysis)

E. Heron Assessment for Marina del Rey Lease Parcel OT & Vicinity

F. Cultural Resources Investigations and Letter from the Native American Heritage Commission

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H. Water Supply Will-Serve Letters and Fire Flow Availability Forms

I. Soil Sampling Analyses and Subsurface Methane Gas Investigation

J. Wind Impact Assessments

Initial Study, NOP, NOP Comment Letters, Conceptual Design Approvals, Scoping Meeting Transcript, and County Agency Screencheck DEIR Comments

APPENDIX A

STAFF USE ONLY

PROJECT NUMBERS: *R2006-01510 (OT) & R2006-02726 (21)*
CASES : *RCDPT200600002 & RCDPT200600003*
RENVT200600109 & RENVT200600177
RCUPT200600115 & RCUPT200600223
RPKPT200600009 & RPKPT200600015
RPAT200600005 & RPAT200600010

****** INITIAL STUDY ******

COUNTY OF LOS ANGELES
DEPARTMENT OF REGIONAL PLANNING

GENERAL INFORMATION

I.A. Map Date: *March 10, 2006 and May 2006* Staff Member: *Rick Kuo*

Thomas Guide: *671 - J6 and 671-J7 & 672-A7* USGS Quad: *Venice*

Location: *4445 Admiralty Way (Parcel OT), and 14025 Panay Way (Parcel 21), Marina Del Rey, CA*

Description of Project: *Proposed are two development projects requiring Conditional Use Permits, Coastal Development Permits, Parking Permits, and Plan Amendments to the Marina Del Rey Specific Plan for the transfer of development potential between Lots OT, 21, and 20. The Plan Amendment on Lot OT is to designate the parcel for Hotel land use with a mixed-use overlay and to transfer 114 hotel spaces and 5,000 s.f. of office space from the Admiralty Development Zone to the Oxford Development Zone. The project also proposes to build a six-story, 114-unit retirement facility with 5,000 s.f. of retail space with a 248-space, partially subterranean parking structure and to relocate 94 of its 186 existing and required parking spaces to lot 21. The proposed retirement facility will operate 24 hours a day and be staffed by 65 employees in 4 shifts with a maximum of 35 employees per shift. There are various non-native trees and shrubs on-site that will be removed. The proposed project on Lot 21 is to demolish two existing buildings and replace them with a new five-story, 29,348 s.f. marine commercial building with a 447-space parking structure. This marine commercial building will house the currently existing 2,916 s.f. of marine commercial retail space and 3,132 s.f. of marine commercial offices and a 5,000 s.f. yacht club and 2,300 s.f. of marine commercial office space transferred from Lot 20. In addition, a health club from the other existing building (16,000 s.f.) on Lot 21 will be relocated to the new proposed marine commercial building with a 10,000 s.f. health club and 6,000 s.f. of new marine commercial office space. The proposed marine commercial building will operate 8 to 12 hours a day and be staffed by 76 employees in 2 to 3 shifts with a maximum of 35 to 45 employees per shift. The City of Los Angeles Hyperion Treatment Plant and the Los Angeles County Waterworks District #80 will serve the two project sites. Project sites' accesses are from Admiralty Way and Washington Blvd. for Parcel OT and Panay Way for Parcel 21.*

Gross Area: *2.1 acres and 2.55 acres*

Environmental Setting: *Both project sites are located in the unincorporated Los Angeles County community of Marina Del Rey adjacent to its small craft harbor, and are approximately 3/4 mile west of Lincoln Boulevard (State Route 1) and south of Washington Boulevard. Surrounding land uses consist of single- and multi-family residences and commercial establishments. There is a brackish lagoon (Oxford Basin) immediately to the east of Parcel OT which is currently used as an open parking lot. Basin D of the Marina is directly north of Parcel 21. Both project sites are at approximately 10 feet above mean sea level.*

Zoning: *Parking (Parcel OT) and Marine Commercial (Parcel 21)*

General Plan: *Marina Del Rey Specific Plan*

Community/Area Wide Plan: *Marina Del Rey Land Use Plan*

Major projects in area:

Project Number	Description & Status
R2005-04106	*Addition of 69 new rooms to existing hotel (Pending).*
R2005-00728	*Sale of alcohol and expansion of existing parking lot (Pending).*
R2005-00234	*544-unit apartment community in 12 structures (Approved 6/7/06).*
CDP/CP3-029	*179 apartment units with density bonus (Approved 1/27/03).*
CDP/CP98134	*1022 apartment units/10,000 s.f. retail, 439 boat slips (Approved 12/6/00).*
CDP/CP98172	*99 apartment units, yacht club, offices, parking structure (Approved 10/2/00).*

NOTE: For EIRs, above projects are not sufficient for cumulative analysis.

REVIEWING AGENCIES

Responsible Agencies

- ☐ None
- ☒ Regional Water Quality Control Board
  - ☒ Los Angeles Region
  - ☐ Lahontan Region
- ☒ Coastal Commission
- ☒ Army Corps of Engineers
- ☒ *US Fish & Wildlife (Carlsbad)*

Trustee Agencies

- ☐ None
- ☒ State Fish and Game
- ☐ State Parks
- ☐ _____
- ☐ _____

Special Reviewing Agencies

- ☐ None
- ☐ Santa Monica Mountains Conservancy
- ☐ National Parks
- ☐ National Forest
- ☐ Edwards Air Force Base
- ☐ Resource Conservation District of the Santa Monica Mtns.
- ☒ *City of Los Angeles*
- ☒ *Culver City*
- ☒ *Los Angeles City Public Works*
- ☒ *AQMD*
- ☒ *Coalition to Save the Marina*
- ☒ *Native American Heritage Commission*

Regional Significance

- ☒ None
- ☐ SCAG Criteria
- ☐ Air Quality
- ☐ Water Resources
- ☐ Santa Monica Mtns. Area

County Reviewing Agencies

- ☐ Subdivision Committee
- ☒ DPW: *Traffic & Lighting, Geotechnical & Materials Engineering, Waterworks and Sewer Maintenance, EP*
- ☒ Health Services: *Environmental Hygiene*
- ☒ *Beaches and Harbors*
- ☒ *Sanitation Districts*
- ☒ *Sheriff's and Fire*

IMPACT ANALYSIS MATRIX

CATEGORY	FACTOR	Pg	Less than Significant Impact/No Impact	Less than Significant Impact with Project Mitigation	Potentially Significant Impact	Potential Concern
HAZARDS	1. Geotechnical	5	☐	☐	☒	*Liquefaction area*
	2. Flood	6	☐	☒	☐	*Tsunami inundation area (to be addressed with Geotechnical Hazards)*
	3. Fire	7	☒	☐	☐	
	4. Noise	8	☐	☐	☒	*Construction, adjacent residential uses*
RESOURCES	1. Water Quality	9	☐	☐	☒	*Proximity to water bodies, NPDES*
	2. Air Quality	10	☐	☐	☒	*Parking lot and parking structure, construction*
	3. Biota	11	☐	☒	☐	*Removal of trees for bird nesting*
	4. Cultural Resources	12	☐	☒	☐	*Potential for on-site prehistoric and historic archaeological resources*
	5. Mineral Resources	13	☒	☐	☐	
	6. Agriculture Resources	14	☒	☐	☐	
	7. Visual Qualities	15	☐	☐	☒	*Height of proposed structure*
SERVICES	1. Traffic/Access	16	☐	☐	☒	*Cumulative impacts*
	2. Sewage Disposal	17	☒	☐	☐	
	3. Education	18	☒	☐	☐	
	4. Fire/Sheriff	19	☒	☐	☐	
	5. Utilities	20	☐	☐	☒	*Water supply*
OTHER	1. General	21	☒	☐	☐	
	2. Environmental Safety	22	☐	☒	☐	*Methane gas hazard (Parcel OT)*
	3. Land Use	23	☐	☐	☒	*Plan Amendments sought*
	4. Pop./Hous./Emp./Rec.	24	☒	☐	☐	
	Mandatory Findings	25	☐	☐	☒	

DEVELOPMENT MONITORING SYSTEM (DMS) *

As required by the Los Angeles County General Plan, DMS shall be employed in the Initial Study phase of the environmental review procedure as prescribed by state law.

1. Development Policy Map Designation: *Category 2: Conservation/Maintenance*

2. ☐ Yes ☒ No Is the project located in the Antelope Valley, East San Gabriel Valley, Malibu/Santa Monica Mountains or Santa Clarita Valley planning area?

3. ☐ Yes ☒ No Is the project at urban density and located within, or proposes a plan amendment to, an urban expansion designation?

If both of the above questions are answered "yes", the project is subject to a County DMS analysis.

☐ Check if DMS printout generated (attached)

Date of printout: _____

☐ Check if DMS overview worksheet completed (attached)

*EIRs and/or staff reports shall utilize the most current DMS information available.

Environmental Finding:

FINAL DETERMINATION: On the basis of this Initial Study, the Department of Regional Planning finds that this project qualifies for the following environmental document:

☐ NEGATIVE DECLARATION, inasmuch as the proposed project will not have a significant effect on the environment.

An Initial Study was prepared on this project in compliance with the State CEQA Guidelines and the environmental reporting procedures of the County of Los Angeles. It was determined that this project will not exceed the established threshold criteria for any environmental/service factor and, as a result, will not have a significant effect on the physical environment.

☐ MITIGATED NEGATIVE DECLARATION, inasmuch as the changes required for the project will reduce impacts to insignificant levels (see attached discussion and/or conditions).

An Initial Study was prepared on this project in compliance with the State CEQA Guidelines and the environmental reporting procedures of the County of Los Angeles. It was originally determined that the proposed project may exceed established threshold criteria. The applicant has agreed to modification of the project so that it can now be determined that the project will not have a significant effect on the physical environment. The modification to mitigate this impact(s) is identified on the Project Changes/Conditions Form included as part of this Initial Study.

☒ ENVIRONMENTAL IMPACT REPORT*, inasmuch as there is substantial evidence that the project may have a significant impact due to factors listed above as "significant."

☐ At least one factor has been adequately analyzed in an earlier document pursuant to legal standards, and has been addressed by mitigation measures based on the earlier analysis as described on the attached sheets (see attached Form DRP/IA 101). The EIR is required to analyze only the factors not previously addressed.

Reviewed by: Rick Kew Date: 1-30-07

Approved by: Date: 1-30-07

☐ This proposed project is exempt from Fish and Game CEQA filling fees. There is no substantial evidence that the proposed project will have potential for an adverse effect on wildlife or the habitat upon which the wildlife depends. (Fish & Game Code 753.5).

☐ Determination appealed--see attached sheet.

*NOTE: Findings for Environmental Impact Reports will be prepared as a separate document following the public hearing on the project.

HAZARDS - 1. Geotechnical

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☒	☐	☐	Is the project site located in an active or potentially active fault zone, Seismic Hazards Zone, or Alquist-Priolo Earthquake Fault Zone?
				Liquefaction (State of CA Seismic Hazard Zones Map - Venice Quad).
b.	☐	☒	☐	Is the project site located in an area containing a major landslide(s)?
				(State of CA Seismic Hazard Zones Map - Venice Quad).
c.	☐	☒	☐	Is the project site located in an area having high slope instability?
d.	☒	☐	☐	Is the project site subject to high subsidence, high groundwater level, liquefaction, or hydrocompaction?
				Liquefaction (State of CA Seismic Hazard Zones Map - Venice Quad).
e.	☐	☒	☐	Is the proposed project considered a sensitive use (school, hospital, public assembly site) located in close proximity to a significant geotechnical hazard?
f.	☐	☒	☐	Will the project entail substantial grading and/or alteration of topography including slopes of more than 25%?
				Parcel OT - 4,755 c.y. and Parcel 21 - 3,986 c.y. with small quantity to be exported from both parcels.
g.	☐	☒	☐	Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?
h.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Building Ordinance No. 2225 C Sections 308B, 309, 310 and 311 and Chapters 29 and 70.

☐ **MITIGATION MEASURES** / ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design ☒ Approval of Geotechnical Report by DPW

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be impacted by, **geotechnical** factors?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

HAZARDS - 2. Flood

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Is a major drainage course, as identified on USGS quad sheets by a dashed line, located on the project site?

(State of CA Seismic Hazard Zones Map - Venice Quad).

b.	☐	☐	☒	Is the project site located within or does it contain a floodway, floodplain, or designated flood hazard zone?

Tsunami inundation area (LA County Safety Element - Flood Inundation Hazards Map).

c.	☐	☒	☐	Is the project site located in or subject to high mudflow conditions?

d.	☐	☒	☐	Could the project contribute or be subject to high erosion and debris deposition from run off?

A brackish lagoon is located immediately to the east of Parcel OT. Surface runoff from project site during construction and throughout life of the project could affect the water quality of the lagoon. Runoff from Parcel 21 during construction may drain into the Marina to the north.

e.	☐	☒	☐	Would the project substantially alter the existing drainage pattern of the site or area?

f.	☐	☐	☐	Other factors (e.g., dam failure)?

STANDARD CODE REQUIREMENTS

☐ Building Ordinance No. 2225 C Section 308A ☐ Ordinance No. 12,114 (Floodways)
☒ Approval of Drainage Concept by DPW

☒ MITIGATION MEASURES / ☒ OTHER CONSIDERATIONS

☐ Lot Size ☐ Project Design

Tsunami inundation to be addressed with Geotechnical Hazards. Runoff, SUSMP/SWPPP, and BMPs to be address with Water Quality.

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be impacted by **flood (hydrological)** factors?

☐ Potentially significant ☒ Less than significant with project mitigation ☐ Less than significant/No impact

HAZARDS - 3. Fire

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Is the project site located in a Very High Fire Hazard Severity Zone (Fire Zone 4)? *(LA County Safety Element - Wildland and Urban Fire Hazards Map).*
b.	☐	☒	☐	Is the project site in a high fire hazard area and served by inadequate access due to lengths, widths, surface materials, turnarounds or grade? *Project site access for Parcel O1 are from Admiralty Way and Washington Blvd., and Panay Way for Parcel 21.*
c.	☐	☒	☐	Does the project site have more than 75 dwelling units on a single access in a high fire hazard area?
d.	☐	☒	☐	Is the project site located in an area having inadequate water and pressure to meet fire flow standards? *Served by the LA County Waterworks District #80.*
e.	☐	☒	☐	Is the project site located in close proximity to potential dangerous fire hazard conditions/uses (such as refineries, flammables, explosives manufacturing)?
f.	☐	☒	☐	Does the proposed use constitute a potentially dangerous fire hazard?
g.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Water Ordinance No. 7834 ☐ Fire Ordinance No. 2947 ☐ Fire Regulation No. 8

☐ Fuel Modification/Landscape Plan

☐ **MITIGATION MEASURES** / ☐ **OTHER CONSIDERATIONS**

☐ Project Design ☐ Compatible Use

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be impacted by **fire hazard** factors?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No impact

HAZARDS - 4. Noise

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Is the project site located near a high noise source (airports, railroads, freeways, industry)?

Both project sites are approximately 3/4 mile west of Lincoln Boulevard (State Route 1).

b.	☒	☐	☐	Is the proposed use considered sensitive (school, hospital, senior citizen facility) or are there other sensitive uses in close proximity?

Residential uses are adjacent to the proposed project sites.

c.	☐	☐	☒	Could the project substantially increase ambient noise levels including those associated with special equipment (such as amplified sound systems) or parking areas associated with the project?

Operational noises typical of urban evironment.

d.	☒	☐	☐	Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels without the project?

Noise from construction and construction equipment.

e.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☒ Noise Control – Chapter 12.8 ☐ Building Ordinance No. 2225--Chapter 35

☐ **MITIGATION MEASURES** / ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design ☐ Compatible Use

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be adversely impacted by **noise**?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

RESOURCES - 1. Water Quality

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Is the project site located in an area having known water quality problems and proposing the use of individual water wells?

Both project sites will be served by the LA County Waterworks District #80.

b.	☐	☒	☐	Will the proposed project require the use of a private sewage disposal system?

Both project sites will be served by the Los Angeles City Hyperion Treatment Plant.

	☐	☐	☐	If the answer is yes, is the project site located in an area having known septic tank limitations due to high groundwater or other geotechnical limitations *or* is the project proposing on-site systems located in close proximity to a drainage course?

c.	☐	☐	☒	Could the project's associated construction activities significantly impact the quality of groundwater and/or storm water runoff to the storm water conveyance system and/or receiving water bodies?

Surface runoff from Parcel 21 during construction may drain into the Marina.

d.	☐	☐	☒	Could the project's post-development activities potentially degrade the quality of storm water runoff and/or could post-development non-storm water discharges contribute potential pollutants to the storm water conveyance system and/or receiving bodies?

NPDES permit required.

e.	☐	☐	☒	Other factors?

Proximity to Mother's Beach and Marina (Parcel 21) and Oxford Basin (Parcel OT).

STANDARD CODE REQUIREMENTS

☐ Industrial Waste Permit ☐ Health Code Ordinance No. 7583, Chapter 5

☐ Plumbing Code Ordinance No. 2269 ☒ NPDES Permit Compliance (DPW)

☐ **MITIGATION MEASURES** / ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be impacted by, **water quality** problems?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

RESOURCES - 2. Air Quality

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Will the proposed project exceed the State's criteria for regional significance (generally (a) 500 dwelling units for residential uses or (b) 40 gross acres, 650,000 square feet of floor area or 1,000 employees for nonresidential uses)?
b.	☐	☒	☐	Is the proposal considered a sensitive use (schools, hospitals, parks) and located near a freeway or heavy industrial use?
c.	☐	☐	☒	Will the project increase local emissions to a significant extent due to increased traffic congestion or use of a parking structure, or exceed AQMD thresholds of potential significance per Screening Tables of the CEQA Air Quality Handbook? *Two lower levels for parking structure on Parcel OT and transfer of 94 parking spaces to existing surface parking lot on Parcel 21.*
d.	☐	☐	☒	Will the project generate or is the site in close proximity to sources which create obnoxious odors, dust, and/or hazardous emissions? *Temporary construction.*
e.	☐	☒	☐	Would the project conflict with or obstruct implementation of the applicable air quality plan?
f.	☐	☒	☐	Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?
g.	☒	☐	☐	Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? *Project site in non-attainment area.*
h.	☐	☐	☐	Other factors:

STANDARD CODE REQUIREMENTS

☐ Health and Safety Code Section 40506

☐ **MITIGATION MEASURES** / ☐ **OTHER CONSIDERATIONS**

☐ Project Design ☒ Air Quality Report

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be impacted by, **air quality**?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

RESOURCES - 3. Biota

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Is the project site located within a Significant Ecological Area (SEA), SEA Buffer, or coastal Sensitive Environmental Resource (ESHA, etc.), or is the site relatively undisturbed and natural?

SEA #29 (Ballona Creek) is one mile to the southeast of Parcels OT and 21.

b.	☐	☒	☐	Will grading, fire clearance, or flood related improvements remove substantial natural habitat areas?

Grading in the amounts of 4,755 c.y. for Parcel OT and 3,986 c.y. for Parcel 21.

c.	☐	☒	☐	Is a drainage course located on the project site that is depicted on USGS quad sheets by a dashed blue line or that may contain a bed, channel, or bank of any perennial, intermittent or ephemeral river, stream, or lake?

d.	☐	☐	☒	Does the project site contain a major riparian or other sensitive habitat (e.g., coastal sage scrub, oak woodland, sycamore riparian woodland, wetland, etc.)?

Parcel OT is adjacent to the Oxford Basin.

e.	☐	☒	☐	Does the project site contain oak or other unique native trees (specify kinds of trees)?

f.	☐	☒	☐	Is the project site habitat for any known sensitive species (federal or state listed endangered, etc.)?

g.	☐	☐	☒	Other factors (e.g., wildlife corridor, adjacent open space linkage)?

Trees on Parcel OT may provide nesting for Black-crowned night herons.

☒ MITIGATION MEASURES / ☐ OTHER CONSIDERATIONS

☐ Lot Size ☐ Project Design ☐ Oak Tree Permit ☐ ERB/SEATAC Review

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on **biotic resources**?

☐ Potentially significant ☒ Less than significant with project mitigation ☐ Less than significant/No impact

RESOURCES - 4. Archaeological / Historical / Paleontological

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☐	☒	Is the project site in or near an area containing known archaeological resources or containing features (drainage course, spring, knoll, rock outcroppings, or oak trees) which indicate potential archaeological sensitivity?
				Historic Venice Landfill may have extended onto Parcels OT and 21, potential for prehistoric and historic archaeological resources.
b.	☐	☒	☐	Does the project site contain rock formations indicating potential paleontological resources?
c.	☐	☒	☐	Does the project site contain known historic structures or sites?
d.	☐	☐	☒	Would the project cause a substantial adverse change in the significance of a historical or archaeological resource as defined in 15064.5?
				Historic Venice Landfill may have extended onto Parcels OT and 21, potential for prehistoric and historic archaeological resources.
e.	☐	☒	☐	Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?
f.	☐	☐	☐	Other factors?

☒ **MITIGATION MEASURES** / ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design ☒ Phase I Archaeology Report

CONCLUSION

Considering the above information, could the project leave a significant impact (individually or cumulatively) on **archaeological**, **historical**, or **paleontological** resources?

☐ Potentially significant ☒ Less than significant with project mitigation ☐ Less than significant/No impact

RESOURCES - 5. Mineral Resources

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?
b.	☐	☒	☐	Would the project result in the loss of availability of a locally important mineral resource discovery site delineated on a local general plan, specific plan or other land use plan?
c.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES** / ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design

CONCLUSION

Considering the above information, could the project leave a significant impact (individually or cumulatively) on **mineral** resources?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No impact

RESOURCES - 6. Agriculture Resources

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?
				(Los Angeles County Important Farmland 2002 Map)
b.	☐	☒	☐	Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?
c.	☐	☒	☐	Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?
d.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES** / ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design

CONCLUSION

Considering the above information, could the project leave a significant impact (individually or cumulatively) on **agriculture** resources?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No impact

RESOURCES - 7. Visual Qualities

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☐	☒	Is the project site substantially visible from or will it obstruct views along a scenic highway (as shown on the Scenic Highway Element), or is it located within a scenic corridor or will it otherwise impact the viewshed?
				The proposed marine commercial building may obstruct views of Mother's Beach and Basin D of the Marina; view corridor is required.
b.	☐	☒	☐	Is the project substantially visible from or will it obstruct views from a regional riding or hiking trail?
				(Los Angeles County Trail System Map).
c.	☐	☒	☐	Is the project site located in an undeveloped or undisturbed area, which contains unique aesthetic features?
d.	☐	☒	☐	Is the proposed use out-of-character in comparison to adjacent uses because of height, bulk, or other features?
e.	☒	☐	☐	Is the project likely to create substantial sun shadow, light or glare problems?
				Parcel OT proposes a six-story facility, two of which are partially subterranean.
f.	☐	☐	☐	Other factors (e.g., grading or land form alteration):

☐ **MITIGATION MEASURES** / ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design ☐ Visual Report ☐ Compatible Use

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on **scenic** qualities?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

SERVICES - 1. Traffic/Access

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☒	☐	☐	Does the project contain 25 dwelling units, or more and is it located in an area with known congestion problems (roadway or intersections)?
				Proposed 114-unit retirement facility on Parcel OT and commercial offices on Parcel 21.
b.	☐	☒	☐	Will the project result in any hazardous traffic conditions?
c.	☐	☐	☒	Will the project result in parking problems with a subsequent impact on traffic conditions?
				Required parking provided with a 248-space parking structure on Parcel OT and 447 parking spaces on Parcel 21.
d.	☐	☐	☒	Will inadequate access during an emergency (other than fire hazards) result in problems for emergency vehicles or residents/employees in the area?
				Fire lane required along Marina-side of parcel.
e.	☐	☐	☒	Will the congestion management program (CMP) Transportation Impact Analysis thresholds of 50 peak hour vehicles added by project traffic to a CMP highway system intersection or 150 peak hour trips added by project traffic to a mainline freeway link be exceeded?
f.	☐	☒	☐	Would the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?
g.	☒	☐	☐	Other factors? *Cumulative Marina traffic impacts.*

☐ **MITIGATION MEASURES** / ☐ **OTHER CONSIDERATIONS**

☐ Project Design ☒ Traffic Report ☒ Consultation with Traffic & Lighting Division

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the physical environment due to **traffic/access** factors?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

SERVICES - 2. Sewage Disposal

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	If served by a community sewage system, could the project create capacity problems at the treatment plant?

To be serviced by the City of Los Angeles Hyperion Treatment Plant.

b.	☐	☒	☐	Could the project create capacity problems in the sewer lines serving the project site?

Existing County and City of Los Angeles sewage infrastructure is adequate to serve the proposed projects.

c.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Sanitary Sewers and Industrial Waste Ordinance No. 6130

☐ Plumbing Code Ordinance No. 2269

☐ **MITIGATION MEASURES** / ☐ **OTHER CONSIDERATIONS**

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the physical environment due to **sewage disposal** facilities?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No impact

SERVICES - 3. Education

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Could the project create capacity problems at the district level?

Senior residential and commercial/office uses proposed.

b.	☐	☒	☐	Could the project create capacity problems at individual schools which will serve the project site?
c.	☐	☒	☐	Could the project create student transportation problems?
d.	☐	☒	☐	Could the project create substantial library impacts due to increased population and demand?
e.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES** / ☐ **OTHER CONSIDERATIONS**

☐ Site Dedication ☐ Government Code Section 65995 ☐ Library Facilities Mitigation Fee

Student-generating residential uses not proposed.

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) relative to **educational** facilities/services?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No impac

SERVICES - 4. Fire/Sheriff Services

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Could the project create staffing or response time problems at the fire station or sheriff's substation serving the project site?
b.	☐	☒	☐	Are there any special fire or law enforcement problems associated with the project or the general area?
c.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES / ☒ OTHER CONSIDERATIONS**

☐ Fire Mitigation Fees

Nearest Fire station is less than a mile away at 4433 Admiralty Way, Marina Del Rey, CA 90292.

Nearest Sheriff's station is less than a mile away at 13851 Fiji Way, Marina Del Rey, CA 90292.

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) relative to **fire/sheriff** services?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No impact

SERVICES - 5. Utilities/Other Services

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☐	☒	Is the project site in an area known to have an inadequate public water supply to meet domestic needs or to have an inadequate ground water supply and proposes water wells?

Water supply will be provided by the LA County Waterworks District #80.

b.	☐	☐	☒	Is the project site in an area known to have an inadequate water supply and/or pressure to meet fire fighting needs?

Water usage in the Marina Del Rey is near the entitlement limit.

c.	☐	☒	☐	Could the project create problems with providing utility services, such as electricity, gas, or propane?

d.	☐	☐	☒	Are there any other known service problem areas (e.g., solid waste)?

Solid waste generated by demolition/construction and operation of mixed-use retirement facility and commercial offices.

e.	☐	☒	☐	Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services or facilities (e.g., fire protection, police protection, schools, parks, roads)?

f.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Plumbing Code Ordinance No. 2269 ☐ Water Code Ordinance No. 7834

☐ **MITIGATION MEASURES** / ☒ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design

The applicant shall obtain proof of availability of adequate water supply to Parcels OT and 21 and provide a recycling plan addressing waste generated during project operation. Solid waste generated by demolition/construction to be addressed in the EIR Project Description.

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) relative to **utilities/services**?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

OTHER FACTORS - 1. General

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Will the project result in an inefficient use of energy resources?
b.	☐	☒	☐	Will the project result in a major change in the patterns, scale, or character of the general area or community?
c.	☐	☒	☐	Will the project result in a significant reduction in the amount of agricultural land?
d.	☐	☐	☐	Other factors? _____

STANDARD CODE REQUIREMENTS

☐ State Administrative Code, Title 24, Part 5, T-20 (Energy Conservation)

☐ **MITIGATION MEASURES** / ☐ **OTHER CONSIDERATIONS**

☐ Lot size ☐ Project Design ☐ Compatible Use

_____

_____

_____

_____

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the physical environment due to any of the above factors? _____

_____

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No impact

OTHER FACTORS - 2. Environmental Safety

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Are any hazardous materials used, transported, produced, handled, or stored on-site?
b.	☐	☒	☐	Are any pressurized tanks to be used or any hazardous wastes stored on-site?
c.	☐	☒	☐	Are any residential units, schools, or hospitals located within 500 feet and potentially adversely affected?
d.	☐	☒	☐	Have there been previous uses that indicate residual soil toxicity of the site or is the site located within two miles downstream of a known groundwater contamination source within the same watershed?
e.	☒	☐	☐	Would the project create a significant hazard to the public or the environment involving the accidental release of hazardous materials into the environment? *Parcel OT lies within Methane Buffer Zone for the Playa Del Rey and Venice fields (LA County Department of Building and Safety.*
f.	☐	☒	☐	Would the project emit hazardous emissions or handle hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?
g.	☐	☒	☐	Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or environment?
h.	☐	☒	☐	Would the project result in a safety hazard for people in a project area located within an airport land use plan, within two miles of a public or public use airport, or within the vicinity of a private airstrip?
I.	☐	☒	☐	Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?
j.	☐	☒	☐	Other factors?

☐ **MITIGATION MEASURES** / ☒ **OTHER CONSIDERATIONS**

☐ Toxic Clean up Plan

Mitigation improvements are typically required where subsurface methane concentrations exceeds 5,000 ppm, and concentrations as high as 28,000 ppm were measured at Parcel OT.

CONCLUSION

Considering the above information, could the project have a significant impact relative to **public safety**?

☐ Potentially significant ☒ Less than significant with project mitigation ☐ Less than significant/No impact

OTHER FACTORS - 3. Land Use

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☒	☐	☐	Can the project be found to be inconsistent with the plan designation(s) of the subject property?

Plan Amendment for Lot OT to change land use from Parking to Hotel and to transfer 114 hotel spaces and 5,000 s.f. of office space from the Admiralty Development Zone to the Oxford Development Zone.

b.	☒	☐	☐	Can the project be found to be inconsistent with the zoning designation of the subject property?

Retirement facility is proposed on Parcel OT, and 94 proposed parking spaces are transferred to Parcel 21 which is 3/5 mile away.

c. Can the project be found to be inconsistent with the following applicable land use criteria:

☐	☒	☐	Hillside Management Criteria?
☐	☒	☐	SEA Conformance Criteria?
☐	☐	☐	Other?

d.	☐	☒	☐	Would the project physically divide an established community?
e.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES** / ☐ **OTHER CONSIDERATIONS**

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the physical environment due to **land use** factors?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

OTHER FACTORS - 4. Population/Housing/Employment/Recreation

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Could the project cumulatively exceed official regional or local population projections?
b.	☐	☒	☐	Could the project induce substantial direct or indirect growth in an area (e.g., through projects in an undeveloped area or extension of major infrastructure)?
c.	☐	☒	☐	Could the project displace existing housing, especially affordable housing?
d.	☐	☒	☐	Could the project result in a substantial job/housing imbalance or substantial increase in Vehicle Miles Traveled (VMT)?
e.	☐	☐	☒	Could the project require new or expanded recreational facilities for future residents?
f.	☐	☒	☐	Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?
g.	☐	☐	☐	Other factors?

Project will increase residential units for seniors, which requires additional recreational facilities in the Marina area.

☐ **MITIGATION MEASURES / ☒ OTHER CONSIDERATIONS**

Development on Parcel OT will increase residential units for senior but will provide on-site recreational amenities. Parcel 21 includes a park plaza and pedestrian promenade.

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the physical environment due to **population, housing, employment**, or **recreational** factors?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No impact

MANDATORY FINDINGS OF SIGNIFICANCE

Based on this Initial Study, the following findings are made:

	Yes	No	Maybe	
a.	☐	☒	☐	Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?
b.	☐	☐	☒	Does the project have possible environmental effects which are individually limited but cumulatively considerable? "Cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.
c.	☐	☐	☒	Will the environmental effects of the project cause substantial adverse effects on human beings, either directly or indirectly?

Traffic, Air Quality

Geotechnical Hazards, Water Quality, Air Quality, Noise, Environmental Safety

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the environment?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No impact

Los Angeles County
Department of Regional Planning

Planning for the Challenges Ahead

Bruce W. McClendon, FAICP
Director of Planning

DATE: March 1, 2007

TO: All Interested County Departments

FROM: Paul McCarthy
DEPARTMENT OF REGIONAL PLANNING
Impact Analysis Section

SUBJECT: **NOTICE OF PREPARATION**
The Oceana Retirement Facility and Holiday Harbor Courts Projects
County Project Nos. R2006-01510 (Parcel OT) & R2006-02726 (Parcel 21)
Coastal Development Permit Nos. RCDPT200600002 & RCDPT200600003
Environmental Nos. RENVT200600109 & RENVT200600177
Conditional Use Permit Nos. RCUPT200600115 & RCUPT200600223
Parking Permit Nos. RPKPT200600009 & RPKPT200600015
Plan Amendment Nos. RPAT200600005 & RPAT200600010

The attached Notice of Preparation (NOP) has been distributed for the above projects located in the unincorporated community of Marina Del Rey adjacent to its small craft harbor, and are approximately ¾ mile west of Lincoln Boulevard (State Highway 1) and south of Washington Boulevard. Figure 1 (Project Location Map) shows the project location from both the regional and local perspectives.

Proposed are two development projects requiring Conditional Use Permits, Coastal Development Permits, Parking Permits, and Plan Amendments to the Marina Del Rey Specific Plan for the transfer of development potential between Lots OT, 21, and 20. The Plan Amendment on Lot OT is to designate the parcel for Hotel land use with a mixed-use overlay and to transfer 114 hotel spaces and 5,000 s.f. of office space from the Admiralty Development Zone to the Oxford Development Zone. The project also proposes to build a six-story, 114-unit retirement facility with 5,000 s.f. of retail space with a 248-space, partially subterranean parking structure and to relocate 94 of its 186 existing and required parking spaces to lot 21. There are various non-native trees and shrubs on-site that will be removed. The proposed project on Lot 21 is to demolish two existing buildings and replace them with a new five-story, 29,348 s.f. marine commercial building with a 447-space parking structure. This marine commercial building will house the currently existing 2,916 s.f. of marine commercial retail space and 3,132 s.f. of marine commercial offices and a 5,000 s.f. yacht club and 2,300 s.f. of marine commercial office space transferred from Lot 20. In addition, a health club from the other existing building (16,000 s.f.) on Lot 21 will be relocated to the new proposed marine commercial building with a 10,000 s.f. health club and 6,000 s.f. of new marine commercial office space.

The NOP is being sent to your department at this early stage of the CEQA process to determine what, if any, technical reports should be included in the environmental document for your department's subsequent review. In addition, if there are special aspects of the project that require a detailed review by your department, your comments should indicate such requirements at this time.

The pubic review period for the NOP will be from March 1 to March 30, 2007. Due to the time limits mandated by State law, your response must be received by our office at the earliest date possible, but not later than April 4, 2007. If you have any questions, please contact Rick Kuo at (213) 974-6461 Monday through Thursday between 7:30 a.m. and 5:30 p.m. or via email at rkuo@planning.lacounty.gov. Our offices are closed on Fridays.

PM:rk

Enclosure

Los Angeles County
Department of Regional Planning

Planning for the Challenges Ahead

Bruce W. McClendon, FAICP
Director of Planning

March 1, 2007

Ms. Lily Cusick
County of Los Angeles Fire Department
Forestry Division, Prevention Bureau
5823 Rickenbacker Road, Room 123
Commerce, CA 90040

SUBJECT: **NOTICE OF PREPARATION**
The Oceana Retirement Facility and Holiday Harbor Courts Projects
County Project Nos. R2006-01510 (Parcel OT) & R2006-02726 (Parcel 21)
Coastal Development Permit Nos. RCDPT200600002 & RCDPT200600003
Environmental Nos. RENVT200600109 & RENVT200600177
Conditional Use Permit Nos. RCUPT200600115 & RCUPT200600223
Parking Permit Nos. RPKPT200600009 & RPKPT200600015
Plan Amendment Nos. RPAT200600005 & RPAT200600010

Dear Ms. Cusick:

The application for the above project is currently being processed by our Department. We would appreciate the review and input by the following divisions of your Department on the enclosed materials.

- ☒ Forestry, Environmental Review Unit
- ☒ Planning Division
- ☒ Subdivision Division
- ☐ Health Hazardous Materials Division

The Notice of Preparation (NOP) is being sent to your department at this early stage of the CEQA process to determine what, if any, technical reports should be included in the environmental document for your department's subsequent review. In addition, if there are special aspects of the project that require a detailed review by your department, your comments should indicate such requirements at this time.

The pubic review period for the Notice of Preparation will be from March 1 to March 30, 2007. Due to the time limits mandated by State law, your response must be received by our office at the earliest date possible, but not later than April 4, 2007. If you have any questions, please contact Rick Kuo at (213) 974-6461 Monday through Thursday between 7:30 a.m. and 6:00 p.m. Our offices are closed on Fridays.

Very truly yours,

DEPARTMENT OF REGIONAL PLANNING
Bruce W. McClendon, FAICP
Director of Planning

Rick Kuo

for Paul McCarthy, Supervising Regional Planner
Impact Analysis Section

BWM:PM:rk

Los Angeles County
Department of Regional Planning

Planning for the Challenges Ahead

Bruce W. McClendon, FAICP
Director of Planning

March 1, 2007

Department of Public Works
Land Development Division
900 South Fremont Avenue
Alhambra, CA 91803
Attn: Suk Chong

SUBJECT: **NOTICE OF PREPARATION**
The Oceana Retirement Facility and Holiday Harbor Courts Projects
County Project Nos. R2006-01510 (Parcel OT) & R2006-02726 (Parcel 21)
Coastal Development Permit Nos. RCDPT200600002 & RCDPT200600003
Environmental Nos. RENVT200600109 & RENVT200600177
Conditional Use Permit Nos. RCUPT200600115 & RCUPT200600223
Parking Permit Nos. RPKPT200600009 & RPKPT200600015
Plan Amendment Nos. RPAT200600005 & RPAT200600010

Dear Mr. Chong:

The application for the above-mentioned project is currently being processed by our Department. We would appreciate the review and input by the following divisions of your Department on the enclosed materials.

- ☒ Geotechnical and Materials Engineering Division
- ☒ Traffic and Lighting Division
- ☒ Environmental Programs Division
- ☒ Waterworks and Sewer Maintenance Division

The Notice of Preparation (NOP) is being sent to your department at this early stage of the CEQA process to determine what, if any, technical reports should be included in the environmental document for your department's subsequent review. In addition, if there are special aspects of the project that require a detailed review by your department, your comments should indicate such requirements at this time.

The pubic review period for the NOP will be from March 1 to March 30, 2007. Due to the time limits mandated by State law, your response must be received by our office at the earliest date possible, but not later than April 4, 2007. If you have any questions, please contact Rick Kuo at (213) 974-6461 Monday through Thursday between 7:30 a.m. and 6:00 p.m. Our offices are closed on Fridays.

Very truly yours,

DEPARTMENT OF REGIONAL PLANNING
Bruce W. McClendon, FAICP
Director of Planning

Rick Kuo

for Paul McCarthy, Supervising Regional Planner
Impact Analysis Section

BWM:PM:rk

NOTICE OF PREPARATION

DATE: March 1, 2007

PROJECT TITLE: Oceana Retirement Facility (Parcel OT) and Holiday Harbor Courts (Parcel 21) Project EIR
County Project Nos. R2006-01510 (OT) and R2006-02726 (21)
Environmental Nos. RENVT200600109 (OT) and RENVT200600177 (21)
Coastal Development Permit Nos. RCDPT200600002 (OT) and RCDPT200600003 (21)
Conditional Use Permit Nos. RCUPT200600115 (OT) and RCUPT200600223 (21)
Parking Permit Nos. RPKPT200600009 (OT) and RPKPT200600015 (21)
General Plan Amendment Nos. RPAT200600005 (OT) and RPAT200600010 (21)

PROJECT APPLICANT(s):

Parcel OT
MDR Oceana, LLC
5150 Overland Avenue
Culver City, California 90230

Parcel 21
Holiday-Panay Way Marina, L.P.
5150 Overland Avenue
Culver City, California 90230

LEAD AGENCY:

Rick Kuo
Los Angeles County Regional Planning Department
Department of Regional Planning
320 West Temple Street, Room 1348
Los Angeles, CA 90012
Tel: (626) 974-6461
Fax: (213) 626-0434

The County of Los Angeles, as lead agency under the California Environmental Quality Act (CEQA), will prepare an Environmental Impact Report (EIR) for the Oceana Retirement Facility and Holiday Harbor Courts Project. In compliance with CEQA Guidelines Section 15082, the County of Los Angeles is sending this Notice of Preparation (NOP) to responsible and trustee agencies involved in the project. The EIR may be utilized to provide environmental analysis pertaining to responsible and trustee agency approvals. As such, the purpose of the NOP is to solicit comments on the scope and content of the EIR germane to each agency's statutory responsibility with respect to the proposed project. This NOP is also being sent to other parties expressing interest in receiving such notices, for comment within their areas of interest.

The review period for the NOP will be from March 1 to March 30, 2007. Due to the time limits mandated by State law, your response must be received by our office at the earliest date possible, but not later than April 4, 2007. Please direct all written comments to the above address. In your written response, please include the name of a contact person in your agency.

PROJECT DESCRIPTION:

Holiday-Panay Way Marina, L.P. and MDR Oceana, LLC (applicants) are proposing residential and commercial development of Parcels OT and 21 of the Marina del Rey (Marina) Land Use Plan (LUP). The Los Angeles County (County) is the landowner of both Parcels, and the County Department of Beaches and Harbors serves as co-applicant on this and all projects on County-owned land within the Marina. Holiday-Panay Way Marina, L.P. and MDR Oceana, LLC, are therefore lessees of the sites.

MDR Oceana, LLC proposes the Oceana Retirement Facility for Parcel OT, which is a 2.10-acre site on Admiralty Way in the Oxford Development Zone (DZ) #6 of the Marina del Rey LUP. The proposed Oceana Retirement Facility (Parcel OT) is proposed to be developed with a six-floor, 114-unit retirement facility, which would house an estimated population of 145 residents (assuming a 90 percent occupancy at any given time).[1] The facility would include retail space, a lobby, two lounges, two card rooms, a chapel, administration and reception offices, a dining room, a library, arts and crafts room, laundry facilities, a trash and mailroom, a kitchen, a beauty salon, and on-site parking.

Holiday-Panay Way Marina, L.P. proposes the Holiday Harbor Courts commercial development for Parcel 21, which is a 2.55-acre site on Panay Way in the Panay Development Zone (DZ #4) of the Marina del Rey LUP. The proposed Holiday Harbor Courts project (Parcel 21) would replace existing on-site marine commercial office, health club, and retail uses with a new five-floor structure housing marine commercial office, health club, yacht club, and retail uses, as well as a public park plaza, promenade, and on-site parking.

PROJECT LOCATION:

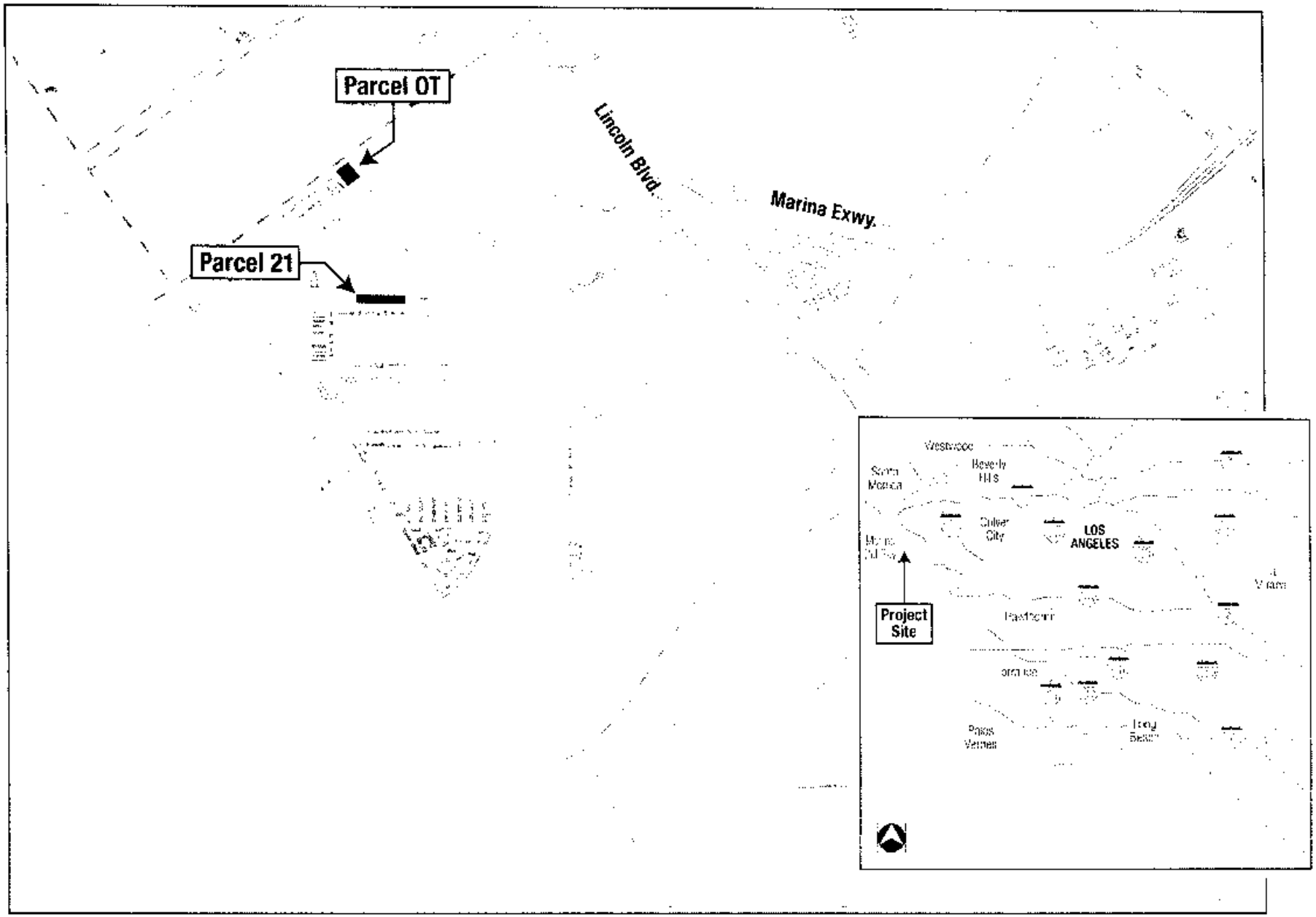
The proposed project is located within the unincorporated County community of Marina del Rey, with the surrounding region including the Pacific Ocean to the west, community of Venice to the north, community of Playa del Rey and the Los Angeles International Airport (LAX) to the south, and the terminus of State Highway 90 (Marina Expressway) at Lincoln Boulevard (State Highway 1) to the east (refer to **Figure 1**). Both developments are located on the United States Geological Survey (USGS) 7.5 minute Venice Topographic Quadrangle; however, the specific areas on which Parcels OT and 21 are sited were not covered by the Public Land Survey System (PLSS). Rather, they are identified as being part of the Spanish/Mexican Land Grant System, specifically Rancho Ballona. As depicted on the Venice Topographic Quadrangle, the location of Parcel OT is 33° 59' 5" north latitude and 118° 27' 20" west longitude, and the location of Parcel 21 is 33° 58' 45" north latitude and 118° 27' 15" west longitude. Parcel OT is also denoted as Assessor's Parcel Number (APN) 4224-006-900 at 4445 Admiralty Way, and Parcel 21 is APN 8940-370-022 at 14025 Panay Way.

ENVIRONMENTAL SETTING:

The Oceana Retirement Facility project site (Parcel OT) is approximately 92,000 sq. ft. in size, with dimensions of approximately 260 ft. wide along Admiralty Way and 355 ft. deep traversing from Washington Boulevard to Admiralty Way. The Parcel is currently used for public parking, with 186 parking spaces, is predominantly paved and relatively flat, and is bordered with flowerbeds containing shrubs and trees (mostly non-native vegetation). Parcel OT is bordered on the west by the Marina International Hotel, with a driveway separating the two uses; on the south by Admiralty Way and residential, hotel and restaurant uses; on the north by Washington Boulevard and single family homes north of Washington Boulevard; and on the east by a walkway/bike path and the Marina Lagoon (also known as the Oxford Retention Basin or Bird Sanctuary), as depicted in **Figure 2**.

The Holiday Harbor Courts project site, Parcel 21, is located on the Panay Way mole road atop a quay. The Holiday

[1] Occupancy assumptions are based upon developer's experience at multiple other facilities of this type. If occupancy were at 100 percent, the resident population would be 161.



Source: Venice, California, U.S.G.S. 7.5 Minute Topographic Quadrangle

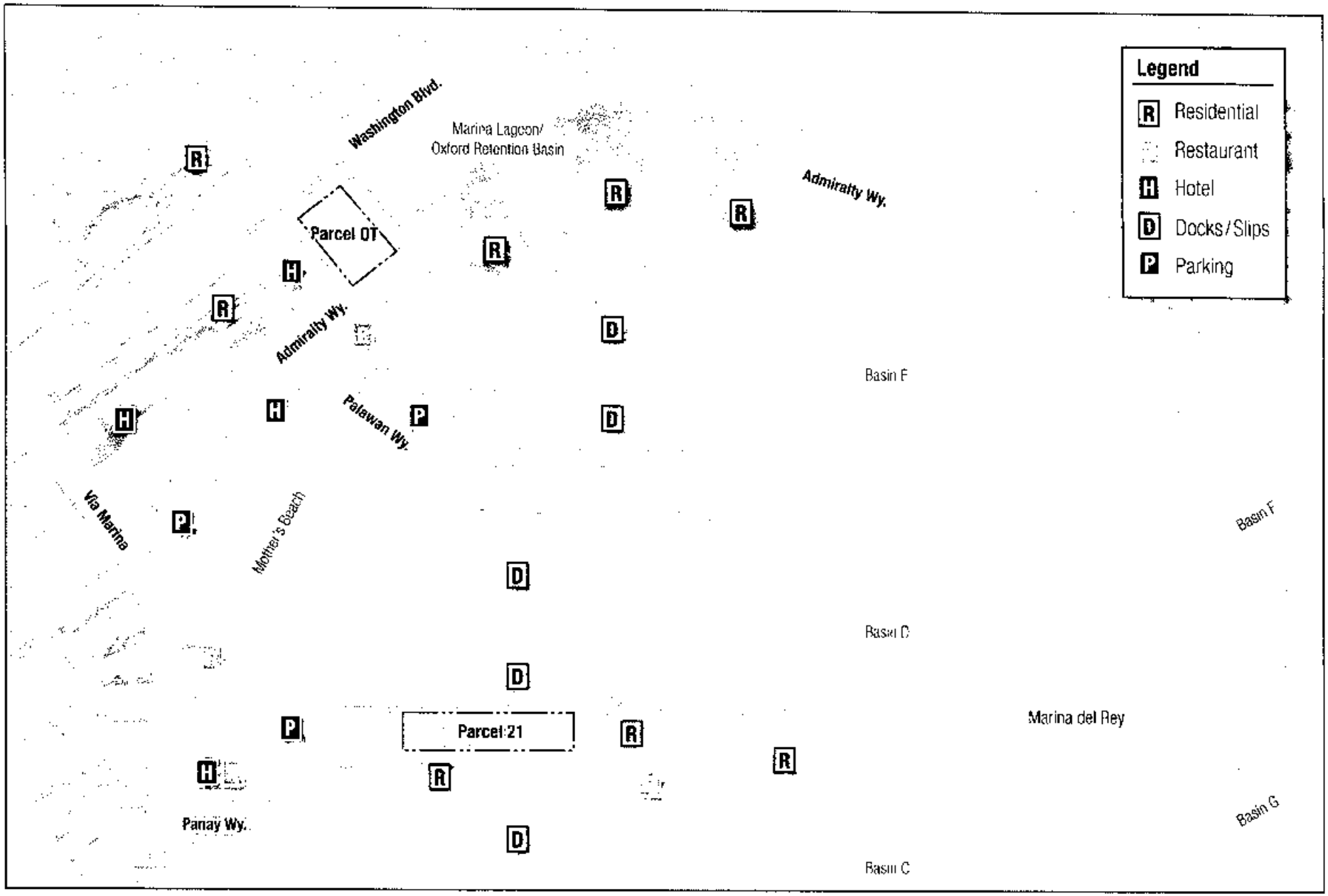
OCEANA RETIREMENT FACILITY AND HOLIDAY HARBOR COURTS NOP

ENVICOM CORPORATION

Project Location

FEET 0 1,000 2,000

FIGURE 1



Aerial Source: LA Gatis Services, Inc. September 2005

OCEANA RETIREMENT FACILITY AND HOLIDAY HARBOR COURTS NOP

ENVICOM CORPORATION

Surrounding Land Use

0 250 500 FEET

FIGURE 2

Harbor Courts site measures approximately 741 ft. in width along the frontage of Panay Way and approximately 150 ft. in depth from Panay Way to the water. The Parcel is currently developed with two commercial structures and a paved parking area that serves the commercial structures and also provides parking for boaters using the adjacent docks. One structure consists of a health club and the other is comprised of retail and marine commercial offices. The site also contains some sparse landscaping and a pedestrian walkway along the water's edge. A six-story apartment building is adjacent to and east of Parcel 21, with an improved promenade along the water's edge adjacent to the apartment building. Other uses adjacent to Parcel 21 include apartments and a restaurant with parking to the south, as well as restaurants and retail space to the west (refer to Figure 2). Marina docks and slips (designated Marina Basin D in the LUP) are located immediately to the north of the site.

PROJECT CHARACTERISTICS:

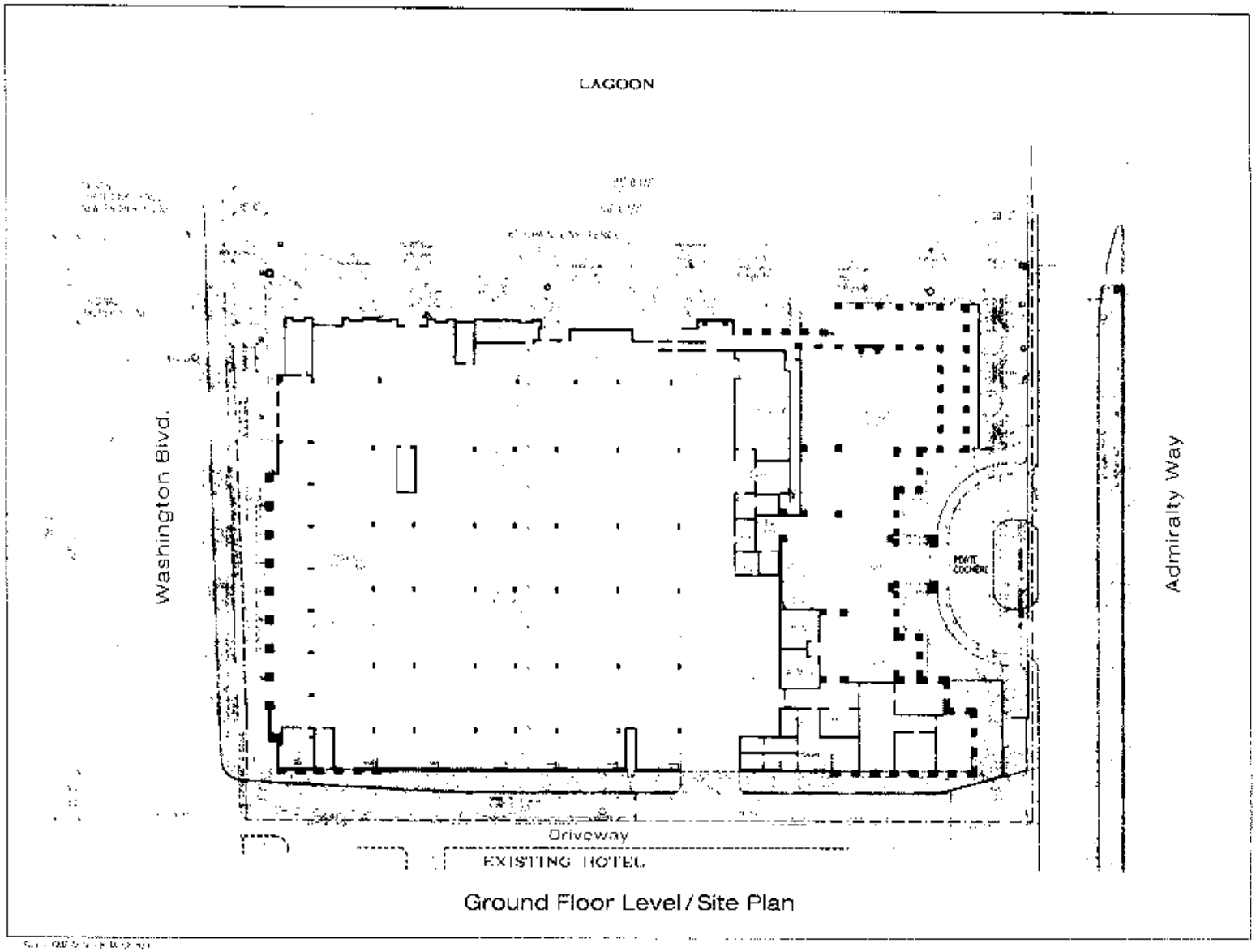
1. Proposed Land Uses

Parcel OT

The ground floor of the proposed site plan for Parcel OT is displayed in **Figure 3**, and all of the levels of the proposed structure and the floor area assigned to each use are listed in **Table 1**. As the proposed development on Parcel OT is a retirement facility, the structures have been designed with consideration given to senior citizens with physical disabilities, providing easier access to indoor and outdoor uses.

Table 1
Proposed Development Uses

Use (Category)	Area (sq. ft.)	Floor Level
Suites		
67 One Bedroom Suites (at approx. 700 sq. ft. ea.)	46,900	Various Floors
47 Two Bedroom Suites (at approx. 1,050 sq. ft. ea.)	49,350	Various Floors
Ancillary Facilities		
Computer Room	440	First Floor
Screening Room	1,030	First Floor
Café	535	First Floor
Gym	1,199	First Floor
Private Dining	540	First Floor
Retail Space	5,000	Lower Ground Level
Lounge One	3,400	Ground Floor
Administration Offices, Receptionist Area, Laundry, Trash & Mailroom	1,700	Ground Floor
Dining Room	4,145	Second Floor
Library	920	Second Floor
Arts & Crafts Room	1,065	Second Floor
Kitchen	1,630	Second Floor
Lounge Two	1,455	Second Floor
Beauty Salon	750	Second Floor
Card Room	810	Second Floor
Card Room	770	Third Floor
Total	**121,639**	


LAGOON
Washington Blvd.
Admiralty Way
PORTE COCHERE
Driveway
EXISTING HOTEL
Ground Floor Level / Site Plan

Parcel 21

The proposed Holiday Harbor Courts development would replace existing on-site marine commercial office, health club, and retail uses with new marine commercial office, health club, yacht club, and retail uses, a public park plaza and promenade, and a 447-space parking structure. Uses approved for Parcel 20 but not built, including marine commercial offices and a yacht club, would also be transferred to Parcel 21. The proposed project would reduce the existing health club floor area by 6,000 sq. ft., with the remaining floor area planned for the additional marine commercial offices. With the transfer of land uses from Parcel 20, the proposed development on Parcel 21 would result in zero sq. ft. of net new leasable area within the Panay DZ #4 of the Marina del Rey LUP. The following tables describe the land use allocations on Parcels 20 and 21 today and as proposed by the project. **Table 2** illustrates the existing square footage on-site. Although approved development on Parcel 20 is not a part of this project, it is included on the table to demonstrate the transfer (donor) uses and locations. All existing development on Parcel 21 would be demolished and replaced with the development identified in **Table 3.**

Table 2
Existing Development

Existing Project Land Use	Net Leasable Commercial Area by Site (sq. ft.)		
	LUP Parcel 20	LUP Parcel 21	Total Existing
Health Club	0	16,000	16,000
Retail[1]	0	2,916	2,916
Marine Commercial Offices	0	0	0
Marine Commercial Offices[2]	0	3,132	3,132
Marine Commercial Offices[3]	2,300	0	2,300
Yacht Club[3]	5,000	0	5,000
Total Net Leasable Area (sq. ft.)	**7,300**	**22,048**	**29,348**

[1]Ship Store.
[2]Existing Tenants: California Sailing Academy, Golden West Yachts, Club Natique, and South Sea Publishing.
[3]Uses to be transferred from Parcel 20 to Parcel 21.

Table 3
Net New Proposed Development for Parcel 21

Proposed Project Land Use	Total Net Leasable Area (sq. ft.)		Net New Leasable Area (sq. ft.)
	Existing	*Proposed*	
Health Club	16,000	10,000	(-) 6,000
Retail[1]	2,916	2,916	0
Marine Commercial Offices	0	6,000	6,000
Marine Commercial Offices[2]	3,132	3,132	0
Marine Commercial Offices[3]	2,300	2,300	0
Yacht Club[3]	5,000	5,000	0
Subtotal	***29,348***	***29,348***	***0***
Total	**29,348**	**29,348**	**0**

[1]Ship Store.
[2]Existing Tenants: California Sailing Academy, Golden West Yachts, Club Natique, and South Sea Publishing.
[3]Includes transferred uses from Parcel 20 to Parcel 21.

As shown in **Figure 4**, the first floor of the Holiday Harbor Courts building would contain the new health club and a portion of the replacement uses of LUP Parcel 21 (retail and marine commercial offices). The second floor would contain the remainder of the replacement uses of LUP Parcel 21 (retail and marine commercial offices), the transfer of marine commercial offices from LUP Parcel 20, and 6,000 sq. ft. of new marine commercial offices. The third floor is devoted to parking (52 spaces), and the fourth floor would contain the yacht club. The yacht club has a high, vaulted ceiling that is roughly equivalent to two levels of parking. The final level consists of the roof of the yacht club and adjacent parking.

2. Project Amenities, Open Space, and Landscape

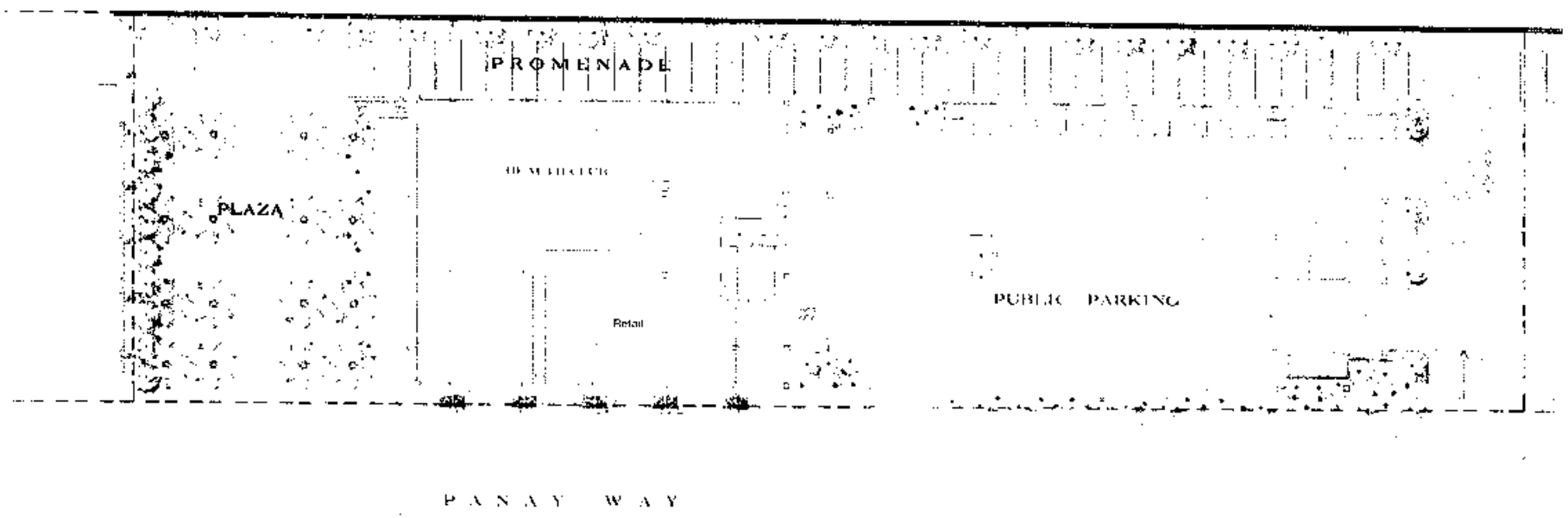
Parcel OT

The commercial retail space in the building, as well as individual retirement facility auxiliary rooms (arts and crafts, lounges, card rooms, chapel, etc.), would provide amenities for the retirement facility residents. Also, the surrounding Marina area provides additional amenities, including the Marina itself (boating, walking along promenades and other walkways, etc.), shopping, a health club, a beach, and restaurants. Many of these amenities are within walking distance of the project.

The project would include an improved, landscaped pedestrian and bicycle access way between Admiralty Way and Washington Boulevard, along the eastern boundary of the Parcel OT, just west of the existing lagoon. This linear passageway would be accomplished by extending the eastern boundary of Parcel OT to include a 35-foot strip of Parcel P, along the Parcels' shared boundary. The modification would be effectuated by the Department of Beaches and Harbors through revised legal descriptions for each of the two Parcels. The passageway would provide improved access for those currently traversing the limited access-way now, as well as the retirees at the proposed facility. These features would provide an improved open space and recreational buffer, which would also allow for improved public viewing access to the lagoon. County access would be provided on the southeast corner of the project site, for maintenance use to service on-site and adjacent utilities, including the retention basin/lagoon.

The Oceana Retirement Facility would include one internal courtyard in the middle of the floor plan on Level 1 for use by the retirees and their guests. The dining room has two terraces; one is a small private terrace and the second is a large terrace that wraps around the dining room and connects to another large terrace off the lounge. There is also an additional private terrace that wraps around the arts and crafts room, library, and computer room. The final terrace on Level 1 is located next to the library, across from the women's restrooms and the stairwell. Other recreation on this level includes an outdoor spa and an indoor gym, a screening room, and a cafe. All suites have their own private balcony. An additional community terrace is located off the second floor lounge.

The entrance of the facility would be framed by date palms (*Phoenix dactylifera*), and a small fountain would be located at the vehicular drop off area. The landscape plan extends into the linear passageway between the retirement facility and the existing retention basin/lagoon connecting Admiralty Way to Washington Boulevard, and would include trees and shrubs, a path approximately 20 ft. wide by 350 ft. long, and benches. The planting palette is divided into three zones; lower slope, middle slope and upper slope. Each zone would include both native and drought tolerant trees, shrubs and ground cover. The landscape area along the pathway is a combination of fan palms and flowering plum trees. The Washington Boulevard frontage is intended to be open for retail uses with fan palms as the street trees. The additional landscaping would center primarily on the perimeter of the building and would include the planting of 1,900 blue finger *(Senecio mandraliscae),* 5,600 sedge (*Carex* Spp.), 21 pink flowering plum trees (*Prunus blireiana*), and 17 New Zealand Christmas trees (*Metrosideros excelsus*), among many other species (number counts provided here are approximations).



First Floor Plan / Site Plan

Parcel 21

A park plaza and improved promenade would also be developed as a part of the proposed project. The park plaza would be located west of the health club and would extend the existing promenade located on Parcel 20 (a developed apartment building). The visitors of the neighborhood park plaza and promenade would have a direct view of the Marina. The park plaza would include an open lawn area, terraced seating, trees, and a pedestrian path between the street and the promenade. A gravel-filled dry well is proposed below the lawn area to retain and recharge storm water run-off from the site.

The plaza and 28-foot wide promenade would offer views of the Marina and would serve a recreational function by allowing the public direct access to the waterfront; specifically Marina small craft harbor uses and Mother's Beach.

The promenade would incorporate a variety of different shaped and colored pavers with colors such as charcoal, antique brown, terra cotta and buff. The promenade would also include benches for pedestrians as well as lighting and shrubs. The promenade is also designed to serve as a fire lane, to satisfy Los Angeles County Fire Department requirements.

The landscaping for Parcel 21 would conform with and compliment the existing landscaping on Parcel 20, which is developed with apartments. The landscaping would consist of palm trees, perennial plants, and accent paving around the building entry. Other species to be used in the plant palette include big blue lily turf (*Liriope muscari*), bird of paradise (*Strelitzia reginae*), and New Zealand flax (*Phormium tenax*, or "Maori Maiden").

The project has been designed within the combined height and view corridor provisions of the LUP. The plan includes an allowable height limit of 45 ft. with a view corridor requirement of 20 percent of a project's total water frontage (LUP, page I-9). However, LUP policy allows for an increase in building height of 1.5 ft. for every corresponding one percent view corridor increase. The project building height is 56 ft. (with a five ft. setback), which is the same height as other adjacent properties on Panay Way. The marine commercial building's height of 56 ft. requires a view corridor equal to 27.33 percent of the frontage, which amounts to a required 146 ft. of view corridor. A total of 146 ft. (or greater) for the view corridor would be accommodated in the design. The view corridors on the project site would facilitate public views of the shoreline, providing views of the water, the harbor's docks and slips, and Mother's Beach. The plaza would form the primary view corridor for the Holiday Harbor Courts site, at 105 ft. in width. Two additional view corridors are provided. One is on the ground floor level between the parking structure and the commercial building, at 27.2 ft. in width, and the other is east of the parking structure and is 50 ft. in width.

3. Parking

Parcel OT

Of the 186 public spaces parking currently on Parcel OT, 94 spaces would be relocated to Parcel 21 as part of the Holiday Harbor Courts development, to be located to the south of Parcel OT on Panay Way. The Oceana Retirement Facility would provide parking for proposed uses, in accordance with the County Code, as well as retaining 92 of the existing public parking spaces. **Table 4** describes the parking to be provided on Parcel OT and that to be transferred to Parcel 21.

Table 4
Proposed Parking for Parcel OT and Parking Transfer to Parcel 21

Use	Existing Parking on Parcel OT	Proposed Parking	
		Parcel OT	Parcel 21
Public Parking	186	92	
Retirement Facility		42	
Retail		20	
Relocated/Transferred Public Parking			94
Total	186	**154**	**94**

Parcel 21

Parking for the proposed Holiday Harbor Courts development is to be provided in a six-level parking structure that is attached to the structure housing the yacht club and marine commercial uses. The parking structure would serve visitors to the Holiday Harbor Courts as well as provide for general public parking (for example, to serve visitors to Mother's Beach). This design allows for direct access to the commercial structure, in addition to close access to the Marina slips and Mother's Beach. As discussed above, Parcel 21 would include transferred parking from the proposed development on Parcel OT, which is located in the Oxford DZ #6 of the Marina del Rey LUP and is to be converted from a parking lot to a retirement facility, as well as parking transferred from Parcel 20. As shown in **Table 5** below, an estimated 447 parking spaces would be provided by the proposed project after the transfers are made from Parcels OT and 20.

Table 5
Parcel 21 Proposed Parking and Parking Replacement

Type of Parking	Amount
Replacement for on-site Parcel 21 uses	94
Yacht Club/ Marina Commercial Offices (replacement from Parcel 20, uses approved but not built)	112
New Uses	15
Replacement for Boater Parking	112
Replacement from Parcel OT	94
Replacement for Health Club	20
Total	**447**

4. Demolition of Existing Development and On-site Grading

Grading for Parcel OT is not expected to require any fill materials but will result in the estimated export of 4,755 cubic yards (c.y.) of cut materials. Grading for Parcel 21 is also not expected to require any fill materials but will result in the estimated export of 3,986 c.y. of cut materials. Additionally, the waste generated by the demolition of the existing structures and parking lot on Parcels OT and 21 would be hauled to the Community Recycling and Resource Recovery Center, which is operated by the Crown Disposal Company and located at 9147 De Garmo Avenue in Sun Valley. The remaining materials that can't be recycled will be hauled to a landfill.

POTENTIAL PROJECT IMPACTS:

The County of Los Angeles, as the Lead Agency, has identified in the Initial Study (see attachment) the following potential environmental impacts that will be discussed in the EIR:

- Geotechnical Hazards-liquefaction and tsunami inundation;
- Noise-construction generated noise and effects on adjacent residential uses;
- Water Quality-proximity to water bodies and National Pollutant Discharge Elimination System requirements;
- Air Quality-parking lot, parking structure and construction generated emissions;
- Biota-removal of trees for nesting;
- Cultural Resources-potential for prehistoric and historic archeological resources;
- Visual Qualities-height of proposed structures;
- Traffic/Access-cumulative impacts;
- Utilities (Water Supply)-water usage in Marina del Rey is near entitlement limit and project must obtain a "will serve" letter from Waterworks District No. 29;
- Environmental Safety-methane gas hazards on Parcel OT; and
- Land Use-LUP/LCP Amendment for Parcel OT to designate Parcel OT for Hotel land use with a Mixed Use Overlay Zone (MUZ)[2] and to transfer development potential to Parcel OT (114 hotel spaces and 5,000 sq. ft. of office space from the Admiralty DZ #7 to the Oxford DZ #6); modifications to LCP Amendment No. 01-01 for the transfer of 94 parking spaces from Parcel OT to Parcel 21 and for the transfer of the yacht club and marine commercial offices from Parcel 20 to Parcel 21.

In addition to evaluating the potential effects of the proposed project, the EIR will address a full range of project alternatives.

ENTITLEMENT REQUIREMENTS AND DISCRETIONARY APPROVALS:

The proposed project is an application for:

Parcel OT

- LUP/LCP Amendment to 1) change the land use designation from Parking to Hotel with a MUZ allowing for the mixed-use retirement facility and to 2) transfer development potential (114 hotel spaces and 5,000 sq. ft. of office space) to Parcel OT in the Oxford DZ #6 from the Admiralty DZ #7.
- Conditional Use Permit (CUP), Coastal Development Permit (CDP), and Parking Permit for the transfer of development potential, parking, and trip generations between Parcels OT, 21, and 20.

Parcel 21

- Modifications to LCP Amendment No. 01-01 for the 1) transfer of 94 parking spaces from Parcel OT to Parcel 21 and 2) the transfer of the yacht club and marine commercial offices from Parcel 20 to Parcel 21.
- Conditional Use Permit (CUP), Coastal Development Permit (CDP), and Parking Permit for the transfer of development potential, parking, and trip generations between Parcels OT, 21, and 20.

[2] The Marina LUP MUZ (LUP page 8-12) is intended to provide additional flexibility for development of creatively designed mixed-use projects on selected non-waterfront parcels. Parcels with this overlay zone are permitted to combine land use categories on an individual parcel, and are allowed to mix primary uses within a structure. Development potential available to each applicant is subject to the limitations of the zone in which the parcel resides. Parcels within a Mixed Use Overlay Zone designation may apply to convert existing residential and office development on their own parcel and allocated residential and office development available within their Development Zone to visitor-serving, marine commercial or other coastal-oriented uses.

The Oceana Retirement Facility and Holiday Harbor Courts Projects
NOP Distribution List
(Delivery confirmation required)
March 2007

Note: All copies of the NOP are to be accompanied with the Notice of Completion

County of Los Angeles (4 copies)
Department of Regional Planning
Impact Analysis Section
320 West Temple Street
Los Angeles, CA 90012
Attn: Rick Kuo

County of Los Angeles (5 copies + DPW cover letter + County memo)
Department of Public Works
Land Development Division
900 South Fremont Avenue
Alhambra, CA 91803
Attn: Suk Chong

County of Los Angeles (1 copy + County memo)
Department of Health Services
Environmental Hygiene Program
5050 Commerce Drive
Baldwin Park, CA 91706-1423
Attn: Cole Landowski

County of Los Angeles (1 copy plus County letter)
Department of Beaches and Harbors
13837 Fiji Way
Marina del Rey 90292
Attn: Charlotte Miyamoto

County of Los Angeles Sanitation Districts (1 copy + County memo)
P.O. Box 4998
1955 Workman Mill Road
Whittier, CA 90607-4998
Attn: Environmental Review

County of Los Angeles Sheriff's Department (1 copy + County Memo)
Mr. Gary T. K. Tse
Director of Facilities Planning
Building A9-East/5th Floor North
1000 S. Fremont Avenue
Alhambra, CA 91803
Attn: Mr. Daniel Delgado

County of Los Angeles Sheriff's Department (1 copy + County Memo)
Captain, Marina Del Rey Sheriff's Station
13851 Fiji Way
Marina del Rey, CA 90292

County of Los Angeles Fire Department (3 copies + FD cover letter + County memo)
Forestry Division, Prevention Bureau
5823 Rickenbacker Rd., Rm. 123
Commerce, CA 90040
Attn: Lily Cusick

County/City Libraries

County of Los Angeles Library (2 copies)
Marina del Rey Library
4533 Admiralty Way
Marina del Rey, CA 90292

City of Culver City (2 copies)
Culver City Library
4975 Overland Avenue
Culver City, CA 90230

City of Los Angeles (2 copies)
Loyola Village Library
7114 W. Manchester Avenue
Westchester, CA 90045

City of Los Angeles (2 copies)
Venice-Abbot Kinney Memorial Library
501 S. Venice Boulevard
Venice, CA 90291

State Agencies

California Regional Water Quality Control Board (1 copy)
Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles CA 90013
Attn: Environmental Review (Dionisia Rodriquez)

California Coastal Commission (1 copy)
South Coast Area Office
200 Oceangate, 10th Floor
Long Beach, CA 90802-4325

California Department of Fish and Game (1 copy)
4949 Viewridge Avenue
San Diego, CA 92123

SCAQMD (1 copy)
21865 East Copley Drive
Diamond Bar, CA 91765-4182

Native American Heritage Commission (1 copy)
915 Capitol Mall, Room 364
Sacramento, CA 95814
Attn: Environmental Review

California Highway Patrol (1 copy)
6300 Bristol Parkway
Culver City, CA 90230

DTSC (1 copy)
P.O. Box 806
Sacramento, CA 95812-0806

Caltrans-District 7 (1 copy)
IGR/CEQA Coordinator
Transportation Planning & Analysis
100 S. Main Street
Los Angeles, CA 90012
Attn: Cheryl Powell

State Clearinghouse (15 copies + SCH Notice of Completion form)
P.O. Box 3044
Sacramento, CA 95812-3044

Federal Agencies

US Army Corps of Engineers (1 copy)
Los Angeles District
P.O. Box 532711
Los Angeles, CA 90053-2325

U.S. Fish & Wildlife Service (1 copy)
Ventura Field Office
2493 Portola Rd., Ste. B
Ventura, CA 93003

Other Local Agencies/Parties

City of Los Angeles (1 copy)
Department of Public Works
650 S. Spring St.,

Los Angeles, CA 90014

Los Angeles City Planning Department (1 copy)
200 North Spring Street, Room 525
Los Angeles, CA 90012
Attn: Mr. Con Howe

City of Santa Monica Planning Department (1 copy)
1685 Main Street
Santa Monica, California 90401

City of Culver City Planning Department (1 copy)
9770 Culver Blvd.
Culver City, CA. 90232

Coalition to Save the Marina (1 copy)
P.O Box 9291
Marina del Rey, Ca. 90295

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • www.aqmd.gov

March 6, 2007

Mr. Rick Kuo
Los Angeles County Regional Planning Dept.
Department of Regional Planning
320 West Temple Street, Room 1348
Los Angeles, CA 90012

Dear Mr. Kuo:

Notice of Preparation of a Draft Environmental Impact Report for
The Oceana Retirement Facility and Holiday Harbor Courts Projects

The South Coast Air Quality Management District (SCAQMD) appreciates the opportunity to comment on the above-mentioned document. The SCAQMD's comments are recommendations regarding the analysis of potential air quality impacts from the proposed project that should be included in the Draft Environmental Impact Report (EIR). Please send the SCAQMD a copy of the Draft EIR upon its completion. **In addition, please send with the Draft EIR all appendices or technical documents related to the air quality analysis and electronic versions of all air quality modeling and health risk assessment files. Without all files and supporting air quality documentation, the SCAQMD will be unable to complete its review of the air quality analysis in a timely manner. Any delays in providing all supporting air quality documentation will require additional time for review beyond the end of the comment period.**

Air Quality Analysis
The SCAQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. The SCAQMD recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analysis. Copies of the Handbook are available from the SCAQMD's Subscription Services Department by calling (909) 396-3720. Alternatively, the lead agency may wish to consider using the California Air Resources Board (CARB) approved URBEMIS 2002 Model. This model is available on the SCAQMD Website at: www.aqmd.gov/ceqa/models.html

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the project and all air pollutant sources related to the project. Air quality impacts from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, that is, sources that generate or attract vehicular trips should be included in the analysis.

The SCAQMD has developed a methodology for calculating PM2.5 emissions from construction and operational activities and processes. In connection with developing PM2.5 calculation methodologies, the SCAQMD has also developed both regional and localized significance thresholds. The SCAQMD requests that the lead agency quantify PM2.5 emissions and compare the results to the recommended PM2.5 significance thresholds. Guidance for calculating PM2.5 emissions and PM2.5 significance thresholds can be found at the following internet address:
http://www.aqmd.gov/ceqa/handbook/PM2.5/PM2.5.html

In addition to analyzing regional air quality impacts the SCAQMD recommends calculating localized air quality impacts and comparing the results to localized significance thresholds (LSTs). LST's can be used in addition to the recommended regional significance thresholds as a second indication of air quality impacts when preparing a CEQA document. Therefore, when preparing the air quality analysis for the proposed project, it is recommended that the lead agency perform a localized significance analysis by either using the LSTs developed by the SCAQMD or performing dispersion modeling as necessary. Guidance for performing a localized air quality analysis can be found at http://www.aqmd.gov/ceqa/handbook/LST/LST.html.

It is recommended that lead agencies for projects generating or attracting vehicular trips, especially heavy-duty diesel-fueled vehicles, perform a mobile source health risk assessment. Guidance for performing a mobile source health risk assessment ("Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis") can be found on the SCAQMD's CEQA webpages at the following internet address: http://www.aqmd.gov/ceqa/handbook/mobile_toxic/mobile_toxic.html. An analysis of all toxic air contaminant impacts due to the decommissioning or use of equipment potentially generating such air pollutants should also be included.

Mitigation Measures

In the event that the project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized during project construction and operation to minimize or eliminate significant adverse air quality impacts. To assist the Lead Agency with identifying possible mitigation measures for the project, please refer to Chapter 11 of the SCAQMD CEQA Air Quality Handbook for sample air quality mitigation measures. Additional mitigation measures can be found on the SCAQMD's CEQA webpages at the following internet address: www.aqmd.gov/ceqa/handbook/mitigation/MM_intro.html. Additionally, SCAQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook contain numerous measures for controlling construction-related emissions that should be considered for use as CEQA mitigation if not otherwise required. Other measures to reduce air quality impacts from land use projects can be found in the SCAQMD's Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. This document can be found at the following internet address: http://www.aqmd.gov/prdas/aqguide/aqguide.html. In addition, guidance on siting incompatible land uses can be found in the California Air Resources Board's Air Quality and Land Use Handbook: A Community Perspective, which can be found at the following internet address: http://www.arb.ca.gov/ch/handbook.pdf. Pursuant to state CEQA Guidelines §15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed.

Data Sources

SCAQMD rules and relevant air quality reports and data are available by calling the SCAQMD's Public Information Center at (909) 396-2039. Much of the information available through the Public Information Center is also available via the SCAQMD's World Wide Web Homepage (http://www.aqmd.gov).

The SCAQMD is willing to work with the Lead Agency to ensure that project-related emissions are accurately identified, categorized, and evaluated. Please call Charles Blankson, Ph.D., Air Quality Specialist, CEQA Section, at (909) 396-3304 if you have any questions regarding this letter.

Sincerely,

Steve Smith, Ph.D.
Program Supervisor, CEQA Section
Planning, Rule Development and Area Sources

SS:CB:li
LAC070302-01LI
Control Number

STATE OF CALIFORNIA Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
ds_nahc@pacbell.net

RECEIVED
MAR 19 2007

March 14, 2007

Mr. Rick Kuo
LOS ANGELES COUNTY DEPARTMENT OF REGIONAL PLANNING
320 W. Temple Street, Room 1348
Los Angeles, CA 90012

Re: SCH# 2007021133; CEQA Notice of Preparation (NOP) draft Environmental Impact Report (DEIR) for **Oceana Retirement Facility(Parcel OT) and Holiday Harbor Courts (Parcel 21) Project**; also General Plan Amendments Nos. RPAT200600005 (OT) and RPAT200600010 (21); Los Angeles County Department of Regional Planning; Los Angeles County, California

Dear Mr. Kuo:

Thank you for the opportunity to comment on the above-referenced document. This project is planned in an area known to be culturally resource-sensitive. It is north of the Ballona wetlands and the Playa Vista project that yielded 411 Native American sets of human remains.

The California Environmental Quality Act (CEQA) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR per CEQA guidelines § 15064.5(b)(c). In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE),' and if so, to mitigate that effect. To adequately assess the project-related impacts on historical resources, the Commission recommends the following action:

√ Contact the appropriate California Historic Resources Information Center (CHRIS). Contact information for the 'Information Center' nearest you is available from the State Office of Historic Preservation in Sacramento (916/653-7278). The record search will determine:

- If a part or the entire (APE) has been previously surveyed for cultural resources.
- If any known cultural resources have already been recorded in or adjacent to the APE.
- If the probability is low, moderate, or high that cultural resources are located in the APE.
- If a survey is required to determine whether previously unrecorded cultural resources are present.

√ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.

- The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for pubic disclosure.
- The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.

√ Contact the Native American Heritage Commission (NAHC) for:

- A Sacred Lands File (SLF) search of the project area and information on tribal contacts in the project vicinity who may have information on cultural resources in or near the APE. Please provide us site identification as follows: USGS 7.5-minute quadrangle citation with name, township, range and section. This will assist us with the SLF.
- Also, we recommend that you contact the Native American contacts on the attached list to get their input on the effect of potential project (e.g. APE) impact.

√ Lack of surface evidence of archeological resources does not preclude their subsurface existence.

- Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5 (f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
- Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.

√ Lead agencies should include provisions for discovery of Native American human remains or unmarked cemeteries in their mitigation plans.

* CEQA Guidelines, Section 15064.5(d) requires the lead agency to work with the Native Americans identified by this Commission if the initial Study identifies the presence or likely presence of Native American human remains within the APE. CEQA Guidelines provide for agreements with Native American, identified by the NAHC, to assure the appropriate and dignified treatment of Native American human remains and any associated grave liens.

√ Health and Safety Code §7050.5, Public Resources Code §5097.98 and Sec. §15064.5 (d) of the CEQA Guidelines mandate procedures to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

√ Lead agencies should consider avoidance, as defined in § 15370 of the CEQA Guidelines, when significant cultural resources are discovered during the course of project planning.

Please feel free to contact me at (916) 653-6251 if you have any questions.

Sincerely,

Dave Singleton
Program Analyst

Cc: State Clearinghouse
Attachment: List of Native American Contacts

Native American Contacts
Los Angeles County
March 14, 2007

Gabrielino/Tongva Council / Gabrielino Tongva Nation
Sam Dunlap, Tribal Secretary
761 Terminal Bldg 1, 2nd floor Gabrielino Tongva
Los Angeles , CA 90021
lcandalaria@gabrielinotribe.org
(213) 489-5001 - Officer
(909) 262-9351 - cell
(213) 489-5002 Fax

Gabrielino Tongva Indians of California Tribal Council
Robert Dorame, Tribal Chair/Cultural Resources
5450 Slauson, Ave, Suite 151 PMB Gabrielino Tongva
Culver City , CA 90230
gtongva@earthlink.net
562-761-6417 - voice
562-920-9449 - fax

Gabrielino Tongva Indians of California Tribal Council
Mercedes Dorame, Tribal Administrator
20990 Las Flores Mesa Drive Gabrielino Tongva
Malibu , CA 90265
Pluto05@hotmail.com

Carol A. Pulido
165 Mountainview Street Chumash
Oak View , CA 93022
805-649-2743 (Home)

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native American with regard to cultural resources for the proposed SCH#2007021133; CEQA notice of Preparation (NOP); draft Environmental Impact Report (DEIR); General Plan Amendment Nos RPAT200600005 (OT) and RPAT200600010 (21) for Oceana Retirement Facility and Holiday Harvor Courts; Marina Del Rey Area; Los Angeles County, California.

Native American Contacts
Los Angeles County
March 14, 2007

Beverly Salazar Folkes
1931 Shadybrook Drive
Thousand , CA 91362
805 492-7255
Chumash
Tataviam
Fernandeño

Ti'At Society
Cindi Alvitre
6602 Zelzah Avenue
Reseda , CA 91335
calvitre@yahoo.com
(714) 504-2468 Cell
Gabrielino

Owl Clan
Dr. Kote & Lin A-Lul'Koy Lotah
48825 Sapaque Road
Bradley , CA 93426
(805) 472-9536
Chumash

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas, Tribal Adminstrator
4712 Admiralty Way, Suite 172
Marina Del Rey , CA 90292
310-570-6567
Gabrielino Tongva

Fernandeno Tataviam Band of Mission Indians
Randy Guzman-Folkes, Dir. Cultural and Environmental Department
601 South Brand Boulevard, Suite 102
San Fernando , CA 91340
ced@tataviam.org
(818) 837-0794 Office
(805) 501-5279 Cell
(818) 837-0796 Fax
Fernandeno
Tataviam

Diane Napoleone and Associates
Diane Napoleone
6997 Vista del Rincon
La Conchita , CA 93001
dnaassociates@sbcglobal.net
805-643-7492
Chumash

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th Street, Rm. 403
Los Angeles , CA 90020
(213) 351-5324
(213) 386-3995 FAX

Gabrieleno/Tongva Tribal Council
Anthony Morales, Chairperson
PO Box 693
San Gabriel , CA 91778
ChiefRBwife@aol.com
(626) 286-1632
(626) 286-1758 - Home
(626) 286-1262 Fax
Gabrielino Tongva

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native American with regard to cultural resources for the proposed SCH#2007021133; CEQA notice of Preparation (NOP); draft Environmental Impact Report (DEIR); General Plan Amendment Nos RPAT200600005 (OT) and RPAT200600010 (21) for Oceana Retirement Facility and Holiday Harvor Courts; Marina Del Rey Area; Los Angeles County, California.

County of Los Angeles
Sheriff's Department Headquarters
4700 Ramona Boulevard
Monterey Park, California 91754-2169

Leroy D. Baca, Sheriff

March 29, 2007

Mr. Gary T.K. Tse, Director
Facilities Planning Bureau
Los Angeles County Sheriff's Department
1000 S. Fremont Avenue
Building A-9 East, 5th Floor, North
Alhambra, California 91803

Re: Notice of Preparation: Oceana Retirement Facility and Harbor Courts Projects. County Project Nos. R2006-01510 & R2006-02726

Dear Director Tse:

Pursuant to your request, the following is a response to the Notice of Preparation for the proposed Oceana Retirement Facility and the Holiday Harbor Courts projects. This response is based upon the limited information provided by the Department of Regional Planning, Impact Analysis Section. Because specific information was not requested, this response will attempt to address each of the pertinent law enforcement issues known to this Department at the time of this writing.

- Service Area for the Marina del Rey Sheriff's Station

The Marina del Rey Sheriff's Station provides primary law enforcement services for the unincorporated areas of Marina del Rey, Ladera Heights, Windsor Hills, and View Park. The station also provides marine law enforcement services in the Marina del Rey Harbor and the Los Angeles County Maritime Region in general. The Marina del Rey Sheriff's Station does not routinely operate in the incorporated areas. However, our personnel occasionally will assist neighboring law enforcement agencies when requested and in the event of an emergency.

- Staffing Allocation of Personnel, Populations Served, Ratio of Deputies to the Population

Marina del Rey presently has 70 sworn employees and 20 professional staff employees assigned to the station. 18 are supervisors and/or managers, 6 are detectives, 3 are assigned to special operations, and 14 are assigned to staff the harbor operation boats.

The field deployment consists of four deputies on day shift and six deputies working the evening and graveyard shifts. Two of these deputies on each shift are assigned to the unincorporated area of Marina del Rey. Additionally, on all shifts there is an assigned field sergeant and a two person boat crew deployed in the harbor.

The 2000 census noted approximately 26,000 permanent residents in the communities patrolled by the station (Marina-8,176, Ladera Heights-6,568, View Park-Windsor Hills-10,958). The Marina del Rey community also attracts a large working and tourist population. Consequently, the current deputy to population ratio varies greatly as a result of the daily and the seasonal influx of visitors traversing the community area.

- Current Emergent and Routine Response Times to the Proposed Project Sites

During the period of January 1, 2006, through January 1, 2007, Marina del Rey Station personnel responded to a total of 10,349 calls for service in the reporting district encompassing the project area, and the calls are classified as follows: 326 calls were designated as emergent with an average response time of 6.29 minutes. 1,594 calls were designated as priority calls with an average response time of 7.72 minutes, and 8,433 calls were designated as routine calls with an average response time of 21.53 minutes.

- Types and Number of Calls for Service Currently Received for the Project Site and Project Area

The following statistics are specific to the Marina jurisdiction during the periods of January 1, 2006, through January 1, 2007. 1% of the calls received were for suspicious persons or vehicles, 60 % of the calls received were for disturbances (i.e., family disputes, loud music, loud vehicles, party calls, drunk persons, etc.), 14 % of the calls were received for theft related incidents, 3 % of the calls were received for traffic related incidents, and 2 % of the calls were received for vandalism.

- Increase in Crime Rate & Calls for Service

Census data from 2000 placed the permanent resident population in Marina del Rey at 8,176, and the proposed project is anticipated to increase that community by an estimated 145 residences. Additionally, the project proposes to transfer approximately 29,348 square feet of commercial retail space from various locations in the Marina and onto lot 21. The additional residences and redevelopment and modernization of 29,348 square feet of commercial business space is expected to increase the daily and permanent population, with a corresponding increase in calls for service.

The presence of a retirement community could significantly impact Marina del Rey Station on a broad scope of law enforcement issues. Commonly, retirement communities experience the need for a law enforcement's response because of crimes involving elder abuse, identity theft, and calls for service resulting in medical aid. The increase in incidents involving any of these crimes and/or medical issues could easily place demands on Marina Station resources resulting in the loss of investigative and/or

community service hours in other areas.

- Additional Staffing Needs and Physical Working Accommodations

This project, taken separately, will not require the permanent assignment of additional patrol cars to Marina del Rey. However, in looking at the aggregate of ongoing redevelopment in Marina del Rey with its projected increase in population and traffic density, one can extrapolate a corresponding increased demand for services and degradation of unit response times. This will eventually necessitate the addition of both sworn personnel and support staff in the Marina. The station presently assigns only two one-person patrol vehicles in the Marina del Rey area per shift. Additionally, the station's physical plant is operating at maximum capacity and an increase in personnel will necessitate an increase in facility space.

- Configuration/Design/Layout of the Building Structures/Parking

Based upon the information provided in the Notice of Preparation report regarding structure placement, access points and parking allotments, it appears that there is ample access for vehicles into and out of the apartment complex, and sufficient parking consideration.

- Traffic and Access

The proposed project, when completed, will increase traffic around the project site and adjacent arteries. This will degrade response times for patrol cars. The California Highway Patrol provides contractual traffic enforcement services to the unincorporated areas of the County, including Marina del Rey. Their input regarding traffic issues in the draft EIR may be of value (CHP West L.A. Division, 6300 Bristol Parkwat, Culver City 90230, 310-642-3939).

- Infrastructure Limitations/Law Enforcement Tactical Concerns

In light of the recent terror events of September 11th, and the Hurricane Katrina disaster, the emergency management community now fully recognizes the need to integrate evacuation procedures into a variety of response protocols. Lessons learned revealed that in the event of a catastrophic emergency the probability exists that there may be limited and/or insufficient public safety resources to accommodate the demands necessary to safely evacuate a retirement living community. As such, we recommend the project manager incorporate mass transit capabilities within the parameters of this development's fiscal administration and planning. Future mitigating plans may include strategies such as the implementation of Contraflow Traffic System, the use of wireless or reverse 911 technologies for situations such as advanced tsunami warnings, and traffic flow surveillance (webcams/GPS) to alert evacuees of the most effective exit routes.

- The Department's Ability to Serve the Project

The Los Angeles County Sheriff's Department will be able to adequately service this project. However, we believe the Department of Regional Planning's Initial Study conclusion that the impact of the projects on Sheriff's services will have a "less than significant/no impact" is inaccurate. Our qualitative analysis of this project, and the proposed ten year marina redevelopment in aggregate, reveals multiple variables which could result in a significant impact to the daily operation of the station. It is anticipated that the cumulative increase in population and traffic density will significantly increase the demand for services, degrade response times, and complicate such emergency activities as evacuation, creating new challenges to provide efficient and effective law enforcement service to the project location and the area in general.

If you have any additional questions, please contact my Operations Lieutenant, Gregory Nelson, at 310-482-6091.

Sincerely,

LEROY D. BACA, SHERIFF

Mary Campbell

Mary D. Campbell, Captain
Commander,
Marina del Rey Station

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

DONALD L. WOLFE, Director

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone (626) 458-5100
http://dpw.lacounty.gov

ADDRESS ALL CORRESPONDENCE TO
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

April 2, 2007

IN REPLY PLEASE
REFER TO FILE LD-0

TO: Paul McCarthy
Department of Regional Planning

Attention Rick Kuo

FROM: Rossana G. D'Antonio
Department of Public Works
Land Development Division

RESPONSE TO NOTICE OF PREPARATION
OCEANA RETIREMENT FACILITY AND HOLIDAY HARBOR COURTS
MARINA DEL REY

We reviewed the Notice of Preparation for the Oceana Retirement Facility and Holiday Harbor Courts projects in Marina del Rey. Oceana Retirement Facility is located on the County-owned Parcel No. OT in the Oxford Development Zone 6. The proposed project would consist of a six-floor, 114-unit retirement facility and would house an estimated 145 residents. Holiday Harbor Courts project is located on the County-owned Parcel No. 21 in the Panay Development Zone 4. This project would replace existing on-site marine commercial office, health club, and retail uses with a new five-floor structure housing marine commercial office, health club, yacht club, and retail uses, as well as a public park plaza, promenade, and on-site parking. We offer the following comments for your consideration as you prepare the Environmental Impact Report (EIR).

Environmental Safety

The Oceana Retirement Facility project, including an underground parking structure in Parcel OT, appears to be located on the former Venice Landfill. The project proposes to export 4,755 cubic yards of soil from the site for the construction of an underground parking structure. If any excavated soil is contaminated by/or classified as hazardous waste by an appropriate agency, the soil must be managed and disposed in accordance with applicable Federal, State, and local laws and regulations. Also, the geotechnical report must address feasibility of construction on the Venice Landfill, its impact to the development, and include all recommended mitigation measures.

The Los Angeles County Building Code, Section 110.3, requires that a building or structure located on or within 1,000 feet (304.8 m) of a landfill containing decomposable material must be protected against landfill gas intrusion. The project in Parcel OT appears to be located in an area designated as methane buffer zone for the Playa del Rey and Venice fields. This issue should be addressed and mitigation measures provided. The discussion should include subsurface lateral migration of landfill gas, migration detection, and control and protection systems for affected enclosed buildings and structures. Our Environmental Programs Division must be contacted for issuance of necessary permits.

The proposed development activities will require closure/post closure maintenance of the site in accordance with Section 21190, Title 27 of the California Code of Regulations, relating to post closure land use of a closed and inactive landfill site. The draft EIR should address how the project will satisfy these requirements with the appropriate regulatory agencies including: Los Angeles County Department of Public Works, Department of Public Health (Solid Waste Management Program), and the California Integrated Waste Management Board.

Geology and Soils

All the geotechnical issues discussed in the Initial Study should be addressed in the EIR. Geotechnical reports evaluating the proposed project sites and recommending mitigation measures for the geotechnical hazards should be included in the EIR.

Hydrology and Water Quality

As discussed in the Initial Study, to adequately assess/address the hydrology and water quality issues, a drainage concept and a Standard Urban Stormwater Mitigation Plan (SUSMP) are required and must be submitted for review and approval by Public Works.

Solid Waste/Hazardous Waste

As discussed in the Initial Study, the EIR should identify what measures will be implemented to mitigate the impact to County solid waste facilities. Mitigation measures may include waste reduction and recycling programs. The residents of the retirement facility and tenants of the commercial offices/retail spaces should be provided with educational materials. All of the structures, as well as the public areas such as the plaza and promenade, should be provided with adequate containers for the collection and removal of recyclable materials.

The existing hazardous waste management infrastructure in this County is inadequate to handle the hazardous waste currently being generated. The additional household hazardous waste generated by the proposed projects could adversely impact existing hazardous waste management infrastructure. This issue should be addressed and mitigation measures provided. Mitigation measures may include, but are not limited to, providing the residents of the retirement facility and the tenants of the commercial offices/retail space with educational materials on the proper management and disposal of household hazardous waste. The project proponent may contact Public Works for available educational materials by calling 1(888) CLEAN LA.

Traffic/Transportation

Oceana Retirement Facility is estimated to generate a net increase of approximately 387-vehicle trips daily, with 10 and 41 vehicle trips during the a.m. and p.m. peak hours, respectively. Holiday Harbor Courts project is estimated to generate a net decrease of approximately 19 vehicle trips daily, with net increase of two vehicle trips during the a.m. peak hour, and net decrease of 11 vehicle trips during the p.m. peak hour. Together, the projects are estimated to generate a net increase of approximately 278-vehicle trips daily, with 12 and 30 vehicle trips during the a.m. and p.m. peak hours, respectively.

We agree with the Initial Study that the project may have significant impact to County and County/City roadways and intersections in the area. We would like the opportunity to review the related environmental documents and traffic study upon their completion. The County's methodology shall be used when evaluating the County and/or County/City intersections. The applicant must confer with Caltrans, City of Los Angeles, and Culver City in order to select the methodology to use when determining the impact to the freeways and the transportation circulation system within their respective jurisdictions. The traffic impact study shall also address the cumulative impacts generated by this and nearby developments by including the level of service analysis for the affected roadways, intersections, and freeway facilities. Upon identifying impact, the traffic study must identify feasible mitigation measures. Our Traffic Impact Analysis Report Guidelines may be obtained on the Department's website at http://ladpw.org/Traffic.

Underground Storage Tanks

Should any operation within the subject project include the construction, installation, modification or removal of underground storage tanks, our Environmental Programs Division must be contacted for required approvals and operating permits.

Utilities–Water

The proposed project is located in the service area of Los Angeles County Waterworks District's Marina Del Rey Water System. The applicant must contact the Los Angeles County Waterworks District to determine the requirements for providing water service to the proposed development, which may include improving the backbone water system in the Marina area.

If you have any other questions or require additional information, please contact Suk Chong at (626) 458-7150.

SPC:ca
P:\ldpub\CEQA\Suk\Oceana Retirement Facility and Holiday Harbor Courts_NOP-IS_DRP-Marina del Rey.doc

County of Los Angeles
Sheriff's Department Headquarters
4700 Ramona Boulevard
Monterey Park, California 91754-2169

LEROY D. BACA, SHERIFF

April 10, 2007

Mr. Paul McCarthy
Impact Analysis Section
Los Angeles County
Department of Regional Planning
320 West Temple Street
Los Angeles, California 90012

Dear Mr. McCarthy

REVIEW OF ENVIRONMENTAL DOCUMENT
NOTICE OF PREPARATION
OCEANA RETIREMENT FACILITY AND HARBOR COURTS PROJECTS

This is in response to your Notice of Preparation (NOP) for the Oceana Retirement Facility and Holiday Harbor Courts Projects in Marina del Rey. For our comments, please see the attached letter from Captain Mary D. Campbell, of the Marina del Rey Sheriff's Station.

In summary, Marina del Rey Station states that this project may lead to increased calls in response to crimes against the elderly and medical aid requests. The result could be a loss of investigative and/or community service hours in other areas. The Station, therefore, makes specific reference to the Initial Study's characterization of the project's impacts on Sheriff's services having a "less than significant/no impact," as being inaccurate.

The Station is currently operating at the maximum capacity of its physical and human resources. This project, in aggregate with other redevelopment in Marina del Rey, will eventually necessitate an increase in staff and facility space. Marina del Rey Station also states that the project will increase traffic around the project area, having a negative effect on patrol car response times. Finally, the Station points out that retirement living communities make particular demands on public safety resources in the event of natural and man made disasters. They make specific recommendations for addressing these needs.

While this project by itself does not create a specific need for any additional requirements to the Station, it may have a cumulative impact on call and response times, staffing, and inadequate facility accommodations when considered with other developments in this area. In addition, the construction effort itself may also impact call and response times due to the project's proximity to a major thoroughfare for the City. We reserve the right to address these issues in future reviews.

Should you have any additional questions regarding this matter, please contact Mr Tom Bellizia, of my staff at (626) 300-3021.

Sincerely,

LEROY D. BACA, SHERIFF

Gary Tse by arf

Gary T. K. Tse, Director
Facilities Planning Bureau

Parcel 21
Design Control Board Submittal

June 2005

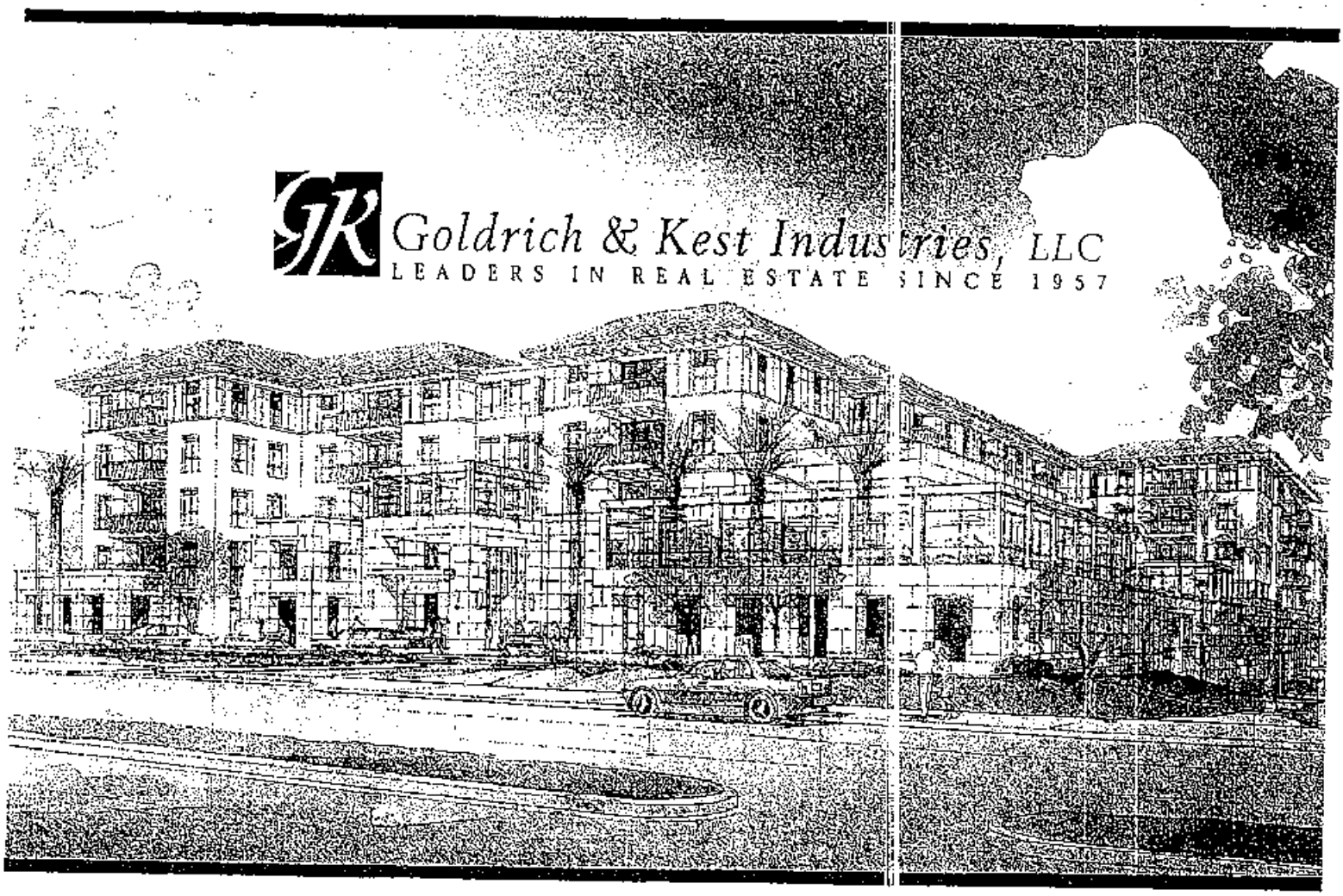
APPROVAL IN CONCEPT *

COUNTY OF LOS ANGELES
DEPARTMENT OF BEACHES & HARBORS
PLANNING DIVISION

PLANNER _____

DATE 5-18-05

*DCB #05-016 approved in concept, with conditions: applicant must consider the public benefit in the building layout; provide access for public parking; add palm trees against the elliptical façade; and use the highest quality materials for the project.



Parcel OT
Design Control Board Submittal

June 2005

APPROVAL IN CONCEPT *

COUNTY OF LOS ANGELES
DEPARTMENT OF BEACHES & HARBORS
PLANNING DIVISION

PLANNER _____

DATE 8-18-05

*DCB #05-015 approved in concept, with conditions. See Minutes of August 18, 2005 DCB meeting for details.

THE OCEANA RETIREMENT FACILITY AND HOLIDAY HARBOR COURTS PROJECT SCOPING MEETING

COURTYARD MARRIOTT

13480 MAXELLA AVENUE

MARINA DEL REY, CALIFORNIA

AUGUST 9, 2007

FILE NO. P07031

REPORTED BY DEBRA L. PRESUTTI

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THE OCEANA RETIREMENT FACILITY AND

HOLIDAY HARBOR COURTS PROJECT

SCOPING MEETING

COURTYARD MARRIOTT

13480 MAXELLA AVENUE

MARINA DEL REY, CALIFORNIA

AUGUST 9, 2007

FILE NO. P07031

REPORTED BY DEBRA L. PRESUTTI

Mr. Zola: There are some brownies and cookies back there, and we're going to make everybody take a pile of them before the meeting.

Unidentified Female Speaker: If you'd publicized this, the brownies would be gone by now.

Unidentified Male Speaker: Maybe you could put them in the freezer and use them when you have a scoping hearing. You know, you can't do it tonight without the public.

Mr. Zola: We've done other ones and we've had a full room of 80 people and the cookies still don't go.

Let me introduce myself and then we'll go from there. My name is Lloyd Zola. I'm with the firm of HDR.

Can you hear me okay?

The Reporter: Yes.

Mr. Zola: Okay. We've got a court reporter. I just want to make sure she can hear.

And what I've been asked to do by Los Angeles County is host the scoping meeting for the project. And what we'll do tonight is we'll walk through that. I understand your concerns regarding notice, and I think you've been very clear with the County about those. So what we'd ask for tonight is we're here, we have a purpose to being here, we understand the issue that you have regarding notice. Get that in writing as part of this;

that will become part of the record. The County will then consider what they want to do next and we'll go from there.

Unidentified Male Speaker: With all due respect, I don't think you have enough people here to hold a scoping meeting.

Mr. Zola: Here's what we're going to do. Your choice is we can either take testimony tonight because you are here or we can all go home and say we would have had a meeting had we wanted to. But since you're here -- I understand the issue about notice and I under your concerns, but you're here tonight and I think --

Unidentified Female Speaker: I appreciate what you're saying about that, too, that we are here. And because we're here, I would like to say something, but this should not be considered a scoping hearing.

Mr. Zola: That is an issue I think you've been very clear about.

Unidentified Female Speaker: You can't compromise that. I mean either -- this cannot be considered the scoping meeting if there's nobody here.

Unidentified Male Speaker: I have a lot of comments (overlapping speakers) -- I have a lot of comments. I will not make them tonight until the room is filled with the interested parties. You didn't notify --

Mr. Zola: That is your decision.

Unidentified Male Speaker: You have --

Mr. Zola: Hold on. This is not your meeting. You are not running the meeting.

(Overlapping Speakers.)

Unidentified Male Speaker: This most certainly is my meeting though I'm not running it.

Mr. Zola: Sir -- Okay. That is what I meant.

Since you are here, if you want to give testimony, fine; if you don't want to give testimony, that is your decision. The question as to how the County will treat this meeting is the County's decision, and that is a decision they will make.

Unidentified Male Speaker: I would like to --

(Overlapping Speakers.)

Mr. Zola: Please, let me finish. I'll do the same when it's your turn. And I think we'll let each person have their say uninterrupted as best as we can.

That is a decision the County will make, and they will make that decision following this meeting. You've been very clear about your objection, and if you want to take your time to make that objection again, you can do that, but I think we're very clear on that.

Now, a scoping meeting -- the purpose, the reason that we're here tonight is to take comments

regarding the scope of an environmental impact report that the County is having prepared, and that is the purpose of this meeting. It is not a meeting that was called or a meeting that is intended to deal with we like the project, we do not like the project; it's not a meeting for or against the project.

Unidentified Female Speaker: I have a question.

Mr. Zola: When I'm done, we'll take questions.

Okay. Now, the County has received some applications for a couple parcels within the Marina -- 20, 21, and OT. As a result of those applications, the County has looked at them and determined that those applications are subject to the California Environmental Quality Act, CEQA, and that they then have to do a number of things. One of them is to have an initial study prepared that looks at are there potentially significant impacts to the project. The County has done that.

Back in March of this year, an initial study and Notice of Preparation were distributed, and that is the larger document that you saw out on the table up front. The purpose of that document is a public notice that an EIR, Environmental Impact Report, is being prepared. That was distributed in March of this year.

The second part -- and the purpose of that is not only to determine how do we deal with environmental

documentation, but what needs to be addressed in that environmental document for the project. This is the second part of that public review: What should be in the document?

After this meeting is over, there's another meeting. There will be an environmental impact report that will distributed. That document will describe the impacts of the proposed projects. And that will go out for a 45-day public review, and then you can provide written comments on that document. Then there's public hearings at the Regional Planning Commission Board and the Coastal Commission. So this is not a situation where, if you don't comment tonight, there's no time to comment.

The basic project that is being reviewed and that we're going to be dealing with is two parts. One is the Oceana Retirement Facility. That is a 114-unit retirement facility that has some retail space, ancillary facilities. That site which is Parcel OT is currently used for parking, 186 spaces, and a lot of you have seen that site.

The second part of the project being analyzed is the Holiday Harbor Courts, and that's a commercial development proposed on Parcel 21. That's going to replace on-site uses and also some new marine commercial uses, a public park project, promenade, and on-site

parking.

Now, the site for the Harbor Courts is currently developed. There's a commercial facility there -- two commercial structures, health club, retail, office, and a paved parking area. So what will happen there is those buildings will be taken down, new buildings put in place. So the existing uses will be replaced with new commercial office, health club, yacht club, retail uses, promenade, and a 447-space parking structure.

Somebody asked earlier how tall the parking structure is. It's five levels.

Unidentified Female Speaker: It is proposed for five levels?

Mr. Zola: That's what is proposed, yes.

Unidentified Female Speaker: On which one? 20 or 21?

Mr. Zola: On 21.

Now, on Parcel 20 there are some uses approved that are not built. So part of the --

Unidentified Female Speaker: Now you're talking about 20.

Mr. Zola: They're both (inaudible.) The development is going on Parcel 21. On Parcel 20 there is some development approved that is not built. Part of the request is to take the development that's approved on

parcel 20 not built and build it on 21.

Unidentified Female Speaker: You can't -- you can't --

Mr. Zola: Wait --

Unidentified Female Speaker: -- at this point. No. This is a procedural thing, and it is completely outside of the approved method of doing things. This is about 21 and OT; this has nothing to do with 20.

Mr. Zola: Okay. All I'm doing --

Unidentified Female Speaker: You cannot introduce 20 now. We have been asking for a master plan to take into consideration everything for the public --

Mr. Zola: Wait --

Unidentified Female Speaker: No. I need to finish because I object to you carrying on any more.

Mr. Zola: That's fine, you can object, but --

Unidentified Male Speaker: In other words, you don't invite the public, you don't want to hear from the five people in the room.

Unidentified Female Speaker: This is -- this is an outrage. This is an outrage. There has been no public notice. You are now piggybacking something in here. We can't get things coordinated when we would like them, but you will introduce a brand new thing. At what stage is this?

There has been a lease option, there has been a Design Control Board, there have been small craft harbor meetings, all of which we have been obligated to try to get to and make our things. (Overlapping Speakers.) Now you're introducing something else. No. You cannot do it in that order. That is illegal and it is not allowable.

Mr. Zola: Okay. Hold on. You asked a question.

There is an application in front of the County. All I am doing is describing what that application is. I have said that this is not a meeting to argue the application itself.

Unidentified Female Speaker: No, but this is the process about the application.

Mr. Zola: Hold on. I did not interrupt you.

Unidentified Male Speaker: Actually, you did.

Mr. Zola: Sorry. I will apologize.

Unidentified Female Speaker: Actually, you did.

Mr. Zola: I interrupted the interruption, that is true.

There is an application in front of the County. The application includes a request to move some approved development that is not built; so development that was approved on Parcel 20 to allow it to be built.

Unidentified Female Speaker: What development was approved on Parcel 20 --

Mr. Zola: If I could finish, I would get there.

Unidentified Female Speaker: Okay, okay. Excuse me. I beg your pardon.

Mr. Zola: Okay.

That is the application. The development -- what is approved on Parcel 20 that is being requested to be moved is described in the initial study; so it's there in writing.

Unidentified Female Speaker: How about let's make it easy for the five people in the room who are interested and tell us what it is.

Mr. Zola: May I just finish, please?

Okay. The existing development on Parcel 20 is what? A health -- a hotel.

Unidentified Male Speaker: Parcel 20 right now is --

(Overlapping Speakers.)

Unidentified Female Speaker: Pacific Yacht Club. It is supposed to be -- as a condition it is supposed to be kept there in perpetuity as a condition for the other Parcel 20.

Mr. Zola: And that is a decision that the County will be asked to make. If the County decides, as you have said, that it is to be kept in perpetuity as a condition of approval, then they don't approve this project.

Unidentified Female Speaker: But the project

(overlapping speakers) without approval. You can't undo it afterwards.

I'm sorry, not you. I beg your pardon. The County is not allowed to do that. The County is acting illegally, and they are making you their agent in doing this.

Mr. Zola: The County has not said yes. Okay?

Unidentified Female Speaker: Then why are we here?

Mr. Zola: We are here because the County cannot act until there is an environmental impact report.

Unidentified Female Speaker: No, no, no. The County must not act and do this, period.

Unidentified Male Speaker: With all due respect, this cannot constitute a scoping hearing. There are six members of the public here because the public has not been notified about this. This can't constitute a scoping hearing.

(Overlapping Speakers.)

Mr. Zola: Please. Please, let me -- can I finish, please?

Unidentified Female Speaker: We'll let him finish and --

Unidentified Male Speaker: Finish. We shouldn't start before the public is here. It is a --

(Overlapping Speakers.)

Mr. Zola: If you do not want to be here, you do not have to. You are not being held against your will. If you wish to disrupt and -- if people have a comment they would like to make, that will become part of the record; and, if you wish for that not to become part of the record, that is where you're headed. So those people who are here wishing to be heard on the record, let's let them do it.

Unidentified Female Speaker: Sir, would you mind spelling your name.

Mr. Zola: Okay. The easiest thing I'll probably deal with all night long. Z-O-L-A. I'll give you a business card. That's my last name. First name is Lloyd, L-L-O-Y-D.

Unidentified Female Speaker: And your organization?

Mr. Zola: I'm with HDR.

Unidentified Female Speaker: Which is?

Mr. Zola: Which is an engineering and environmental consulting firm.

All I'm doing -- my contract -- just so everybody knows, my sole contract to do anything on this project is this meeting.

Unidentified Female Speaker: I'm sorry. May I interrupt just one --

Mr. Zola: No.

Unidentified Female Speaker: -- more time to apologize? Because you have no idea what's going on. Suddenly, we are counting down on you. So, yes, we will let you give your presentation, but we would also like the opportunity, when you are finished, that we can present exactly this case. And it is not specifically on OT or 21. So, if you will extend us that courtesy, we will try to bite our tongues in the meantime.

Mr. Zola: All right, thank you.

All right. We'll try this again.

The basic issue is that, whether you agree with it or not -- I think I can pretty well figure out where you're standing -- an application has been put in front of the County, or a couple applications have been put in front of the County. And the County now must act on them or go through a process and then take an action on those.

Part of what it sounds like you're going to argue is that the County has no right to act on those. But that is ultimately a question for the commission and board where the decision is made. At this point staff is obligated to take that into the decision-making arena.

So the other part of the project is the parking, and that is another issue I think some of you have raised. There's now 186 parking spaces on Parcel OT. Of those, 94 are going to be relocated to Parcel 21 as part of this

application. The application proposes using --

Unidentified Female Speaker: Excuse me, I'm sorry. You said 94?

Mr. Zola: 94.

Unidentified Female Speaker: Where -- what's 94 --

Mr. Zola: Okay. 94 spaces will be moved. All of this --

Unidentified Female Speaker: From?

Mr. Zola: -- is in the initial study that you have. So you have all this in writing. I think you've all picked that up.

So part of the proposal is to move some of the existing parking spaces. And so the applications that are in front of the County, just so you know what they are, on Parcel OT, which is the retirement facility, are amendments to the coastal program, both to the land use plan and the coastal program, to change the existing designation on Parcel OT from parking to hotel and then adopt a mixed-use overlay zone that will allow the mixture of uses at the retirement facility. So that is one of the applications that's there on Parcel OT.

And then the transfer development potential. The development potential is 114 hotel spaces and 5,000 square feet of office. That's the development potential you are arguing that can't move. But their request is to

transfer development potential; so what was approved and not built, the proposal is to build that on Parcel OT.

Unidentified Female Speaker: So OT -- wait. All right. Now --

Mr. Zola: Transfer the development to OT.

Unidentified Female Speaker: The development potential of Parcel 20 is being moved to OT?

Mr. Zola: 21. I'm sorry.

Unidentified Female Speaker: 21. It's being moved to 21?

Mr. Zola: Yes, 21. So the development potential, we're talking 114 hotel spaces, 5,000 square feet of --

Unidentified Female Speaker: No, there's not a hotel on 21.

Mr. Zola: Okay. Hold on. All I'm doing is summarizing what you already have in writing..

Unidentified Female Speaker: I think there's an error. There was a hotel development on 21?

Mr. Zola: On 20. There's approval on Parcel 20 described in your initial study as being proposed to be transferred. The other application is a conditional use permit, coastal development permit to transfer -- to do that development transfer and parking (inaudible) arrangements. So that's all in this package.

The basic package, what it comes down to, is a

114-unit retirement facility and then rebuild Holiday Harbor Courts with a net increase of about 6300 square feet. You can see an existing facility rebuilt 6000 square feet bigger.

Unidentified Female Speaker: Oh, no. You're increasing -- you're transferring it from 21 over to OT and then you're rebuilding Holiday Harbor using that development potential?

Mr. Zola: Right.

Unidentified Female Speaker: This makes no sense.

Mr. Zola: Well, the applications are at the County. I was going to say, if you want to go through the applications, they're there to be reviewed. The initial study with the project description you have in your hands.

Unidentified Female Speaker: I can't find Parcel 20 on the illustration here.

Mr. Zola: I'll show you. Let's see if we can find them.

Unidentified Male Speaker: You also said it was referred to in that document. Can you tell us where?

Unidentified Female Speaker: I don't recall seeing hotel rooms at all.

Mr. Zola: Okay. Let me just tell you where in the document it is, then we're going to get past the project description. If you go to the document you have, there's

one page called Notice of Preparation. On the Notice of Preparation Project Title, all the applications are listed. If you go to page 2, Project Description, there's a short description there. Then if you go a few pages, you go to page 5, and then you get a more detailed project description that starts with project characteristics, proposed land uses, site plans, floor plans, tables of existing development, how things are going to be moved or proposed to be moved.

On page 8 are the project amenities, open space, landscaping. Then you go to page 10, which is the start of the discussion of parking. You keep going in that same document, you come to page 12. And the bottom half of that identifies that these are the entitlements being proposed; so that will give you those on page 12. The last half of page 12 is the entitlement requirements and discretionary improvements. So that's a description of what the approvals are or what they're proposed.

Then if you go to the next page, you have the initial study. And the initial study outlines the first review of what are the potential significant impacts of the project. So given that the project was proposed, there is a requirement on the County to review what are the potential impacts that project could lead to, and that's what you have in the initial study.

So that is -- that analysis is a conclusion of the initial study -- I'll be done in a minute -- the conclusion of the initial study is that there are potentially impacts that cannot be mitigated that will be significant and, therefore, an environmental impact report is required. So that was the reason that the County had an initial Notice of Preparation prepared.

The Notice of Preparation is a notice to public agencies and the public that an environmental impact report is going to be prepared. That was distributed in March of this year. It went through a 30-day review period. That 30-day review period closed on March 30th.

Now we're having a meeting here on August 9th -- and I know all the arguments about having another meeting; so without going back into that, those of you here, if you want to give written comments either after the meeting -- on the back of your agenda, there's a place for it -- if you want to do that afterwards over the next couple weeks, go ahead and fill out the written comments and send them directly.

I'm almost done.

Unidentified Female Speaker: I'm just a little slow here. You said the 30-day review ends what date?

Mr. Zola: The 30-day review period for that Notice of Preparation actually ended March 30th.

We're having a meeting tonight. I know the argument about what the meeting is. Any additional written comments from any of you, get them to Rick -- there's an address there on your agenda -- over the next couple weeks.

Now, in the Notice of Preparation, as I said, there was a requirement to prepare an environmental impact report. The purpose of that environmental impact report is so that when the applications are in front of the County decision-makers, they can make a decision based on an understanding of what are the environmental implications of the project that's being proposed. So, provide an understanding of physical changes to the environment; what alternatives could reduce those impacts; what are measures that could be imposed on the project to reduce impacts, mitigation measures; and, to provide the public with an opportunity to comment to the County on what you believe the impacts are. And all that is a prelude to the County actually making a decision for or against the project in a public hearing.

Now, the Notice of Preparation identifies that the environmental impact report goes through all the issues and is going to address these issues:

It's going to address geotechnical matters, liquefaction.

It's going to address flooding, the potential of tsunami, seismic sea wave, noise during construction, effects on adjacent residences.

Water quality. Because the projects are close to -- adjacent to water bodies, national pollutant discharge elimination systems requirements. All that will be addressed in the EIR.

Air quality, dealing with emissions from the parking lot, parking structures; construction emissions or air-quality emissions during construction.

Biological resources related to removal of trees and birds nesting in those trees.

The visual quality, dealing with the height of buildings and changes in views. I think that was one of the issues that you had.

Unidentified Female Speaker: Yeah. And I see something missing.

Mr. Zola: I'll get there.

Okay. That is why we're here.

Traffic and access, cumulative impacts of traffic of this project and projected traffic in the Marina area.

Utilities, dealing with water supply and is there adequate water; how will this project affect water supply for the Marina?

Environmental safety. In that case, dealing primarily with Parcel OT and potential methane gas hazards there.

And then, land use, dealing with the fact that there are amendments being proposed.

So there's amendments being proposed. The EIR is going to analyze what are the land use effects of those proposed amendments.

Unidentified Female Speaker: Are those amendments available?

Mr. Zola: Those are part of the application; those are described -- yeah.

Unidentified Female Speaker: We haven't seen them.

Mr. Zola: Okay. It's there for you.

The next step -- discussion of another meeting aside -- is there will be an environmental impact report prepared that will describe and analyze these issues, and that will be out for public review in the fall or about the fall of this year. That will be out for a 45-day public review. You will have -- the public and public agencies will have an opportunity to comment on the specifics of those analyses. Do we agree, do we not agree, did you miss something, did you not miss something. And all of those comments will come during that 45-day review period which will end late fall, towards the end of

the year.

Unidentified Female Speaker: You're going to prepare this environmental impact report by when?

Mr. Zola: It should be out -- the schedule now shows it will be out sometime in the fall.

Unidentified Female Speaker: This fall?

Mr. Zola: This fall.

Then public hearings on the project. And what will happen is there will be a review of that draft environmental review report, public comments coming back, comments from agencies. And then those will be reviewed by the County, responses to those comments will be prepared. Then what's called a final EIR will be prepared, including the document you saw originally plus your comments and responses to those comments.

And only then will there be public hearings before the Regional Planning Commission. Those starting maybe again this year, maybe early next year, depending on what is the timing of getting an EIR out, how many comments, how long does it take to respond; and then, Board hearings sometime thereafter in 2008. So that's where we are now.

What we'll do now is take responses or comments from each of you. And so what I would ask -- we know the issue. We'll -- just since we have a small crowd, let's

start on this side of the room and go across that way and give each of you a chance to speak.

We have a court reporter here. So the court reporter will take down your comments. Your verbal comments will be taken down literally and become part of the public record so that when the EIR goes out for its review, when the Planning Commission and the Board reviews the EIR, your comments will be part of that record.

Now, I also know you're going to make comments regarding the meeting so --

Unidentified Female Speaker: Will that also be part of the record?

Mr. Zola: That will be part of the record, although I will tell you this: That you've made that request; you have said that. You have requested an additional meeting. The County will make a decision as to whether they will hold an additional meeting, and that's a decision for them to make.

Unidentified Female Speaker: And advertise it --

Mr. Zola: We can go through -- advertisement. I think the issue of advertisement, for those of you who are here, we have your names and addresses. If you want to get information as to how this meeting was advertised, notice was sent out, there was an ad in the paper. So this is available --

Unidentified Female Speaker: Is it available tonight?

(Overlapping Speakers.)

Mr. Zola: It's -- it's -- please, let me --

(Overlapping Speakers.)

Unidentified Female Speaker: Okay. I'm sorry. You must understand. It took me three months to get the last list that Regional Planning --

(Overlapping Speakers.)

Mr. Zola: I understand the passion that you have for the project.

Unidentified Female Speaker: No. It's frustration.

Mr. Zola: Whatever emotion it is, it's clear.

So those things -- I mean, it is -- the list is public record, the advertisement is public record; so if you want to go down to the County and review all that record -- I know you want to speak; I got it. -- that is there as part of the record to review. So given that --

Unidentified Male Speaker: I want to speak to your comments.

Mr. Zola: You will be given the opportunity to do that.

Unidentified Male Speaker: You're refusing to take comment. You're saying things. You can say anything you want, and you don't -- I raised my hand three or four

times.

(Overlapping Speakers.)

Mr. Zola: I am done with my part of this. It would have gone a lot quicker if I could have just gone from beginning to end, but I understand.

Unidentified Male Speaker: Well, it will be a lot quicker than (inaudible) the public.

Mr. Zola: Now, what we're going to do now is we'll start from one end and go to the other. We have a sign-up sheet on the outside. If you want to speak, just identify yourself for the court reporter. If you haven't signed the list and you want to speak, make sure afterwards -- identify yourself and make sure afterwards that you sign the sign-up sheet so that way our record is clear.

Once we have something on the record, it's there. So we don't need to hear however many times the same thing, because once it's there, it's there. So --

Unidentified Female Speaker: Number one --

The Court Reporter: Would you identify yourself, please.

Ms. Andrus: My name is Carla Andrus, and I will take a lot of issue with the notice in here. It's obvious that nobody that you noticed on your -- with your efforts that you say are on record -- that was what? In the Argonaut? Whatever means you used was completely unsuccessful.

I found out about this because I had to badger people downtown this morning, and I called (inaudible). I thought it was a Regional Planning meeting, only to find out eventually that oh, no, it's a meeting by Rosie.

Rosie was the one who finally -- I went through this maze of people, and Rosie was the one who finally said to me, oh, no, it's going to be a meeting at the Marriott Courtyard at 6:00 o'clock. Okay?

So I informed Nancy. I informed Mary Ann and Steven and Mr. Yang, Jun Yang, from power. And Steve informed the other two guests that you have here today.

Unidentified Male Speaker: None of us got notice.

Mr. Zola: Hey, please. Let her finish.

Ms. Andrus: Your public outreach is a failure. And not only is it a failure, it suggests that you really would just like to see this thing pushed through the process -- which we've witnessed a lot of times -- without public comment and without transparency. So that's the first thing that I would say.

And about this project. This project -- we've gotten conflicting things. There's no update on this report that you've got. We were told there would no longer be a five-story parking structure. The Design Control Board said they did not want to see a five-story parking structure here. And she had asked every one of

the projects around Mother's Beach, which was every parking lot, FN -- what was it? FN, LT, GR, IR, and NR; every one of these parking lots. There's no cumulative impact on how this is going to treat our land use plan.

These are all public parking lots. This is not a -- there's no parking analysis done which was being asked for at the Design Control Board. Instead of responding to the Design Control Board with Susan Cloke's request that all these projects come back to her with a change in the project, either they're scaled down or even considered new sites. Instead of that, the Design Control Board was stripped of its authority. It was -- the supervisors were like off where their heads, we do not need the Design Control Board to tell us about land use. Okay?

But that is not the final word; it's the California Coastal Commission that has the final word on that. And so in the meantime, we're entitled to due process. But these five parking lots have not come back to the Design Control Board. And we've only gotten rumors. That's all I've seen; I haven't seen anything in writing, but we've gotten rumor that they are not going to do this five-structure parking lot. But that's only hearsay. I heard that from Stan Wisniewski.

And none of it has been -- that change has not

been legitimized; so they're avoiding process, and they're avoiding process in all kinds of ways. They are running away from this because actually the whole plan is ridiculous. Taking public use of public land and giving it to private developers for the lowest priority -- and when you look at Parcel OT, specifically, that is the lowest priority -- when we have come to the County with an alternative plan. And it was just mentioned, but there was no response from the County whatsoever.

We came to the County with a professional designer, Ms. Regina Rubino, from Santa Monica. And we came with a whole list of names supporting: Public, you know, local residents and visitors alike support -- and different organizations -- supporting this alternative plan that would not require an LCP Amendment; that would honor our LCP and consider options such as -- and you could even extend the Oxford Flood Basin, which would help the water quality in the long run.

But short of that, we could make it a lap pool so the rowers and the people in the region, the general public, could use this for swimming, as we already know that Mother's Beach is not really -- I don't think it will ever be satisfactory as far as swimming goes. And, you know, in the summer I guess they get an okay grade, and they let the kids go in, but this would be a safe

alternative for parents that are concerned about the water quality no matter what the grade says.

Outside of that, Goldrich & Kest is the last person you should, the last developer you should be considering for this project.

Mr. Zola: I was trying hard not to -- the purpose is to stick with the environmental part.

Unidentified Female Speaker: But this is environmental, which I'm saying you did not include this aspect of it. One aspect you're not including is the residents, the community of Marina del Rey. As you start to over build and start more residential, you become responsible more and more for a sense of community. And we already know that Goldrich & Kest had Parcel 20 with the Capri, and it took all these senior citizens forever to battle him just to get the affordable housing that he promised, which was a part of his conditional permit.

Mr. Zola: Again, I'm trying --

Ms. Andrus: This is environmental impact in that we're talking about the residents of the Marina. Why would we give a developer who has proven to be not a good neighbor, why would we give him this project? He is not a good neighbor to the seniors.

Mr. Zola: Again, the question is: What should be addressed in the document being prepared?

Unidentified Female Speaker: You should definitely address the impact this would have on the community at large, especially when you're talking about senior citizens. This is a retirement hotel. I cannot imagine why, after all of the fighting that the senior citizens had at the Capri, why they would honor and privilege Goldrich & Kest with such a project.

Mr. Zola: And again, I think that issue, the issue you're raising regarding the ultimate action the County is going to take --

Unidentified Female Speaker: I'm talking about the impact on the community.

Mr. Zola: I got it. Yes. The way I wrote this down is need to address community impacts, impacts on sense of community, impacts on seniors.

Unidentified Female Speaker: No. No.

Unidentified Female Speaker: But we also have an impact on the developers that we choose in the Marina; okay? And when we make our choices -- number one, nobody bid it. I don't remember there being a bid on this. I don't know why Goldrich & Kest was handed this part of our crown jewels. I don't know why he was just handed it. There was no bid.

Mr. Zola: Okay. Again, the bidding procedures, how we -- whatever happened to get an application there is an

issue that you need to raise directly with the County. That's not --

Ms. Andrus: We need to raise it here.

Mr. Zola: The environmental issue --

Ms. Andrus: What other opportunity will we have? We've raised this issue at the Design Control Board. We raised it at the Small Craft Harbor Commission. We've raised it everywhere we've been. It needs to be addressed.

Mr. Zola: Okay. I got it.

(Overlapping Speakers.)

The Court Reporter: When everyone is talking over each other, I can only get one person at a time. So when more than one person is talking, there's not going to be a clear record of your points. So, please, speak one at a time. It would be better for all of us.

Mr. Zola: Yes.

We have -- I think the issue of addressing it, this is not a forum that you're going to get an answer from the County or get a decision.

Ms. Andrus: Where is that forum and why isn't that first --

Mr. Zola: Hold on.

Ms. Andrus: -- before we're here? That's the crucial, basic question.

Mr. Zola: Hold on, hold on. I'll answer that question. That's why I said at the beginning, the purpose of the meeting -- and I know we're going to argue whether we ought to have this one or another one -- is very narrow. And, yes, you obviously have a lot of frustration; that's very clear.

Unidentified Female Speaker: You don't even know half of it. I would love to tell you.

Mr. Zola: I probably don't, but I can imagine just based on --

Unidentified Female Speaker: I don't know that you would want to.

Mr. Zola: Well --

Unidentified Female Speaker: When you know --

(Overlapping Speakers.)

Mr. Zola: The issue -- the question that you're asking is: What is the right forum for that question? This is the forum for what ought to be in the environmental; okay? The right forum for that is -- the issue over how you got there is a discussion with the Department of Beaches and Parks or with your County supervisor.

And, again, I know your frustration.

Unidentified Female Speaker: And why would I be frustrated? Because I'm going to ask Stan Wisniewski, and

he's going to say, you know, it's a process.

Mr. Zola: Well, we're not going to get that answer -- (overlapping speakers.) The one thing that's for certain is we're not going to get that answer.

Unidentified Female Speaker: One thing for certain is that this is a dysfunctional process and it's dysfunctional by design. And, if we really were serious about really thinking about responsible development in the Marina, these things would have already been answered. There would have been a public notice. There would have been --

Mr. Zola: We've already said that. I'm --

(Overlapping Speakers.)

Ms. Andrus: -- this ridiculous plan here, where they want to --

(Overlapping Speakers.)

Okay. Then I will continue on my way, which is outside of the cumulative impact that this would have on the community and on the senior citizens specifically and the choices of developers on this subject, there are several issues; okay? And I --

Mr. Zola: I'm sorry, but there are other people that want to speak.

Unidentified Female Speaker: I know that.

Mr. Zola: Okay. Go ahead.

Ms. Andrus: Okay.

Unidentified Female Speaker: Could you clarify -- because we've identified the six members of the public who managed to network with each other. Can you identify the others in the room who are here officially or --

(Overlapping Speakers.)

Mr. Zola: Anyone who is sitting in this room other than me, if they want to identify themselves later, that's fine. If they don't want to --

Unidentified Female Speaker: Okay. Well, are there official representatives from Regional Planning here? From the developer here? We'd like to know. From the lessee?

Mr. Zola: As I said, if they want to identify -- okay, we know the County is here because he's seated --

(Overlapping Speakers.)

Unidentified Female Speaker: Who is the County?

Mr. Zola: Sorry to point you out.

Okay. Why don't we finish with your comment on what ought to be in the EIR, then we can get to the next one, and we'll somehow get through tonight.

Unidentified Female Speaker: What a goal.

Mr. Zola: You've got to have goals.

Ms. Andrus: Yeah.

Well, the parking analysis was not done as a

cumulative effect on all of the parking -- where is the parking going to go? The five-structured level parking lot was denied by the Design Control Board. We were told by Stan Wisniewski, not in an official way --

Mr. Zola: Okay. Hold on. I know that because we talked a little bit earlier that you have an issue over what actions were taken before regarding that; you've already said that.

There's a document being prepared now. So the question is: What ought to be in that document? So just in terms of the parking issue, when you say that an analysis has not been done, the proper, not proper, but what we're trying to get tonight is an analysis of cumulative parking needs to be done as part of the environmental documents now being done.

I think your concern regarding the actions that were taken on past parking structures, fives stories or five levels, in terms of the document being done now, an analysis should be done. Part of the analysis that should be done is whether, in fact, that height or size or however we want to say it, that those number of levels should be or can be permitted based on past actions, and that would be the analysis that would occur in this document.

Ms. Andrus: Yeah, but I'm confused about we were

already told that that five-structure parking level would not be there; so this document that you have in front of us is outdated.

Mr. Zola: I can't speak to what you were told or what actions occurred prior to this.

The situation --

Unidentified Female Speaker: So assuming that it's what it is in this document, five-level structure parking to take up overflow for projects that don't even have LCP Amendments is ridiculous. It's putting the cart before the horse. You can't do an environmental impact report if you don't see the cumulative effects of all this.

Mr. Zola: Okay. Yes. And I'll try to word that differently.

The analysis you're asking for sounds like what should be done is an evaluation of cumulative parking demand and how it is -- I think the question you're asking --

Ms. Andrus: No, not demand. No.

Mr. Zola: How much parking --

Ms. Andrus: No. You know what? Here's the real issue: Every one of those parking lots should remain either a parking lot or should be designated for a parked use. None of them should be even considering putting the lowest priority land use such as hotel, residential, any

of these things.

Mr. Zola: Yeah, you've said -- we've got that.

I'll try and draw a distinction. The issue you just raised is an issue of project reviews, the project itself. Should the County approve it or not approve it? And you're arguing, no, they shouldn't because of the reasons you gave. Before the County makes that decision yes or no, they're going to evaluate and review the environmental document that has certain analyses in it.

Ms. Andrus: And I'm hoping they review alternative ideas.

Mr. Zola: Gotcha.

Ms. Andrus: Because we have alternatives that honor our land use plans, and these things have just been rejected out of hand; they have been totally ignored.

And the other thing is that here's your biggest impact of all: You are not honoring our local coastal plan; you are piecemealing this EIR; you are talking these parking lot projects into different EIR's without addressing the whole land use.

And, as Nancy was saying, we need a master plan to deal with this effectively. Otherwise, it's just like this; this kind of meeting where it's being railroaded through, and we're being obligated to something that we don't want and we don't need and that will be detrimental

to the Marina, period.

Mr. Zola: Got it.

Unidentified Female Speaker: And its use.

Mr. Zola: And the phrase you used -- piecemeal evaluation -- that's something they can then look at and say, okay, your request would then be a cumulative analysis of all the requested parking so you could see the pieces all together in that --

Unidentified Female Speaker: And we want to see how Mother's Beach -- the strategic plan for Mother's Beach. And we want that connected with the Burton Chase Park Strategic Plan and the other strategic plan. And then, whatever is left over, we need a full look at the whole Marina; an overview, and then you'll see this, okay? Parcel 20, which they want to bifurcate and call it Parcel 19 or whatever it is they're doing, this was already approved by the California Coastal Commission for a yacht and marine commercial offices I believe it was.

The last time we went to the Design Control Board, the County wanted to put its administrative offices on that parcel.

Mr. Zola: Okay. Again, and I'll try and steer you back to what ought to be in this document.

Unidentified Female Speaker: We need to make sure that they honor the yacht use because that's how they got

the Capri. And there's also zoned 75 units of congregate care, which is parcel 18, which Goldrich & Kest still has not honored.

Mr. Zola: Okay. So the request -- I wrote this several comments ago -- is how do we ensure that the project or that project requirements are in fact enforced? I think you've asked that question a lot of different ways. Because you've said that past --

Unidentified Female Speaker: You know, I think this is kind of frustrating; so I would just really like to see somebody else take the floor, and maybe we can get back to these things. I think it should be more of a dialogue instead of a diatribe just on and on and on, and then you and me having this discussion. It's just not a good forum this way.

Unidentified Female Speaker: No, I have some points. I'd like to speak.

Mr. Zola: Anybody else on this side?

Ms. Audet: All right. I'm going to come close to the transcriber here so she can hear what I have to say.

(Overlapping Speakers.)

The Reporter: Would you identify yourself for me, please.

Ms. Audet: I'm sorry. My name is DeDe Audet A-U-D-E-T, and I live adjacent to the Marina, and I serve

on the local Neighborhood Council Board.

From the very beginning this Marina has not provided the amenities for having residential use of the area. There are no churches on the land, no hospitals, no schools. These are all items that are removed from the tax base of the surrounding community.

Next, the county needs overflow parking. The parking lots on the beach on holidays and on the weekends have to turn people away. So this idea of the parking lots being underutilized is simply -- because no one has made an effort to try to use them properly.

Now, people are a part of the environment, and I would hope that any environmental review takes into account the people in the surrounding community who are now being subjected every year to more and more traffic from this Marina. It's not fair. The exhaust fumes from the automobiles are poisoning the air, and people in the surrounding community are the ones that have to put up with it. That all needs to go into the environmental report.

Now, I do agree with the people that are here that the people of the surrounding community should have been advised to come to this meeting because it's quite obvious that very few people are here.

Thank you very much. I know that you're all

doing the best work that you can because we all have to have a job of some kind. But I think you're going to have to take these things into consideration and make the Marina into a fair community that encourages young people from all over the county to engage in water sports not to put up buildings. (Applause.)

Unidentified Female Speaker: My turn. I am --

Mr. Zola: Okay. We need your name.

Ms. Macpherson: Challis Macpherson. That's C-H-A-L-L-I-S, M-A-C-P-H-E-R-S-O-N.

I am pleased to be the Chair of the Land Use and Planning Committee for the Venice Neighborhood Council. And last year our committee originated an extensive defining letter regarding the OT project listing our objections. That is part of the record. I won't go over that.

But I want to bring one thing in front of you. One, of course, is this is a violation of the Brown Act. This was not adequately posted, period. We are all out of compliance here.

Now, regarding the retirement facility. I'm 71. My friend here is 86. The retirement facility has 115 parking spaces for 145 residents. Are we assuming that seniors don't drive? Yes. I'm here to tell you that seniors drive. And guess what? If they can't park in

this fancy facility, they're going to park in front of my house. And I am not pleased.

Aside from that, I think this is a farce as well as far as posting is concerned. I mean, I'll reiterate, it's a violation of the Brown Act. Thank you.

Mr. Zola: We had somebody else back there. Did you want to speak?

Mr. Freedman: Yes. My name is Steve Freedman. I have expressed to various County officials on a number of occasions that I'm an interested party here. I've signed in at prior meetings, and I've communicated directly. When someone told me that there was a Notice of Preparation, when I heard about it, the period for taking testimony was already passed. But somebody told me, gave me Rick Kuo's name and contact with the County as the person responsible for this Notice of Preparation. And I called and e-mailed and had an exchange with Mr. Kuo wherein I asked for a copy of this Notice of Preparation. The response that I got, for the record, was that he didn't have any more copies of it.

Mr. Zola: Okay. I know you had a discussion with him --

Mr. Freedman: I'll go ahead, thank you. We've waited for a while.

With all due respect, I'm usually the most

polite and professional guy at meetings. You wouldn't believe me. The process -- I'm talking to process here.

In any case, Mr. Kuo told me -- as if little L.A. County didn't have a copying machine to make more copies, he said he didn't have any more copies. This evening he had a slightly other story about referring me to the consultant, which he did not do --

Mr. Zola: Let's leave that one --

(Overlapping Speakers.)

Mr. Freedman: No, no. Let's let me make my comments for the record, thank you. My frustration is not with you, sir. You're obviously well qualified to hold this meeting, but probably not aware of the background and what we go through on this.

None of the public, the few members of the public that are here, none of them to the best of my knowledge, received notice of this meeting. I have looked in this week's Argonaut and last week's Argonaut for the notification and was unable to find it. We have -- this small group of people are here because one person found out this morning over the telephone, I guess, that there was a meeting and she made a little network. So there are many members of the public that care about this process, and this should not be allowed as an excuse for a scoping meeting on this project.

I'm going to speak to process here. I'm not going to make substantive comments on this project tonight because I believe wholeheartedly that another scoping meeting has to be held with adequate, proper, appropriate notification to the public.

And my frustration, again, is not with you, Mr. Zola. You're obviously well qualified to hold this meeting, but you were not the one responsible for letting us know about it. This is a very disturbing matter.

I've been on record, as I said. I should be on the list of any people to be notified. You guys said, oh, you sent out notice, but it was like the Notice of Preparation, we don't have any more copies when I requested one. The public process, for the record, on this matter has been a complete sham, and I'm sorry to share my frustration with you and be a little out of line this evening in expressing my frustration, but this process is not working. It's not even broken.

The County is not acting in good faith. In fact, the County couldn't be acting in much worse faith over this matter in terms of bringing the public into the process. So I will not make any substantive comments for the record tonight other than to talk about the failure of process here. This meeting should have been postponed. Thank you.

Mr. Vandehoek: My name is Robert Vandehoek, V-A-N-D-E-H-O-E-K.

I'm also -- like the previous gentlemen, Steven Freedman -- reluctant to make any substantive comments because of the perception that then this can be called a scoping session; so I'm going to speak, though, but I still don't believe they should be considered substantive comments. I'm really making them for friends of the environment of the area here and not for the consultant to use to make --

Mr. Zola: Before you do that, let me suggest something that just popped into my mind because I think some of you are feeling a dilemma here. One, how do we get comments on the record that would be substantive comments without as you -- you didn't use these words -- legitimizing this meeting -- but I think that's what you're thinking.

Any written comments that will be received by the County over the next two weeks will become part of the record as if they were received during the review period during the Notice of Preparation. If it's more comfortable for you, provide those comments, refer to the Notice of Preparation, comment on the Notice of Preparation, then you don't have to refer to this meeting. And that will be taken as if it were a comment received

during that original review period. That might be one way of making --

Mr. Vandehoek: Thank you, but I want to address that comment because what you're doing is embracing or attempting to embrace the opportunity for people to have a way of writing to say that. But what you're not taking into account, and one of the reasons CEQA has an oral testimony or oral presentation method in its law, is that not everybody is good at writing, is feeling comfortable and can convey their thoughts well in writing. So to be genuine and truthful about a CEQA process means that you give every opportunity for oral comments to be made and that it be noticed properly to the public who you know are interested parties from the past years where they have correspondence and can prove they have had correspondence with the department on the various issues.

And so a genuine embracing way of Beaches and Harbors would be to take everyone who signed in at the Design Control Board for the last ten years or at the Craft Harbor Commission meetings and all of them be mailed and noticed and with a certified letter to each person so that you know that they got notice and so there's never a flaw; or so Beaches and Harbors and the County can never be held accountable that it didn't try genuinely to notify the public.

That's a little extra cost, but considering all the money the Marina makes, sending out a certified letter to perhaps a thousand people who demonstrated an interest in the last ten years so that they've been notified.

So I'm an example of a person who feels comfortable giving an oral testimony as well as a written testimony as well as getting a lawyer to do it, too, if needed.

So -- and I also feel I haven't really even said anything substantive yet, and I feel like I'm probably running on how much time you want to let a person have to talk on that, too. So I'll just say a couple things. But these are really for the general public listening here to become more empowered and not for, again, you to or the department to be able to say this is a scoping session.

In terms of a scoping session's purpose, it is meant for you to hear questions, too, about what concerns we have and to make sure everything is addressed on the environment, both physical, natural, and cultural-human environment, and to always have it in the context of the big picture or essentially the cumulative effects. And we're piecemealing. And there is no excuse by a department when it says, well, we don't know all the projects we're going to do in the next 20 years. Every scenario should be worked out about all the types of

projects the department will be doing, and they should all be considered together with this project or these two projects that you have planned to do an EIR on.

So, in terms of that, you should be looking at all these alternatives that help to have the Marina be healthy biologically, also culturally, sociologically and also the physical environment. So one definite alternative that should be looked at for the parking lot next to the lagoon, the OT parking lot, is removing the parking lot, digging it down ten feet deep to the depth of the lagoon and linking it. In other words, making the lagoon 125 percent larger than it currently is.

By doing that you will be able to improve the water quality for Mother's Beach because the more water that can flush into the lagoon the more it will help with pollution and cleaning. There's well-known science on wetlands to demonstrate that.

That would be your alternative, the premier environmental alternative, which every EIR now coming out of the United States always has something about what's the optimal alternative for the environment. And conducive to that or in conjunction with that, the tide gates at the entrance to the lagoon and that pass through the culvert that goes under the Ruby's restaurant parking lot has to be thought of as being opened up so the sunshine can shine

in on Ruby's parking lot's culvert; so when -- and the gates removed so the water can come in on a high tide to fill the lagoon and the area where the parking lot was. If you deepen and lower the parking lot to base level or ocean sea level so that you have a cleansing effect, as I mentioned before, and you've embraced the environmental consideration.

And that means invertebrates, small things like jelly fish that are in the Marina as well as higher animals like fishes. And we have a large White Sea Bass project the State of California has been funding for ten years now trying to bring back a fish called the White Sea Bass, and never has it been addressed how building the Marina even larger will work on the success of bringing back that fish as well as the documented more than 30 other kinds of fish that live in Marina waters currently.

Then you have the bird aspects. So in each sense you really want to understand the environment. You need to look at it from the perspective of how science and scientists do a biography of the White Sea Bass and how it moves around in the Marina. You need to have a biography done on the Black-crowned Night-Heron, a type of bird, so that it kind of will tell you cumulative impacts by places it flies around to in the Marina to nest, to die, to live, find its food, to rest, to sleep; all the various things

in the daily life and the whole life of that Black-crowned Night-Heron will tell you how you need to divide the Marina for that bird and some of the other birds and, in the same way, for some other selected animal groups.

You can't do it for all the thousand animals that are in the Marina. But we do know from the last 20 years of science that approximately a thousand species of marine life are living in the Marina if you include the sediment, (inaudible) and mud, the kind of water quality, the air above and then the trees that have been planted around the Marina. So that alternative needs to be considered.

And also I believe you need to write a no-action alternative as another paragraph. So the no-action alternative, keeping it the way it is with the parking lot intact, needs to be as long or perhaps even a bit longer than the alternative that's going to be written up for the development. That's obviously going to be your largest part of your report, talking about how this is going to work for the development. And you might have a hundred pages on the development and then you'll have a half a page on the no-action alternative. That's not genuine, that's not truthful; that's not the intent of CEQA to reduce the no-action alternative.

The no-action alternative, which means you leave

it the way it is, (inaudible) wholly and wholeheartedly and honestly. You can write a very lengthy document about all the ways the parking lot could help the public. As one topic you could have ten pages on if you made it a free parking lot that encouraged minorities and poor people to be able to park there so they could enjoy being able to walk among the wealthy there and enjoy the views; and the elderly and how will the parking be for people who are impaired, not just financially but impaired by older age or by handicaps and disabilities. So all those kinds of things, you could have a really genuine no-action alternative to keep it the way it is.

So those are two alternatives -- a no-action alternative and full environmental alternative -- that I see probably is not going to be addressed, and you may not take it to heart because you haven't had a real scoping public notification so you can hear more of the interest in those two alternatives. That's genuine for CEQA and it would prevent you from being successfully sued by the public because CEQA is a legal process and this enters into that legal process.

And I would hope that the written that's being recorded by the court reporter or the stenographer is put online, not edited but in its raw state; not interpreted but with hyphenated words she used or lines drawn through,

whatever, in her first presentation, her first recording of that. And then also a polished one should be there that's more structured, too, so people can understand the gist of what's been said here by Mr. Freedman, by Carla, by the two elder women here, distinguished women here.

Unidentified Female Speaker: Mature ladies --

Mr. Vandehoek: Mature ladies. (Laughter.)

Unidentified Female Speaker: -- from the Venice Neighborhood Council.

Mr. Vandehoek: So that covers it.

I want to add three things in: That a genuine and truthful analysis of how new sewage that's going to be created by more development and how the system and the sewage treatment is already maxed out here and will cost the public more moneys and more taxes to handle that; all the construction impacts, with noise and quality of life that will be disrupted during the building process; and, the genuine treatment of how much more calm life could be, you know, about 50 pages on calmness if no noise is done and no construction is happening and you get a no-action alternative.

Something else that's been bothering a lot of people here: Once one project is done and that noise is done, we have a new project. We have this year-round, ongoing noise, activity and dust. It keeps on going. New

ones come up and then another one. It's like it's an ongoing development without ever an end in the Marina.

I'll stop there.

Ms. Audet: You made a statement that there would be two weeks for written comment. I want to advise you and I want it on the record that the Venice Neighborhood Council meets on the 21st of August. If I can get this on the agenda, that gives people who are concerned only two days. This is very complicated material, and that's really not sufficient time for people to prepare well-thought-out comments.

Unidentified Female Speaker: Oh, good point.

Unidentified Male Speaker: And we haven't had the scoping hearing yet.

Mr. Zola: Okay. We've already been through that.

Unidentified Female Speaker: What are you going to do with it though?

Unidentified Female Speaker: I just want to say I've been a resident of the Marina for 30 --

Mr. Zola: We need you to identify yourself.

Ms. Davis: Gloria Davis. I ran for Congress in this district against Jane Harman. Most people know me on that basis.

I ran here and I've been here for 30 years, and I want to say that all this EIR and all this planning and

all this wonderful material that's been brought out by our wonderful supervisors, who are in mud up to their ears right now, all of them, all of this stuff is kept so quiet. And one of the biggest problems you've all had is that this community is awake now and we're finding out that we can get out and speak. We had a march last year and we got people out.

Look what's happening here just a few hours ago. People are being kept from knowing all this material, and it's obvious that because the public is coming out to speak, it's upsetting the plans of the supervisors and the people in the County. And this has got to stop because we're out to make noise, and we're sick and tired of being pushed around.

And all this information that's on here, the things that you've planned and the things you do without anyone coming in and giving their opinion of any ideas or plans, this isn't the way to run a community. And we've got to start getting wise and get out and get people involved. And that's what our problem has been. And now the Marina is alive and kicking, and we're not going to sit back and take it any more.

And this is why everybody, the few folks who have gotten notified are out here tonight and very (inaudible) about it. And Nancy and our leaders here,

Carla and Don and all the people that work so hard to get people out. We're not going to sit by and let you just run things into us. We care about our community, and that's about the way it's going to sit from now on. Right folks?

Mr. Zola: I think that's been real clear.

Ms. Vernon Marino: My name is Nancy Vernon Marino, M-a-r-i-n-o.

I would also like to add my objection to this hearing or this meeting today as being in any way, shape, or form a legitimate hearing. I don't know, there are six gentlemen in the room who have declined to speak. Two have identified themselves, one from Regional Planning, one from Beaches and Harbors. The other four I don't know. We don't recognize them from our active efforts, but it seems clear to me that, had not one of us discovered this well-hidden fact, that this meeting would have occurred and this process would have continued after tonight in the usual manner saying, oh, we held the scoping hearing and nobody came so this is our comments. And it just moves forward.

There is a violation of the Brown Act. I spoke to Mr. Kuo this afternoon and asked about notice. He could not tell me the name of your firm; he didn't happen to know it. He said that the EIR consultant had sent out

the notice. And I asked him who was responsible. He did not wish to answer that question. He accused me of being hostile. I said, I asked a question, and I just wanted an answer to the question.

There is a deliberate attempt to do things in secret. The County has negotiated with the California Coastal Commission in secret. This meeting is being held in secret. We found out this secret and we are here to say we know you held this meeting in secret. We have asked to be on the scoping list. We have asked to get the notice.

The lessee directly across the street from Parcel OT did not get notice, and he has a very specific interest in OT for his own overflow parking. He could not make it tonight. But I was the one who notified him, not the County. The County is in violation of the Brown Act in having this meeting.

We appreciate and apologize to you for the intensity of our anger and frustration, and really it is not personally against you. You could have had no idea of the scandal that is connected with all of the Marina development.

The biggest objection we have is there is no master plan for the Marina, which every reputable planner, architect, engineer, landscape architect, and reasonable

human being acknowledges is the optimum way to approach a community.

The initial study here lists major projects in the area only by project number. As if anybody knows what those are. I recognize Jamaica Bay, Del Rey Shores, Admiralty Apartments, Capri, probably Esprit I and II; I don't know what the sale of alcohol and expansion of the existing parking lot pending is. Perhaps -- I just don't know, that one is a big mystery to me.

Why are there only six projects listed on this when there are in fact 16 major projects on the County's list? I believe it's 17 now they've added the Parcel P Project. You have been given misinformation. Back when this Notice of Preparation was made, which was I believe March 1st, I think there were 18 projects on the County's Project Status Report. Are they lying to you? Have they given you misinformation? There is misinformation rampant throughout County-prepared documents.

The findings in the Coastal Commission's draft review of how the County is carrying out the policies of the LCP is rife with errors, including the designation of a parcel on Panay Way as congregate care when it has not been. It was approved for congregate care, it was built, but it was not occupied as congregate care. Everyone knows this except the California Coastal Commission.

There are 401 acres of land, but in another part of their findings 375. I have to tell you the County is giving misinformation. So whatever you have prepared, my position is it is null and void because it is based on misinformation or partial information or possibly outright lies. Whether they are deliberate or whether they are inadvertent is immaterial.

You cannot do what you are attempting to do in a competent and professional manner if you do not have good information to begin with. You do not have good information. The County is not interested in providing the truth. And we are saying that the entire process from the beginning is based on misinformation and done in a way so as to minimize public participation and County responsiveness to community input.

Possibly there is collusion with some of the lessees who are major developers and are just buying up lots of areas, lots of parcels outside the Marina, surrounding the Marina. And then, essentially, the County is selling this land; they're giving pieces for 60 years. We are so offended by this process.

You, Mr. Zola, must know House Document 385 establishes the mandate for Marina del Rey for a small craft harbor, recreational boating, and public recreation. The federal government was sold a bill of goods on this

because that's why they approved paying for half the cost of the harbor dredging and construction. The County, which funded the other half, floated a revenue bond to pay for the land-side improvements and their portion.

Mr. Zola: I've been trying not to -- just focus on the --

Ms. Vernon Marino: You have to know this information. You have to know this information. If you are going to do a competent professional job in preparing the EIR, you have to know the truth. We have come here. We want you to know the truth. And if you're not willing to hear the truth, then all I can assume is that you are not interested in doing a competent professional job, an ethical job of preparing an EIR.

The EIR that needs to be done is the EIR for a master plan for this community. That EIR will look at the entirety of proposed development and its impact not only within our community but in the area, the region. That is the proper way to do things. Doing things this way, in secret with misinformation, is a scandal. There really should be a State investigation into how the County is manipulating this process.

(Overlapping Speakers.)

Ms. Vernon Marino: They are taking more land --

Mr. Zola: Whoa, whoa. Wait. I understand --

Ms. Vernon Marino: This has to go on the record. And you as the environmental impact report consultant need to be aware of this going forward so you can make your professional consideration as to whether you want to be a part of this process. It is corrupt.

Do you as this consultant wish to be part of this corrupt process or do you wish to maintain your professional integrity by putting into your report or putting into your contract with the County something to protect your own professional reputation?

Mr. Zola: You've been very clear about that; so I'll try to steer you back to discussion about what ought to be in the document.

Ms. Vernon Marino: What ought to be in the document is a challenge to the County to provide accurate information, complete information, and provide a master plan to you first before you look into this particular individual project. That's what needs to be in your report, not in your EIR because the EIR, if you move forward with that EIR, basically condones the County's practices. And we are asking you, as a professional.

And we do appreciate the fact that you have apparently laid out a very pleasant environment for this meeting. Obviously, it would have accommodated quite a few people had they been informed.

Mr. Kuo, who is responsible for having made that public notice, has apparently failed in his responsibility. And we will take that up with others in the County. We're not asking you. However, what we would do is ask you to facilitate the getting of the list of people who were sent this notice.

As I said, the last time I did not get a notice from Regional Planning. I got kicked around for three months and dozens of e-mails and phone calls --

Mr. Zola: I got the request. Okay.

Ms. Vernon Marino: Okay. We want that list. In other things the list is actually published right along with the materials. So now we're a public record. The County doesn't do that however. You have to make a separate public information request. As I said, this last one took me three months. I have other public information requests. It takes too long because, by the time we get that information, this project -- this OT and 21 and I guess 20 is now mixed up in it, too -- is going to be so far along in the process it will be lost to us. We will have no ability to address it.

But we don't want just OT addressed. We need the entire Marina master plan addressed. Now, the County says that our LCP is the master plan. I have that here actually. This is our master plan.

And they said, this is our master plan. And I said, oh, good let's look at the environmental concerns. Okay. That and you have to open it and go to the page. Here is our environmental report. It says: "According to the sections of the Public Resources Code and the California Environmental Quality Act, this local implementation program is considered to be a functional equivalent to an environmental impact report and is therefore exempt."

Mr. Zola: Okay. Right. What you need to go to --

Ms. Vernon Marino: Now, okay, let's assume it would be exempt and this is the environmental equivalent or the, excuse me, functional equivalent of an EIR. Developers that the County is not following this LCP.

Mr. Zola: We got that comment, too.

Ms. Vernon Marino: And for your project, the land use is a problem. It is not allowed in our LCP; so there is nothing. There is no master -- there is no plan even that has looked at the cumulative impact of completely shuffling land use and placing open space on top of view corridors and stacking different developer's needs for open space one on top of the other. I think we're going end up with one open space in the entire Marina because the public is being doubled up.

Mr. Zola: Okay. I've got the cumulative part,

that's --

Ms. Vernon Marino: Okay. If you're going to do your EIR and consider all these things, then by all means, let's put all of this in your EIR. I'm sure the developer would be happy to pay for what the County should pay for, which is the master EIR.

All of these considerations apply to each and every project, including these ones. They need to be looked at. Not one or two together. I'm not quite sure what the correlation between OT and 21 is that allows them to be looked at as a pair --

Unidentified Female Speaker: One developer.

Mr. Zola: Well --

Ms. Vernon Marino: -- other than a convenience for the developer and allowing him to get a two-for-one and in the meantime making us go around to each one.

We need public notice. We need public outreach. There are currently projects which are directly impacting 35 percent of the land area of Marina del Rey and the promise of more to come. Why is the community unaware that this is happening? The reason -- that's a rhetorical question -- the reason is the County says that notice only needs to go to property owners within whatever the designation is.

Mr. Zola: Again, I'll try -- focus on the project,

the one we have.

Ms. Vernon Marino: Well, no. No. We are focusing on the process.

Mr. Zola: I'm sorry.

Ms. Vernon Marino: You said we would listen to you and you would let us talk about process. The process is key in all of this. You can't separate and say this EIR is just this EIR. That is what the County is doing. That is the process by which the County is usurping --

Mr. Zola: We've got that.

Ms. Vernon Marino: -- a huge hunk of the public land, public right.

There was a consultant's report back a couple of LCP's ago -- I don't remember, sometime in the 90's, I'd have to research and find it -- that discussed the possibility or the likelihood or the idea of once the revenue bond debt was retired, once everything was paid off, that the residential and commercial development which was allowed to service that bond debt would be eliminated and the County would revert this land back to recreational use. We would like to see at least an enhancement and an expansion of public use and not have this golden goose of the prime recreational and visual asset of L.A. County be piecemealed out to private development to become the backyard for the rich and the connected.

Mr. Zola: I got it.

Ms. Vernon Marino: Okay. That also needs to be in the report. If you want to put it in environmental concerns: What is the social cost of stealing the free and low-cost public opportunities for recreation and giving it to those who have more money?

Mr. Zola: Okay. We've got it.

(Overlapping Speakers.)

Ms. Vernon Marino: I thinks it's an economic cost. Look at New York City in the 1970's. They did the same thing. They allowed developers to put in far more than zoning codes allowed. They lost their tax base. The tax base fled the city. They lost their tax base. The people in the city couldn't afford to live there, they doubled up. The results were blight and crime.

We don't want this to happen. We want a viable community. We want to see revitalization and redevelopment. We do not want to see the County's version or vision of that redevelopment because it is myopic.

Mr. Zola: Okay. Again, now we're getting back to process. I got the environmental part.

Ms. Vernon Marino: You've got the environmental part, you don't get the process.

Mr. Zola: I think you've all been very clear on the process.

Ms. Vernon Marino: Okay. We are very, very angry with the County. I do not recognize the man from Beaches and Harbors. I have had some exchanges with Mr. Kuo, who, I might say -- and I will say this publicly -- has been very unaccommodating to requests for information. It needs to be addressed.

And if you can facilitate that being addressed and with this project at least get us started toward the road of having true public participation, my belief is this project needs to go back to the beginning to be properly noticed from the outset. There needs to be an RFP. This needs to be said. There needs to be an RFP and a public bid process for this parcel because the process is not legal, and the alternative --

Mr. Zola: Okay. Now, we're going back to the --

Ms. Vernon Marino: So your participation in the project would therefore be void.

Mr. Zola: Okay.

Ms. Vernon Marino: And your willing participation in the continuation of the process, I believe, would also not be legal. I think you ought to consult some counsel on that and find out what your liabilities would be. And I will stop there because I, I --

Mr. Zola: Okay.

Ms. Vernon Marino: I will stop there. I do have more to say though.

Mr. Zola: Oh, I think it's pretty clear all of you have more to say. And the challenge that was laid down is the public process.

What I'll try to do is summarize the points and kind of take all of what has been said and get it back to the question that we started with, which is what should the EIR do.

Ms. Vernon Marino: No.

Mr. Zola: I'll just try and summarize that. Okay.

Ms. Vernon Marino: No. That's against everything that was just said --

(Overlapping Speakers.)

Mr. Zola: Let me just try. I'll do the process parts, too, I promise. I'll summarize what we've heard.

A lot of the comments revolved around the noticing was unsuccessful, people did not know; you've been very clear about that.

(Overlapping Speakers.)

Mr. Zola: We have a totally written record, a literal record. We've got it.

Ms. Vernon Marino: Inadequate.

Mr. Zola: Okay, inadequate, but all the words are there, recorded.

Public outreach didn't exist, didn't work. The County needed -- I think one of the things that came up in terms of the environmental -- and I'll try to summarize this in terms of contents of the document, and I'll separate those from the process question.

The content of the document that there needs to be analysis of -- and I'm getting these in order not necessarily of importance -- the parking structures in relation to the comments of the Design Review Board that they did not want those five-level structures and the fact there is a number of them proposed; so we need a cumulative analysis as to how parking will be handled. Several of you talked about shortages of parking and the cumulative issues related to parking.

You all -- several of you also referred to inconsistencies with the coastal act or the coastal plan, the issue of what's in that plan; so that there needs to be an analysis of the consistency of the --

Ms. Vernon Marino: No.

Mr. Zola: I'll get to the cumulative part. I'll get there, I promise.

Ms. Vernon Marino: In your summary please put "violation of the LCP." It matters; language matters.

Mr. Zola: Okay. The question is: Is there an analysis of is this consistent with and, if it's

not consistent with (inaudible).

We need to address -- the reference was to community impacts, and someone mentioned impacts on a sense of community; what do these projects mean -- and we'll get to the cumulative part -- on sense of community, impacts on seniors. How do we ensure that project requirements are in fact enforced related to this project, related to past projects. A lot of that was brought up.

A lot of concern with piecemeal evaluation of parking but also piecemeal evaluation of projects within the harbor and the need for a master plan; evaluate an entire master plan. Make sure that when we're evaluating individual requests -- or evaluating an individual request in light of everything that is going to happen throughout the harbor and making sure that all of the list of cumulative projects is complete and accurate.

There were some comments related to the need to evaluate relationship of the project into strategic plans related to some of the environmental enhancement, such as at Mother's Beach.

There was a concern regarding the harbor, I think overall, and that was a cumulative master plan: Is there adequate support facilities -- hospitals and those types of facilities -- to support the residential community?

Need for beach parking which relates back to the cumulative parking analysis.

Desire to have effects on people in the surrounding community evaluated. And that came up -- that same phrase was used in relation to noise and construction, and we'll get to the construction part a little bit later -- but also traffic increases and what are the effects of increase in traffic on people in the surrounding community; that also relates to air quality emissions or air emissions, pollutant emissions from increased traffic.

Better noticing of the community is how I wrote it down. I think some of you would say noticing of the community.

There was a reference to letters that had been submitted, making sure they're part of the record.

Issues related to some people mentioned violation of the Brown Act; another process issue.

One specific issue related to parking for senior facilities, an analysis. Is the number of parking spaces proposed actually adequate for the senior facility as it's being proposed?

Lack of notice issues. And you've all stated various frustrations with the County. No notices --

Ms. Vernon Marino: You're whitewashing what we've

said.

Mr. Zola: Okay. It's all going to be written; it's all going to be the actual words.

Ms. Andrus: I would like a copy of that.

Mr. Zola: Okay. You -- let me finish my notes here.

You talked about the accuracy of the cumulative -- the problem is, as I'm writing notes and I'm reading them, the one thing I can't express in writing them is the emotion with which you spoke, and that's one of the reasons I'm saying this so that's part of the written record. We'll all know that there was a lot of passion and a lot of emotion in your comments.

Ms. Andrus: I could submit this to the Board of Supervisors.

Mr. Zola: We talked about -- oh, in terms of noticing, to take a cumulative list of everyone who's attended meetings in the harbor and use that as a mailing list; use certified notices so it's clear not only what went to who but who got them.

A lot of comments about making sure environmental documents address the big picture items and concerns with piecemealing. So we need to develop scenarios of what will occur throughout the Marina affects outside the Marina, what happens inside, and not just looking at one project and then one project and one

project.

And that also was an issue in terms of temporary construction impacts; that the noise of that construction may be temporary, but as soon as it ends, you've got another project and another project so the noise is not temporary at all.

An alternative that needs to be looked at, it was commented there needs to be looked at an alternative for the parking lot that would be removal of the parking lot and to effectively increase the size of the lagoon which would improve water quality; that would lead to an analysis of what is the effect of the projects on fish and birds within the Marina and throughout the Marina; that you can't look at individual projects and get an accurate picture of what happens overall. That same issue was raised many times in a lot of different ways regarding cumulative.

The other alternative that, based on CEQA, will be addressed -- I think it was a concern as to how it will be addressed -- is the no-action alternative; no project. There needs to be more than one paragraph; it needs to be evaluated in detail. The suggestion was that it be evaluated maybe adding some more, but essentially an equal level of detail to the project but definitely a more detailed analysis of what happens if no project is

approved and things remain as they are.

The full transcript of this meeting needs to be on a website, needs to be made available.

The EIR should include an analysis of sewage treatment.

The cumulative impacts that would be in relation to noise, and the need to identify that it's not just temporary if another project and another project and another project; that in some cases the noise may be constant as one project ends and another one starts.

All the comments about we need another scoping meeting. We did a scoping meeting, but this should not count as a scoping meeting.

We need a clear listing of cumulative projects. There was a concern that when it's by number, it doesn't let the public know what they are, and there also doesn't seem to be a complete listing. So in the environmental document all the projects going on throughout the Marina need to be listed and described in a way people can understand what those projects are. And projects outside the Marina that can affect inside, to get the relationships --

Ms. Andrus: And also other anticipated projects that are known. That's why you need the master plan.

Mr. Zola: I think what I've -- the evaluation in

terms of the master plan -- that we need to make sure that the description of adjacent uses and all the factual bases for the analysis in the EIR is in fact factual; that the baseline information that has already been presented may not be accurate; so it all needs to be rechecked to make sure the baseline and all the basic information is accurate and complete. And to evaluate the consistency of projects with the original mandate for Marina del Rey.

And the statement was made that the EIR that needs to be done is an EIR for the entirety of Marina del Rey and its regional impacts, and only then can you really evaluate an individual project on an individual site in relation to that. I think someone used the phrase "master EIR".

We need complete and accurate information, and we need complete and accurate information on an overall plan for the Marina to use as a baseline for the analysis of this project.

We need to facilitate getting notification lists made available so people can see that. And, then, to evaluate impacts on view corridors, again, in the cumulative analysis so that somebody can see and understand what all of the projects throughout the harbor or throughout the Marina mean when you put them all together. So --

Ms. Andrus: You missed one thing, very important, and that was how this affects the whole County when this is supposed to be a recreational resource for the people of Los Angeles, and we haven't considered what impact that is on them and their resource.

Mr. Zola: Right. I did have that; page 6. Need to address -- and it was referred to as an alternative of increasing public recreation use and evaluate the effects on regional recreation.

Ms. Andrus: Well, maybe to --

(Overlapping Speakers.)

Mr. Zola: All the words that you had are there.

(Overlapping Speakers.)

Ms. Vernon Marino: What about the process and the order of process?

Mr. Zola: Okay. We've been very clear on the process part.

Ms. Vernon Marino: I don't think you have.

Mr. Zola: What I'm going to do is -- I know that this has been difficult for you; this hasn't been the easiest one of these I've ever known. But the comments that you've made, the passion that you've made them with -- obviously, we've got a couple members of the County staff here or the -- they will make their decision

in terms of the issue that you raised about the scoping meeting: Is this it? Is this not it? That's ultimately the decision that the County will make.

Ms. Andrus: What is your recommendation going to be?

Mr. Zola: I don't know enough about -- as you said, I don't know enough about what the noticing was. It's certainly something to look at --

(Overlapping Speakers.)

Mr. Zola: So the next step out of this process, another scoping meeting or not another scoping meeting. There will be an environmental impact report that will be distributed at some point regarding this project.

Ms. Andrus: That's the next step here? No.

Mr. Zola: I said -- come on, be fair. I did say another meeting or not another meeting, then -- but that's the decision the County will need to make. After that decision is made, I guess there will either be a scoping meeting or you will see --

Ms. Andrus: Or back to the RFP.

Mr. Zola: Or -- okay. Or back to the RFP.

At some point, wherever it is, an EIR will be distributed; there will be opportunity for public review. You will look then in that EIR and comment, and it will be available for public comment. You will get written comments back to the County. That process should be --

right now it looks like that will be occurring in the fall of this year, later in the year.

The next step after that is the County will respond to each of the comments it received on the EIR, and then a final EIR that includes the draft EIR the public saw, the public's comments, and the responses to the comments will be made available with a public hearing. And then starting at the Regional Planning Commission in probably early next year and then sometime after that at the Board of Supervisors. So those are the various points for public comment. Written letters to the Department of Regional Planning will be part of the record also.

So with that, I know you're going to want to keep going, but --

Ms. Vernon Marino: You've missed the key thing that I -- .

(Overlapping Speakers.)

Ms. Vernon Marino: Maybe we haven't said it properly.

Mr. Zola: Everything you've said is on the record.

Ms. Vernon Marino: The fact that there is an LCP, a certified LCP, which is our law; that is our law that has been violated. Everything that comes beyond that --

Mr. Zola: Hold on. I've got that.

(Overlapping Speakers.)

Ms. Vernon Marino: That wasn't in anything that you reflected back to us.

Mr. Zola: There is a request -- we started with there is one request to amend the LCP. It is legal to amendment the LCP.

Ms. Vernon Marino: The public needs to be involved in that process. And they are doing all of this first. That is not ethical.

(Overlapping Speakers.)

Mr. Zola: Hold on. You have been very clear on that point.

Ms. Vernon Marino: Okay. So why is that not reflected back to us in your summaries? We want to hear that reflected back so at least we know that you got it. Okay? We want to know that you got it. And in everything that you read back to us, it is glaringly absent.

Mr. Zola: You have been clear on it. I'm not going to get into a debate until we get the exact words that you want to hear. With that, your words are on the record exactly. I know you have other questions. I think to get back into a debate is not going to get anywhere.

The process -- I've described the process and what will happen from here. You have been clear. You want to go back to the beginning of the process in terms of what you said --

Ms. Vernon Marino: But we want your report to reflect that the public concern is that that EIR is being pursued outside what is legally and ethically appropriate.

Mr. Zola: Now we have those exact words.

Ms. Vernon Marino: Okay. And that is on the record.

Mr. Zola: Yes. With that --

Ms. Audet: I have a question. I want to know what your role is.

Mr. Zola: Okay. I said it at the very beginning of the meeting. My role was to get from 6:00 o'clock at the beginning of this meeting to the end of this meeting and to make sure that there is a record -- which there is now -- of the concerns. And I'll say it this way so, hopefully, we won't argue: Of those who are here what concerns you have about what ought to be done with the environmental document being prepared for those projects.

And with that I will --

Ms. Audet: No. What are you going to do? You have some notes. You're going to take those notes to some other place, you're going to (overlapping speakers) and make a report to somebody?

Mr. Zola: Yes. And that I should have said. The notes that I have made, I have read back on the record. We've debated them, filled them in, we've got other pieces of them.

Ms. Audet: Well, you haven't filled in mine because you didn't state what I said accurately.

Mr. Zola: Okay. We also have everything that you said literally word for word; that will be part of the very same record.

Ms. Vernon Marino: Maybe -- let me just make an observation because you have to -- they're going to read your summary; that's what they're going to read. They're not going to read the transcript; they don't care what we've said.

(Overlapping Speakers.)

Ms. Vernon Marino: We want your notes. That's why we're challenging you on your notes. Because we want your notes to correctly reflect what we've said.

Mr. Zola: If you will let me --

Ms. Audet: I want to sit down. I'm an old lady and I need to sit down. I just want to tell you -- do you have an address where we can reach you?

Mr. Zola: I will give you my business card.

Ms. Audet: All right.

Now, the next thing is what I said was that increasing the density of the Marina places a burden on the surrounding, an environmental burden on the surrounding community. And I want to see those words in your notes and in your report.

Mr. Zola: The answer to your question was the record of my report is going to be the transcript that you have here. So my report on this meeting includes everything all of you said, literally. I am not going to attempt -- other than the summary and letting you know that I was in fact trying to keep track of what was going on and trying to take some of the concerns you had, such as yours which is a comment on an environmental concern, and then what is it we need to do in terms of scoping report and the document.

So your concern is this is the impact and we need to do an analysis.

And with that, I will actually thank you for being here. This has been helpful. There's project information here. So with that --

(Overlapping Speakers.)

Mr. Freedman: I've raised my hand for a long time. I didn't jump in, I raised my hand.

I just wanted to say that I thought, considering how rapidly you were going, your notes were reasonably good. I think one observation I have about the public comment as reflected in your notes is that there were precious few comments about Parcel OT and Parcel 21; there were some, but precious few. Most of us were expressing other concerns because we were not noticed about this

meeting; so you weren't getting general concerns. We have concerns about Parcel 21 and Parcel OT as well, and if we spent as much time talking about them --

(Overlapping Speakers.)

Mr. Zola: Did you have a comment?

Mr. Hickman: Yes. I just wanted to introduce the other people that are here and to clarify Mr. Zola's role in the process.

This gentleman right here is Toby Moses, the architect on the project. This is Travis Cullen, he's the environmental -- he's the Chief Operating Officer of Envicom, who is the firm preparing the environmental work and the environmental impact report.

My name is Frank Hickman, I am Director of Real Estate Development from Goldrich & Kest.

(Whereupon, at 8:10 p.m.,

the meeting was concluded.)

TRANSCRIPTIONIST'S CERTIFICATE

I, Debra L. Presutti, do hereby certify:

That the foregoing proceeding was transcribed into typewriting under my direction and supervision;

And, I hereby certify that the foregoing transcript is a full, true and correct transcript of those proceedings.

In witness thereof, I have hereunto subscribed my name this 27th day of August, 2007.

D. Presutti

Debra L. Presutti

COUNTY OF LOS ANGELES

FIRE DEPARTMENT

1320 NORTH EASTERN AVENUE
LOS ANGELES, CALIFORNIA 90063-3294

(323) 890-4330

P. MICHAEL FREEMAN
FIRE CHIEF
FORESTER & FIRE WARDEN

January 27, 2009

Mr. Michael Tripp
Department of Regional Planning
Special Projects Section
320 West Temple Street
Los Angeles, CA 90012

Dear Mr. Tripp:

DRAFT ENVIRONMENTAL IMPACT REPORT, SUBJECT: ENVIRONMENTAL REVIEW AND COMMENT, OCEANA RETIREMENT FACILITY AND HOLIDAY HARBOR COURTS, MARINA DEL REY PARCELS OT AND 21, PROJECT NOS. R2006-01510 AND R2006-02726, STATE CLEARING HOUSE NUMBER 2007021133. MARINA DEL REY (FFER #200800326)

The Draft Environmental Impact Report has been reviewed by the Planning Division, Land Development Unit, Forestry Division, and Health Hazardous Materials Division of the County of Los Angeles Fire Department. The following are their comments:

PLANNING DIVISION:

1. We have no comments at this time.

LAND DEVELOPMENT UNIT:

1. We have no comments at this time.

FORESTRY DIVISION -- OTHER ENVIRONMENTAL CONCERNS:

1. The statutory responsibilities of the County of Los Angeles Fire Department, Forestry Division include erosion control, watershed management, rare and endangered species, vegetation, fuel modification for Very High Fire Hazard Severity Zones or Fire Zone 4, archeological and cultural resources, and the County Oak Tree Ordinance.

2. The areas germane to the statutory responsibilities of the County of Los Angeles Fire Department, Forestry Division have been addressed.

HEALTH HAZARDOUS MATERIALS DIVISION:

1. We have no comments at this time.

If you have any additional questions, please contact this office at (323) 890-4330.

Very truly yours,

FRANK VIDALES, ACTING CHIEF, FORESTRY DIVISION
PREVENTION SERVICES BUREAU

FV:lj

Tripp, Michael

From: Johanna Falzarano [jfalzarano@envicomcorporation.com]
Sent: Wednesday, January 28, 2009 11:29 AM
To: Tripp, Michael
Subject: MDR OT/21 Comments - Sanitation Districts

Michael,

I have been contacting the agencies on the Distribution List, and below please find the first of the returned "comments." Please save this for your records, because as indicated, the Sanitation Districts of Los Angeles County is not a reviewing agency or provider of service for Marina del Rey.

I will be in touch regarding the remaining comments and/or confirmations of "no comment."

Thank you,
Johanna

Johanna N.M. Falzarano, Associate Project Manager
Envicom Corporation
28328 Agoura Road
Agoura Hills, CA 91301
Tel: 818.879.4700
Fax: 818.879.4711

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Begin forwarded message:

> **From:** "Frazen, Ruth" <RFrazen@lacsd.org>
> **Date:** January 28, 2009 11:24:02 AM PST
> **To:** <jfalzarano@envicomcorporation.com>
> **Subject: Marina del Rey Area Development Projects**
>
> FYI
>
> The Sanitation Districts of Los Angeles County do not serve the Marina del Rey area. Please contact the City of Los Angeles for regional sewer and treatment plant information for this area.
>
> ---
>
> Ruth I. Frazen
> Customer Service Specialist - Will Serve Program
> Facilities Planning Department
> Sanitation Districts of Los Angeles County
> P.O. Box 4998, Whittier, CA 90607-4998

(562) 908-4288 x2717
(562) 695-1874 FAX
email: rfrazen@lacsd.org

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900 SOUTH FREMONT AVENUE
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http://dpw.lacounty.gov

GAIL FARBER, Director

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

January 29, 2009

IN REPLY PLEASE
REFER TO FILE: LD-1

TO: Paul McCarthy
Department of Regional Planning

Attention Michael Tripp

FROM: Steve Burger
Land Development Division
Department of Public Works

SCREENCHECK DRAFT ENVIRONMENTAL IMPACT REPORT (SDEIR)
MARINA DEL REY OCEANA RETIREMENT FACILITY
AND HOLIDAY HARBOR COURTS
PROJECT NOS. R2006-01510 AND R2006-02726
MARINA DEL REY PARCELS OT AND 21

As requested, we reviewed the SDEIR for the proposed projects. The proposed Oceana Retirement Facility for Parcel OT, with a 114-unit-retirement facility, is located on a 2.10-acre site on Admiralty Way in the Oxford Development Zone. The Holiday Harbor Courts commercial development for Parcel 21 is located on a 2.55-acre site on Panay Way.

The following comments are for your consideration:

Hazards–Flood

- Section C-Water Quality, Mitigation Measures, Temporary Construction Impacts, WQ-2, page IV.C–10:

  The statement should be revised to read as follow, "The applicant shall prepare a Stormwater Pollution Prevention Plan and grading plan and submit them to Public Works' Land Development Division for review and approval."

Prior to release of the DEIR the following shall be done:

1. The applicant shall prepare a drainage concept, Standard Urban Stormwater Mitigation Plan, and a low-impact development plan and submit them to Public Works' Land Development Division for review and approval.

2. Additional mitigation measures shall be incorporated, if required, for compliance with Total Maximum Daily Load and the Low Impact Development Ordinance, No. 08-2008.

For additional flood comments, please see attached. If you have any further questions regarding flood comment, please contact Lizbeth Cordova at (626) 458-4921, Extension 3764.

Hazards–Water Quality

- The description of water quality limited segments of Marina del Rey in Section C, Water Quality, is incomplete in the narrative and in Table IVC-1. This section only identifies Mother's Beach as water quality impaired for bacteria when the correct description should be for all three Back Basins D, E, and F as well as for Mother's Beach. The most appropriate reference for this information should be the Total Maximum Daily Load regulations for Marina del Rey posted on the website of the Los Angeles Regional Water Quality Control Board.

- The proposed mitigation measures for surface water impacts only address temporary construction impacts due to grading and other construction activities. Mitigation of post-construction operation impacts are proposed only to address trapping debris, sediment, oil/grease, and floating solids. Mitigation measures should also be specific about controlling and treating runoff that may be laden with pathogenic or toxic pollutants for which Total Maximum Daily Loads are presently in effect.

- The Consistency Discussion in Table IVK-2, proposes that development of Parcel OT would include landscape and pedestrian/bikeway access along the east side of the parcel adjacent to Oxford Retention Basin. The County of Los Angeles has future plans to enhance the landscape and construct recreational amenities on the perimeter of Oxford Retention Basin. The development proposal for Parcel OT will likely require review by other County departments to ensure consistency with the vision of the County's future plans for Oxford Retention Basin.

If you have any questions regarding water quality comments, please contact Greg Jaquez at (626) 458-5918.

Services–Utilities/Water

- Water service to Marina del Rey is provided by the Marina del Rey Water System not Los Angeles County Waterworks District No. 80.

- The issued Will Serve letters for the proposed projects do not guarantee adequacy of the existing system for the proposed demand. The Will Serve letters stated that water system improvements will be required to be installed by the developer subject to the requirements set by the Fire Department and the District.

- The SDEIR should evaluate project impacts based on existing water demand and not based on approved development potential water demand. The increase in water demands and potential increase in fire protection should be evaluated independently for both projects and mitigation measures shall incorporate water system improvements/upgrades.

- Parcel OT–The SDEIR should address the conflict between the existing 14-inch water main and the proposed facility. Mitigation measures shall include the relocation and upsizing of the existing 14-inch water main along the eastern property line from Washington Boulevard to Admiralty Way.

- Parcel 21–Panay Way has a single 10-inch water main with limited fire protection capacity. We cannot determine adequacy of existing system to provide fire protection until project fire demands are determined by the Fire Department. Infrastructure requirements should be determined based on required level of fire protection and include in the SDEIR.

- Construction of on-site facilities shall meet all health and safety codes, and all domestic water service meter and fire protection connections shall have a backflow device to prevent contamination of the public water system.

If you have any questions regarding utilities/water comments, please contact Ramy Gindi at (626) 458-3331.

Services-Sewage Disposal

The SDEIR should discuss the collection and disposal of the wastewater that would be generated within the proposed project area especially its potential impact on the available capacity in the existing local sewer lines for both peak dry-weather and

wet-weather flows pursuant with the Statewide General Waste Discharge Requirements (Order No. 2006-0003). The SDEIR should also include discussion on the impact of the proposed project on the existing local and trunk sewer facilities.

Public Works' Marina Sewer Maintenance District is responsible for the operation and maintenance of the local Sewers within the unincorporated Marina del Rey. All proposed Sewer construction should comply with Public Works' sewer design standards.

If you have any questions regarding sewer comment, please contact May Hong at (626) 300-3388.

Other-Environmental Safety

- **Hazardous Waste**

  The proposed project may generate household hazardous waste, which could adversely impact existing Hazardous Waste Management infrastructure. This issue should be addressed and mitigation measures provided. Mitigation measures may include, but are not limited to, providing tenants with educational materials on the proper management and disposal of household hazardous waste. The project proponent may contact Public Works for available educational materials by calling 1(888) CLEAN LA.

- **Storage Space for Recyclables**

  The California Solid Waste Reuse and Recycling Access Act of 1991, as amended, requires each development project to provide an adequate storage area for collection and removal of recyclable materials. The environmental document should include/discuss standards to provide adequate recyclable storage areas for collection/storage of recyclable and green waste materials for this project.

- **Industrial Waste/Storm water**

  Should any operation within the subject project include the construction, installation, modification, or removal of industrial waste treatment or disposal facilities and/or storm water treatment facilities, Public Works' Environmental Programs Division must be contacted for required approvals and operating permits.

If you have any questions regarding environmental safety comment, please contact Corey Mayne at (626) 458-3524.

If you have any other questions or require additional information, please contact Toan Duong at (626) 458-4945.

MA:ca
P:\CEQA\CDM\DRP – Marina Del Rey Oceana Retirement Facility and Holiday Harbor Courts -SDEIR.doc

Tripp, Michael

From: Johanna Falzarano [jfalzarano@envicomcorporation.com]
Sent: Thursday, January 29, 2009 7:52 AM
To: Tripp, Michael
Cc: fdhickman@gkind.com
Subject: MDR Sheriff's Station - Fwd: EIR Oceana Retirement Facility and Holiday Harbor Court

Michael,

The Marina del Rey Sheriff's station has no comment, see below. According to Lt. Gautt, Tom Bellizia from the Sheriff's Department (Fremont Station) is on vacation, but I am trying to track down any correspondence he may have left with a fellow employee.

Johanna

Johanna N.M. Falzarano, Associate Project Manager
Envicom Corporation
28328 Agoura Road
Agoura Hills, CA 91301
Tel: 818.879.4700
Fax: 818.879.4711

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Begin forwarded message:

From: "Gautt, Reginald D." <RDGautt@lasd.org>
Date: January 28, 2009 5:31:21 PM PST
To: <jfalzarano@envicomcorporation.com>
Subject: EIR Oceana Retirement Facility and Holiday Harbor Court

Dear Ms. Falzarano, per our conversation, relating to the Oceana Retirement Facility and Holiday Harbor Court project. Marina del Rey Station has no comment related to the EIR **DRAFT**.

Reginald D. Gautt
Operations Lieutenant
Marina del Rey Station
13851 Fiji Way
Marina del Dey CA 90292
(310) 482-6091 Cell (310) 962-2913

e-mail: rdgautt@lasd.org
Leadership is contagious.
~Gil Atkinson

COUNTY OF LOS ANGELES
Public Health

JONATHAN E. FIELDING, M.D., M.P.H.
Director and Health Officer

JONATHAN E. FREEDMAN
Chief Deputy

Environmental Health
ANGELO J. BELLOMO, REHS, Director

ALFONSO MEDINA, REHS
Director of Environmental Protection Bureau

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Third District

Don Knabe
Fourth District

Michael D. Antonovich
Fifth District

January 12, 2009

Mr. Michael Tripp
Special Projects Section
Los Angeles County
Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012

RE: **The Oceana Retirement Facility and Holiday Harbor Courts, Marina del Rey Parcels OT and 21, State Clearinghouse No. 2007021133**

Dear Mr. Tripp:

This is to inform you that upon review of all documents forwarded to our program by you and upon visiting the proposed project site location at the above address, it appears that the proposed construction project will have a significant noise impact upon the surrounding community during the grading and construction of the site. However, the surrounding community will have no significant noise impact on the above project.

The Screen-check Draft Environmental Impact Report (EIR) identifies two significant impacts before mitigation in the air quality element of the EIR. This document will address the mentioned Cumulative Air Quality and Local Significance Thresholds Impacts.

This document is not a health impact assessment. The recommendations given in this report are measures that should minimize the identified impacts in the air and noise elements of the EIR.

Oceana Retirement Facility and Holiday Harbor Courts
Marina del Rey, CA 90292

The following comments and recommendations are therefore presented:

1. Construction activities should be restricted between the hours of 8:00 A.M. and 5:00 P.M. in order to minimize construction and haul route activities that would increase noise disturbance on surrounding residential and commercial land.

2. All construction equipment, fixed and mobile, shall be in proper operating condition and fitted with standard silencing devices. Proper engineering noise controls should be implemented when necessary on fixed equipment. It is recommended that a monitoring program be implemented by the applicant to monitor mobile sources.

3. It is recommended that the occupants of the surrounding sensitive land use be informed of the anticipated duration of the project, noise impact and any other pertinent information where people can register questions and complaints.

4. The project applicant shall post a notice at the construction site. The notice shall contain information on the type of project, anticipated duration of construction activity, and provide a phone number where people can register questions and complaints.

5. Pile drivers used during the foundation construction are required by building code regulation and therefore vibration impact and high intensity repetitious intrusive noise is expected and unavoidable. In order to minimize the impact associated with pile drivers it is recommended that such construction activity be limited to the hours of 8:00 A.M. and 4:30 P.M. Also, if economically feasible, the use of a noise attenuation barrier around the pile driver should be implemented.

6. Staging and delivery areas should be located as far as feasible from existing residences and should be schedule to take place from the mid-morning to mid-afternoon to take advantage of times when residential zones are less susceptible to annoyance from outside noise.

7. Maintaining equipment in an idling mode shall be minimized. This practice helps minimize the impact associated with noise engine, particulate matter and green gas emissions.

8. Any semi-stationary piece of equipment that operates under full power for more than sixty minutes per day shall have a temporary ¾ inch plywood screen if there is a direct line of sight to any residential bedroom window from the equipment to homes along the perimeter of the construction site.

Oceana Retirement Facility and Holiday Harbor Courts
Marina del Rey, CA 90292

Particle matter emissions (PM_{10} and $PM_{2.5}$) and Greenhouse Gases

The evaluation of particle emissions are now being routinely addressed in preliminary environmental impact reports. Recent research shows significant health risk to populations including children and people of advanced age when exposed to these pollutants. As a result environmental impact reports, including this report, should now address these issues.

The proposed project may result in exposure to these particle emissions to the surrounding community especially during the construction phase of the project, which may include people that belong to high risk populations.

a. Configure construction parking to minimize traffic interference.

b. Schedule construction activities that affect traffic flow on the arterial system to off-peak hours as permitted.

c. Consolidate truck deliveries when possible.

d. Maintain equipment and vehicle engines in good condition and in proper tune according to manufacturers' specifications and per SCAQMD rules, to minimize exhaust emissions.

e. Suspend use of all construction equipment operations during second stage smog alerts. Contact the SCAQMD at 800/242-4022 for daily forecasts.

f. Use electricity from power poles rather than temporary diesel- or gasoline-powered generators.

g. Use methanol- or natural gas-powered mobile equipment and pile drivers instead of diesel if ready available at competitive prices.

h. Use propane- or butane-powered on-site mobile equipment instead of gasoline if readily available at competitive prices.

If you have any questions, please contact Evenor Masis at (626)430-5435.

Cole Landowski, M.S., CIH
Head, Environmental Hygiene Program

From: "Bellizia, Thomas W." <TWBelliz@lasd.org>
Date: February 5, 2009 2:54:46 PM PST
To: <jfalzarano@envicomcorporation.com>
Subject: LA County Sheriff's Response to Oceana Retirement facility & Holiday Harbor Courts Project Draft EIR

Ms. Falzarano,
I am providing you with this e-mail in order to respond to your request for a statement from the Los Angeles County Sheriff's Department (LASD) regarding the Oceana Retirement Facility & Holiday Harbor Courts Project Draft EIR. As we discussed over the telephone this afternoon, we believe that the comments submitted in March of 2007 by Captain Mary Campbell, of the Marina Del Rey Sheriff's Station, adequately address LASD's concerns with this project. These comments are referenced in Section IV. M. 7. Fire/Sheriff Services, of the Draft EIR. After review of this section by Marina Del Rey Station and this office, we have concluded that no further comments are necessary at this time. However, we reserve the right to make additional comments in future reviews.

If you have a questions regarding this matter you may contact me directly at (626) 300-3021.

Regards,

Tom Bellizia
Los Angeles County Sheriff's Dept.
Facilities Planning Bureau
(626) 300-3021
(323) 415 -1985 fax
twbelliz@lasd.org

COUNTY OF LOS ANGELES
FIRE DEPARTMENT

5823 Rickenbacker Road
Commerce, California 90040-3027

DATE: March 25, 2009

TO: Department of Regional Planning
Permits and Variances

PROJECT #: CUP R2006-02726

LOCATION: Parcel 21 - 14025 Panay Way, Marina Del Rey

☐ The Fire Department Land Development Unit has no additional requirements for this permit.

☒ The required fire flow for this development is **5000** gallons per minute for **5** hours. The water mains in the street fronting this property must be capable of delivering this flow at 20 psi residual pressure. **3** Hydrant(s) flowing simultaneously may be used to achieve the required fire flow.

☒ The required fire flow for private on-site hydrants is **2500** gallons per minute at 20 psi. Each private on-site hydrant must be capable of flowing **1250** gallons per minute at 20 psi with two hydrants flowing simultaneously, one of which must be the furthest from the public water source.

☒ Verify **1** Install **TBD** 6" X 4" X 2 1/2" fire hydrant, conforming to AWWA C503-75 or approved equal. All installations must meet Fire Department specifications. Fire hydrant systems must be installed in accordance with the Utility Manual of Ordinance 7834 and all installations must be inspected and flow tested prior to final approval.

☒ **Comments:** THIS PROJECT IS CLEARED BY THE FIRE DEPARTMENT FOR PUBLIC HEARING.

☒ **Location:** 1. Verify the nearest existing public fire hydrant to the property.
2. Once the location of existing public fire hydrants is confirmed, the number and location of new fire hydrant installations will be determined.

☒ **Access:** 1. Submit architectural plans to the Fire Prevention Engineering Division in Hawthorne for review and approval prior to building permit issuance. For submittal requirements contact (310) 263-2732.

☒ **Special Requirements:** THE FOLLOWING ITEM SHALL BE SUBMITTED TO THE FIRE DEPARTMENT LAND DEVELOPMENT UNIT FOR REVIEW AND APPROVAL PRIOR TO ISSUANCE OF A BUILDING PERMIT:

1. An original Fire Flow Availability form (Form 196).

Fire Protection facilities; including access must be provided prior to and during construction. Should any questions arise regarding this matter, please feel free to call our office at (323) 890-4243.

Inspector: SCOTT JAEGGI

COUNTY OF LOS ANGELES
FIRE DEPARTMENT

5823 Rickenbacker Road
Commerce, California 90040-3027

DATE: March 26, 2009

TO: Department of Regional Planning
Permits and Variances

PROJECT #: CUP R2006-01510

LOCATION: Parcel OT - 4420 Admiralty Way, Marina Del Rey

☐ The Fire Department Land Development Unit has no additional requirements for this permit.

☒ The required fire flow for this development is 5000 gallons per minute for 5 hours. The water mains in the street fronting this property must be capable of delivering this flow at 20 psi residual pressure. 3 Hydrant(s) flowing simultaneously may be used to achieve the required fire flow.

☒ The required fire flow for private on-site hydrants is 2500 gallons per minute at 20 psi. Each private on-site hydrant must be capable of flowing 1250 gallons per minute at 20 psi with two hydrants flowing simultaneously, one of which must be the furthest from the public water source.

☒ Verify 2 Install TBD 6" X 4" X 2 1/2" fire hydrants, conforming to AWWA C503-75 or approved equal. All installations must meet Fire Department specifications. Fire hydrant systems must be installed in accordance with the Utility Manual of Ordinance 7834 and all installations must be inspected and flow tested prior to final approval.

☒ **Comments:** THIS PROJECT IS CLEARED BY THE FIRE DEPARTMENT FOR PUBLIC HEARING.

☒ **Location:** Verify and perform Fire Flow Availability tests on the following:
1. The nearest existing public fire hydrant on Admiralty Way. (LAC Waterworks)
2. The nearest existing public fire hydrant on Washington Blvd. (LADWP)
3. If necessary, additional fire hydrant and/or fire protection system installation(s) will be determined during the building plan check phase.

☒ **Access:** 1. Fire apparatus access is adequate as depicted on Site Plan A0.11 dated 03-26-09.
2. Submit architectural plans to the Fire Prevention Engineering Division in Hawthorne for review and approval prior to building permit issuance. For submittal requirements contact (310) 263-2732.

☒ **Special Requirements:** THE FOLLOWING ITEMS SHALL BE SUBMITTED TO THE FIRE DEPARTMENT LAND DEVELOPMENT UNIT FOR REVIEW AND APPROVAL PRIOR TO ISSUANCE OF A BUILDING PERMIT:

1. An original Fire Flow Availability form (Form 196) for each public fire hydrant as specified.

Fire Protection facilities; including access must be provided prior to and during construction. Should any questions arise regarding this matter, please feel free to call our office at (323) 890-4243.

Inspector: SCOTT JAEGGI

Geotechnical Engineering Reports and Amendment Letter

APPENDIX B

Earth Systems
Southern California

14550 Haynes Street, Suite 202
Van Nuys, CA 91411
Ph (818) 779-1999
(818) 901-8075
Fax (818) 901-8084

October 23, 2007

LA-01112-01

Mr. Frank Hickman
Prestige Homes, Inc.
5150 Overland Avenue
Culver City, California 90230

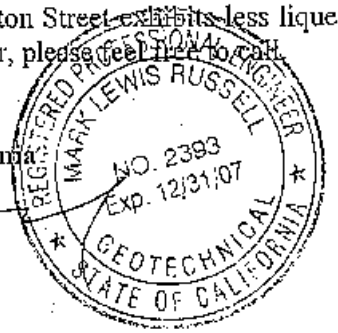
Subject: **Clarification of Statement in Preliminary Geotechnical Engineering Report**
Proposed Residential Development
Parcel OT – APN 4224-006-900
Admiralty Way
Marina del Rey, California

References: Preliminary Geotechnical Engineering Report, Proposed Residential Development, Parcel OT – APN 4224-006-900, Admiralty Way, Marina del Rey, California, by Earth Systems Southern California, PL-06242-01, June 15, 2004.

This letter has been prepared per the request of your environmental consultant (Envicom). Page 9 of the above-referenced Preliminary Geotechnical Engineering Report dated June 15, 2004 states: "The results indicate significant amounts of soil liquefaction can be anticipated at the site. The results suggest that the potential for liquefaction is significantly greater in the southerly part of the site (liquefying layers ranging from 7 to 48 feet below existing grade – B2 and CPT2) than in the northerly part of the site (B1 and CPT1). In the southerly part of the site, the results suggest that only soils between approximately 20 feet and 28 feet are likely to liquefy. That 20 to 28-foot liquefying layer appears to be continuous across both the southerly and northerly parts of the site."

The second from last sentence should read: "In the northerly part of the site, the results suggest that only soils between approximately 20 feet and 28 feet are likely to liquefy." It is the southerly part of the site that exhibits the greater potential for liquefaction; the northerly part of the site closer to Washington Street exhibits less liquefaction potential. If you have any questions regarding this matter, please feel free to call.

Respectfully submitted,
Earth Systems Southern California



Mark L. Russell, G.E.
Project Manager

Distribution: 1 – Addressee, 1 - Envicom (Johanna N.M. Falzarano)

Earth Systems

Southern California

RECEIVED
JUN 2 2 2004
CONSTRUCTION

PRELIMINARY
GEOTECHNICAL ENGINEERING REPORT

Proposed Residential Development
Parcel OT – APN 4332-006-900
Admiralty Way
Marina del Rey, California
PL-06242-01

PREPARED FOR

PRESTIGE HOMES, INC.

June 15, 2004

Prepared By

Earth Systems Southern California
7949 Woodley Avenue
Van Nuys, California 91406

(818) 779-1999
FAX (818) 779-1990

Earth Systems
Southern California

14550 Haynes Street, Suite 202
Van Nuys, CA 91411
Ph (818) 779-1999
(818) 901-8075
Fax (818) 901-8084

October 23, 2007

LA-01112-01

Mr. Frank Hickman
Prestige Homes, Inc.
5150 Overland Avenue
Culver City, California 90230

Subject: **Clarification of Statement in Preliminary Geotechnical Engineering Report**
Proposed Residential Development
Parcel OT – APN 4224-006-900
Admiralty Way
Marina del Rey, California

References: Preliminary Geotechnical Engineering Report, Proposed Residential Development, Parcel OT – APN 4224-006-900, Admiralty Way, Marina del Rey, California, by Earth Systems Southern California, PL-06242-01, June 15, 2004.

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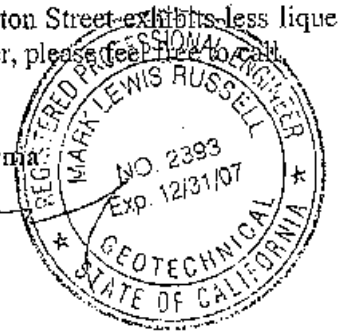
Respectfully submitted,
Earth Systems Southern California



Mark L. Russell, G.E.
Project Manager

Distribution: 1 – Addressee, 1 - Envicom (Johanna N.M. Falzarano)

Earth Systems
Southern California

7949 Woodley Avenue
Van Nuys, CA 91406
(818) 779-1999
Fax (818) 779-1990

June 15, 2004

PL-06242-01

Prestige Homes, Inc.
5150 Overland Avenue
Culver City, California 90230

Attention: Mr. Todd Oliver

Subject: **Preliminary Geotechnical Engineering Report**
Proposed Residential Development
Parcel OT – APN 4224-006-900
Admiralty Way
Marina del Rey, California

Presented herewith is the Preliminary Geotechnical Engineering Report prepared, as authorized, for the site of a proposed residential development in the Marina del Rey community of Los Angeles County, California. The conclusions and recommendations contained in this report are based upon Earth Systems Southern California (ESSC's) understanding of the proposed development and on analyses of the data obtained from the field and laboratory testing programs.

The recommendations provided in this report generally pertain to criteria for site grading and foundation design. ESSC strives to provide analyses and recommendations in accordance with the applicable standards of care for the geotechnical engineering profession at the time the study is conducted. The submittal of this report marks the completion of the scope of geotechnical engineering services described in ESSC's proposal dated January 27, 2004 and authorized on February 2, 2004. Other services which may be required, such as grading observation and construction testing, are additional services that will be billed according to the Fee Schedule in effect at the time such services are provided. Budgets for these services, which are dependent upon design and construction schedules, can be provided when requested. ESSC appreciates this opportunity to provide professional geotechnical engineering services for this project. If you need clarification of the information contained in this report, or if ESSC can be of additional service, please contact the undersigned.

Respectfully submitted,

Earth Systems
Southern California

David J. Murray
Project Manager

Distribution: 6 – Addressee

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June 15, 2004 PL-06242-01

PRELIMINARY GEOTECHNICAL ENGINEERING REPORT
PROPOSED RESIDENTIAL DEVELOPMENT
PARCEL OT – APN 4224-006-900
ADMIRALTY WAY
MARINA DEL REY, CALIFORNIA

INTRODUCTION

This Preliminary Geotechnical Engineering Report has been prepared for the site of a proposed residential development. The purpose of this study was to evaluate the geotechnical engineering characteristics of the on-site subsurface soils relative to the anticipated site development.

This report includes:

1. Descriptions of the field exploration and laboratory tests performed.

2. Evaluation of liquefaction potential of soils beneath the site.

3. Conclusions and recommendations relating to construction of the proposed residential development based upon analyses of data obtained from the exploration and testing programs, and on knowledge of the general and site specific characteristics of the subsurface soils.

SITE DESCRIPTION

The approximate ¾-acre site is between Admiralty Way and Washington Street just east of Palawan Way in the Marina del Rey community of the Los Angeles County, California. The site is approximately ¾ mile west of the Pacific Coast Highway (Hwy 1) and approximately ¾ mile east of the Pacific Coast beach (Plates I and II). The rectangular-shaped project site is currently occupied by an asphalt-paved parking lot with concrete curbs, access ramps and perimeter landscaping. Access to the property is available from Admiralty Way on the southerly side and from Washington Street on the northerly side of the site (see Site Sketch, Plate III). The Marina International Hotel is located just west of the site while a duck pond or lagoon is present on the easterly side of the site.

Topographically, the property consists of ground that slopes gently approximately south to north at elevations from approximately 15 to 10 feet above mean sea level. The ground drops off more steeply at a gradient of approximately 10 horizontal to 1 vertical (10H:1V) on the easterly side of the site where the lagoon is located. No topographic or bathymetric data were available for the lagoon area, however, based on visual inspection it appears that the bottom elevation of the lagoon bottom is somewhere in the range of -5 feet msl. The above-cited descriptions are intended to be illustrative, and are specifically not intended for use as a legal description of the subject property.

PROJECT DESCRIPTION

Based on discussions with the project owner and review of the preliminary sketches by GMP Architects provided, Earth Systems Southern California (ESSC) understands that the proposed project will consist of a multi-unit residential development ("retirement hotel"). The structure will include five stories of living space and one partial-subterranean parking level. The project will also include associated access ramps, walkways, and landscaping. ESSC has not received building or foundation plans for the proposed structure as of this writing. However, based upon the type of construction, estimated structural loads are not expected to exceed 3,000 pounds per linear foot (plf) for continuous foundations and 200 kips for isolated column foundations.

Due to the relatively flat site topography, ESSC has assumed that conventional cut and fill methods will be used to grade the site, with permanent slope heights of no more than five feet. Sewage disposal will be provided by a public sewer system. These assumptions were used as the basis for the exploration, testing, and analyses programs, and for the recommendations contained in this report. If the anticipated foundation loads or other site conditions vary significantly from the values stated herein, the recommendations should be reconfirmed prior to completing project plans.

PURPOSE AND SCOPE OF SERVICES

The purpose of ESSC's services was to evaluate the project site soil conditions, and to provide preliminary geotechnical engineering conclusions and recommendations relative to the project site and the proposed development. ESSC's scope of services included the following:

A. A general reconnaissance of the site and review of available reports from files at the Los Angeles Department of Public Works and the California Regional Water Quality Control Board - Los Angeles Region.

B. Shallow subsurface exploration of the project site by drilling six hollow-stem auger test borings, and advancing three cone penetration test (CPT) soundings.

C. Geotechnical laboratory testing of selected soil samples obtained from the exploration program conducted for this project.

D. Geotechnical engineering analyses of the data obtained from the exploration and testing programs.

E. A summary of findings and recommendations in this written report.

Contained in this report are:

A. Discussions on local and site specific soil conditions.

B. Results of laboratory tests and field data.

C. Evaluation of susceptibility of site soils to earthquake induced liquefaction.

D. Recommendations relating to the proposed site development, including allowable foundation bearing capacity, recommendations for foundation design, estimated total and differential foundation settlements, site grading criteria, lateral earth pressures, soil expansion characteristics, and soil corrosion characteristics.

SITE HISTORY

Much of the vicinity of Marina del Rey was used for production of crude oil in the early part of the twentieth century. A landfill known as the "Venice Dump" was operated in the site vicinity in the early to mid 1900's and is currently closed. The dump was a "Class II landfill" (Law, 1988) and was given a solid waste assessment test (SWAT) ranking of 6 which was later reduced to 15 by the Los Angeles Regional Water Quality Control Board (LARWQCB). No subsurface environmental investigation (SWAT investigation) of the landfill has apparently been completed. However, geotechnical and environmental investigations were conducted for the nearby Ritz-Carlton Hotel (Law 1988, SCS 1987, Converse 1988) which gave some information regarding the nature of the landfill contents. The approximate extent of the Venice Dump based on maps from the County of Los Angeles, is shown on Plate I.

The marina was created in approximately 1963. Based on maps of the County maps of the landfill extents and the current marina configuration, portions of the dump fill were removed during the marina construction. Some of the land in Marina del Rey, particularly the peninsulas of Palawan Way, Panay Way and Marquesas Way consist of dredge material placed hydraulically or as dump fill between the north and south quay walls at that time (USACOE, 1963). The marina construction activities do not appear to have affected the subject site.

FIELD EXPLORATION

The field exploration for this study was conducted on March 10 and 11, 2004. Field exploration consisted of drilling and sampling six exploratory hollow-stem auger test borings to depths of approximately 13 to 60 feet below the existing ground surface, and advancing three electric cone penetration test (CPT) soundings to depths of approximately 8 to 55 feet. The approximate locations of the exploratory test borings and CPT soundings, as indicated on the attached Site Sketch (Plate II), were determined by sighting and tape measuring from existing surrounding improvements. The locations of the borings and CPT soundings should be considered accurate only to the degree implied by the measurement method used.

Bulk (disturbed) samples of the subsurface soils were obtained from tailings generated during drilling. These samples were secured for classification and testing purposes and represent mixtures of soils within the noted depths.

Additional soil samples ("ring samples") were secured from within the test borings using a three-inch outside diameter ring sampler (ASTM D 3550) with a shoe similar to the drive cylinder sampler (ASTM D 2937). A 140-pound hammer falling approximately 30 inches (ASTM D 1586) drove the

sampler. The hammer was operated by an automatic trip mechanism. The hammer operated at a rate of approximately 40 to 45 blows per minute. The number of blows required to drive the sampler 18 inches was recorded in six-inch increments and recorded on the boring logs. Recovered ring samples were sealed in plastic containers and transported to the ESSC laboratory for further classification and testing.

Further sampling and collection of disturbed soil samples was accomplished using the Standard Penetration Test (SPT) sampler in accordance with ASTM D 1586. The SPT sampler is a split barrel sampler with a 1-3/8 inch inside diameter. This sampler is also driven by a 140-pound hammer falling approximately 30 inches. The number of blows required to drive the sampler 18 inches was recorded in six-inch increments and recorded on the boring logs. Soil samples recovered by this method were sealed in sealed plastic bags. Recovered soil samples were transported to the ESSC laboratory for further classification and testing.

The Logs of Test Borings for this report, included in Appendix A, represent ESSC's interpretation of the field logs prepared for each test boring by ESSC's staff, along with their interpretation of soil conditions between samples and results of laboratory tests. While the noted stratification lines represent approximate boundaries between soil types, the actual transitions may be gradual.

The CPT exploration was conducted by hydraulically advancing an instrument Hogentogler 10 cm^2 conical probe into the ground at a rate of 2 cm per second using a 23-ton truck as a reaction mass. An electronic data acquisition system recorded a near-continuous log of the resistance of the soil against the cone tip (Q_c) and soil friction against the cone sleeve (f_s) as the probe was advanced. Resistance readings were recorded for every 2.5 cm (1 inch) of depth. Empirical relationships (Robertson and Campanella, 1985) were applied to the data to give a near-continuous profile of soil stratigraphy. Interpretation of CPT data provides correlations for SPT blow count, internal friction angle, ultimate stress (S_u) of clays, and soil type. Logs of the CPT soundings are included in Appendix B.

LABORATORY TESTING

After visual and tactile classification in the field, the soil samples were brought to ESSC's laboratory. The soil classifications were checked in accordance with the Unified Soil Classification System and a testing program was established as follows:

A. Soil samples were examined and field logs were reviewed to select samples for laboratory testing.

B. In-situ moisture content and dry unit weight for soil ring samples were evaluated (ASTM D 2937 and ASTM D 2216).

C. Soil classification tests consisted of Particle Size Analysis: Mechanical Method and Hydrometer Method (ASTM D 422).

D. The relative strength characteristics of selected ring samples of the near-surface soils were estimated from the results of direct shear tests (ASTM D 3080). The specimens were placed

in contact with water for at least 24 hours before testing and then sheared under normal loads ranging from approximately 0.5 to 2.3 kips per square foot (ksf). Samples were sheared to sufficient strains so that both peak and ultimate values were evaluated.

E. Consolidation tests (ASTM D 2435) were conducted on selected soil ring samples. The maximum stress during testing was 9 ksf. The samples were saturated at 1ksf to check the hydroconsolidation potential. The samples were unloaded to 4 ksf to check the rebound characteristics.

F. Soil chemistry tests consisted of pH, resistivity, conductivity, and a variety of cations and anions including soluble sulfate. Soil chemistry tests were performed by M.J. Schiff and Associates on a soil sample provided by ESSC.

G. Additional tests consisted of Maximum Density-Optimum Moisture (ASTM D 1557) and Expansion Index (ASTM D 4829).

Refer to Appendix C for the laboratory test results. Presentation of the test results provides only that information considered pertinent. References to ASTM and other test standards refer to the standard currently in effect.

GEOLOGIC SETTING

The project site lies within the northwestern limits of the Peninsular Ranges geomorphic province that is characterized by northwest-southeast trending mountain ranges and intervening valleys. Included in this province is the Los Angeles Basin. The project site is located at the northwesterly edge of the southwestern block of the Los Angeles Basin, which is characterized by the deep alluvial deposits of the coastal plain.

GROUNDWATER

Free groundwater was encountered at the site in the test borings at depths of approximately 10 to 17 feet below existing site grade. Groundwater within the marina has been demonstrated to fluctuate significantly, primarily in response to tides. Based on the highest tide recorded in this part of the Southern California Coast (approximately +4.7 feet above mean sea level), the shallowest anticipated groundwater would be approximately 5 to 10 feet below existing ground surface depending on which part of the site is considered (ground surface elevation ranges from approximately 10 to 15 feet above msl).

SOIL CONDITIONS

Artificial fill soils were encountered in each of the six exploratory borings. The depth of fill observed ranged from approximately 12 to 14 feet below existing ground. The fill consisted of a silty soil matrix containing significant amounts of debris including asphalt, glass, metal, brick, wood and other materials. One boring (B3) and one CPT sounding (CPT-1x) encountered "refusal" at depths of 13

feet and 8 feet, respectively. The fill was observed to be poorly compacted and the soil matrix was found to consist predominantly of silty sand, sandy silt, clayey silty, and sandy clay (SM, ML and CL soil types based upon the Unified Soil Classification System). Based upon results of the Expansion Index (EI) Tests (ASTM D 4829) conducted for this investigation, the upper on-site soils are considered to have a "very low" (EI = 0 to 20) expansion potential.

A layer of very soft to medium stiff clay and silt (CL and ML soil types) of varying thickness was found between approximately 13 and 23 feet below existing grade in each of the borings and CPT soundings. Below approximately 23 feet the natural soils were found to consist predominantly of medium dense to very dense silty sands, and slightly silty sands (SM, SW-SM and SP-SM soil types) with density generally increasing with depth. The Logs of the Test Borings in Appendix A and CPT soundings in Appendix B contain more detailed descriptions of the soils encountered. Per the 2001 edition of the California Building Code (CBC) Table 16-J, the site soil profile should be classified as an S_D soil profile (stiff soil profile) or potentially an S_F soil profile if soil liquefaction is considered (discussed further below).

The soil "density," as represented by standard penetration test (SPT) blow counts, is summarized on Plate IV. Both the raw data and the data corrected for depth, hammer energy, borehole diameter, rod length, and sampler liner are presented. The blow count corrections were made in accordance with State of California Guidelines (SCEC, 1999). These corrected data are described as $(N_1)_{60}$ values. The following correction factors were applied to both the SPT and California modified blow counts to arrive at "equivalent" $(N_1)_{60}$ values:

Item		Correction Factor Used
Energy Correction	C_E	1.25 – auto trip hammer
Drive rod Length	C_R	Varies with length of rod. Values used per SCEC.
Borehole Diameter	C_B	1.1 - Borehole Diameter – 8" diam hole
Sampler Liner	C_S	1.2 – unlined samplers

GEOLOGIC HAZARDS

Geologic hazards that may affect the proposed residential structure include seismic shaking and other earthquake-related hazards (secondary seismic hazards), flooding, and erosion.

Fault Rupture

The site is not located within a currently delineated California Geological Survey (CGS) Earthquake fault rupture hazard ("Alquist-Priolo") zone (Hart and Bryant, 1999). No known active faults have been specifically identified beneath the site. Therefore, the potential for active fault rupture is considered to be very low. While fault rupture would most likely occur along previously established fault traces, future fault rupture could occur at other locations.

Seismic Shaking

Although the site is not located within a known "earthquake fault zone," it is located in an active seismic region where large numbers of earthquakes are recorded each year. Historically, major earthquakes (i.e. those with magnitude greater than 7.5) felt in the vicinity of the subject site have originated from faults outside the area. These include the December 21, 1812 "Santa Barbara Region" earthquake that was presumably centered in the Santa Barbara Channel, the 1857 Fort Tejon earthquake, the 1872 Owens Valley earthquake, and the 1952 Kern County earthquake.

The nearest known "active" or "potentially active" faults in the vicinity of the subject site include the Santa Monica fault (approximately 7.2 kilometers [km] northwest of the site), the Palos Verdes fault (approximately 7.4 km southwest), the Malibu Coast fault (approximately 8.6 km northwest), the Newport-Inglewood fault (approximately 9.5 km northeast of the site), and the Hollywood fault (approximately 12 km northeast of the site).

The subject site, like all other sites in the general area, can be affected by moderate to major earthquakes centered on faults in southern California. To provide estimates of the seismic shaking that the proposed structures could experience, a probabalistic seismic hazard analysis presented by the State of California has been used. The Seismic Hazards Report for the Venice Quadrangle (CDMG, 1998) presents the results of probabilistic seismic hazards evaluations for the project site vicinity. The report indicates that predominant magnitude around Marina del Rey ranges from 6.6 to 7.1. The mapping of ground accelerations indicates that the site is located in an area where peak ground accelerations (in alluvium conditions) are anticipated to be about 0.45g for a 10% probability of exceedance in 50 years.

To further evaluate potential future seismic shaking, analyses were conducted using the FRISKSP computer program (Blake, 1998) and the current set of earthquake fault data (Blake, 2000). The attenuation relationship from Boore (1997) was used. A mean-plus-one standard deviation criterion was used. These analyses suggest an approximate maximum acceleration value of 0.5g for a 10% probability of exceedance in 50 years (see Appendix D).

Based on the various analyses discussed above, it is recommended that, as a conservative approach, the design earthquake for this site be considered to be a 7.1 magnitude event, with a peak ground acceleration of 0.5g. Acceleration values provided are estimates only. Actual acceleration values may be more or less than those provided. Vertical accelerations are estimated to be approximately $^2/_3$ of the horizontal acceleration.

Seismic Design Parameters

Based on the significant thickness of loose liquefiable soil beneath the site, the Soil Profile Type (2001 CBC section 1636.2) could be classified as S_F: soil requiring site specific evaluation. The Stiff Soil Profile (S_D) factor is considered the most appropriate soil profile for design of the proposed project since the structure will be supported by improved ground or by pile foundations that will be supported by the relatively dense sandy soils encountered below the liquefiable soil. A site-specific design ground acceleration has been developed as discussed above. The project structural engineer should consider the use of this value for structural design in lieu of seismic coefficient (C_a) and near

source factor (N_a) values drawn from the code tables. The applicable 2001 CBC seismic parameters is itemized below:

Table III
Summary of Seismic Parameters

Seismic Zone	4
Seismic Source Type Santa Monica Fault	B
Distance from Seismic Source	7 km
Soil Profile Classification (2001 CBC Table 16-J)	$S_{D/F}$
Seismic Zone Factor – Z (2001 CBC Table 16-I)	0.40
Seismic Coefficient - C_a (20011 CBC Table 16-Q)	$0.44N_a$
Seismic Coefficient - C_v (2001 CBC Table 16-R)	$0.64N_v$
Near Source Factor - N_a (2001 CBC Table 16-S)	1.0
Near Source Factor - N_v (2001 CBC Table 16-T)	1.1
Estimated Peak Horizontal Acceleration (DBE)*	0.45 g $\pm$
Estimated Predominant Magnitude, Mw*	6.6 – 7.1
*10% probability of being exceeded in 50 years	

Secondary Seismic Hazards

Secondary seismic hazards related to ground shaking include liquefaction, lateral spreading, ground deformation, areal subsidence, tsunamis, and seiches.

Liquefaction: Liquefaction is defined as a loss of strength of saturated cohesionless soil generally due to seismic shaking. Soil types most susceptible to liquefaction are loose, saturated silty to clean fine sands. The project site is located within a "liquefaction hazard zone" (CDMG, 1999).

The liquefaction potential at both soil boring locations (B1 and B2) was evaluated using a spreadsheet format based on the procedures outlined by NCEER (1997). The results of these analyses are included in Appendix E. Assumptions used in the liquefaction analyses included:

a) The earthquake magnitude is conservatively taken as 7.1 and the peak ground acceleration is conservatively taken as 0.5g,
b) The earthquake occurs during a time of shallowest anticipated groundwater (approximately 7 feet below existing ground),
c) Blow counts from the ring sampler (California Modified sampler) were corrected to "equivalent" SPT blow counts using a conversion factor of 0.63 as recommended by the Southern California Earthquake Center (SCEC, 1999),
d) Soils with corrected blow counts $(N_1)_{60}$ greater than 30 were not considered liquefiable, nor were soils containing 15% or more clay fines.

The liquefaction potential for each CPT sounding soil profile was evaluated by the procedures set forth by Idriss & Boulanger (2004). These procedures are programmed in spreadsheet form, and the

results of these CPT-based liquefaction analyses for magnitude 7.1 and ground accelerations of 0.5g are also included in Appendix E.

The results indicate significant amounts of soil liquefaction can be anticipated at the site. The results suggest that the potential for liquefaction is significantly greater in the southerly part of the site (liquefying layers ranging from 7 to 48 feet below existing grade – B2 and CPT2) than in the northerly part of the site (B1 and CPT1). In the southerly part of the site, the results suggest that only soils between approximately 20 feet and 28 feet are likely to liquefy. That 20 to 28-foot liquefying layer appears to be continuous across both the southerly and northerly parts of the site.

Seismic Induced Ground Subsidence and Ground Damage: The potential for liquefaction-induced ground subsidence was estimated using the procedures of Tokimatsu and Seed (1987) for the boring data, and Moss (2003) for the CPT data. The data suggests that in the event of a nearby earthquake as discussed above, liquefaction-induced ground subsidence in the south side of the site could range from approximately 1.2 to 1.4 inches (see B1 and CPT1). In the northerly part of the site, liquefaction-induced ground subsidence is estimated to range from 3.3 to 5.3 inches. The ground subsidence calculations are included with the liquefaction calculations in Appendix E.

Based on guidance from SCEC (2002), the resulting differential ground settlements can be assumed to be approximately one-half of the maximum total ground subsidence values for design purposes (SCEC, 1999). This would give earthquake-related differential settlement in the south part of the site of approximately ¾ inch, but as much as 2.7 inches in the northerly part of the site. Alternatively, the differential settlement between the northerly and southerly ends of the proposed structure could be taken as the difference in the maximum anticipated settlement in each of those areas (5.3 inches minus 1.4 inches = 3.9 inches).

Assuming a three-foot thick liquefied layer overlain by approximately 8 feet of unliquefied soils (i.e. liquefied layer below proposed building floor near boring B2), ground damage such as sand boils and ruptures could be anticipated if liquefaction occurs based on the guidelines provided by Ishihara (1985).

Lateral Spreading: Lateral spreading is a phenomenon involving lateral movement of soils on or near a slope that have been temporarily weakened due to liquefaction. As shown in the liquefaction analyses, the corrected blow counts $(N_1)_{60}$ for the liquefiable layers appear to range from approximately 3 to 16 blows per foot. According to Youd (2002), soils with corrected blow counts less than 15 blows per foot can be susceptible to lateral spreading, particularly with the presence of a nearby "free face" such as the adjacent lagoon. However, only the upper liquefying layer found in the southerly part of the site has both an adjacent "free face" (i.e. is above the bottom of the lagoon elevation) and corrected blow counts less than 15 blows per foot.

As preliminary screening for the potential for lateral spreading at the site, the site conditions were checked using the procedures provided by Youd (2002). That procedure suggests that lateral ground movement of up to approximately 7 feet could be experienced (see Appendix F). As a more specific method for evaluating lateral spread potential at the site, a "sliding block" type evaluation (MCEER, 2001), was completed. A computer slope stability analysis program (STABL6H) was used along

with estimated post-liquefaction shear strengths to evaluate the stability of the site in the event of a liquefaction-producing earthquake. Post-liquefaction shear strengths ("residual strengths) for the liquefied layers were estimated using the chart provided by Seed and Harder (1990). Using average $(N_1)_{60}$ values of 3 and 12 for the upper-most and deeper liquefying layers, respectively, residual strengths of 200 psf and 400 psf were estimated.

The slope stability program was used to evaluate both a potential static "flow failure" condition (i,e, residual strengths but no ground acceleration), and a dynamic condition (i.e. weakened liquefied soil subject to ground acceleration).

Safety factors of approximately 2.0 to 3.6 were computed for circular failure surfaces (and 7.8 for planar failure), suggesting that "flow failure" would not be expected at this site since these safety factors exceed 1.0. However, safety factors of approximately 0.5 to 0.6 were computed for circular failure surfaces (and 0.9 for planar surfaces) subject to expected ground acceleration, suggesting that some lateral soil spreading would be anticipated since these safety factors are less than 1.0.

It should be understood that the computer "psuedostatic" analysis is an approximation that applies a continuous force horizontally out of the slope. During a seismic event, the slope will actually experience various directional components of acceleration and velocity, both in and out of the slope. The following parameters were used for the pseudostatic evaluation of the dynamic condition

Parameter	Value	Comment
Magnitude, M	7.1	
Distance to fault, r	7 km	Distance to Santa Monica Fault
Max. Horiz. Acceleration, MHAr	0.5 g	See seismic discussion, above
Acceptable Displacement	5 cm	Assumed acceptable for structures
Factor, f_{eq}	0.534	From SCEC 2002, Figure 11.1
Seismic Coefficient, k_{eq}	0.27	Per SCEC 2002, $k_{eq} = f_{eq}$(MHAr/g)

The yield acceleration for the most critical failure (circular failure on section B-B') was then estimated at 0.11g by "back-calculating" to a safety factor of 1.0. Using the anticipated maximum acceleration and yield acceleration, the lateral ground displacement was estimated using procedures presented in MCEER (2001) and SCEC (2002). The lateral displacement calculated according to these methods was approximately 15 inches. A horizontal ground displacement of 30 inches is significantly lower than the displacements predicted by Youd's method, but may still be enough to cause distress to shallow or deep foundations. The results of each of these analyses are presented in Appendix F.

The issue of lateral spreading is a complex problem involving soil properties and the type of expected earthquake motion. Studies have shown that the degree of lateral spreading is not uniform but rather is greatest at the free face and decreases to zero away from the free face (in this case, along the easterly south part of the site near the lagoon). More complex evaluations using mathematical modeling (such as finite-element analyses) could be used and could provide more realistic results. For the purposes of this report, the simplified statistical and "psuedo-static" approaches described above are considered acceptable.

Slope Stability, Flooding, Seiches, and Tsunamis

The site area is relatively flat and the adjacent lagoon slope is not steep. Therefore, potential hazards from slope instability, landslides, or debris flows are considered negligible. Because of its location in a marina, flooding hazards at the site would be directly related to tides. Ground surface at the site is located above the highest recorded tide for the vicinity (approximately +5 feet msl) and thus is not considered at significant risk of flooding from normal rainfall or tidal activity. Hazards from seiches (surging water within the marina) and tsunamis (seismically induced ocean waves) could conceivably pose hazards at the site. Marina del Rey is identified as falling within a projected 500-year tsunami run-up area based on mathematical model studies (LACRP, 1990) although no data are provided for lesser recurrence intervals. Marina del Rey is not identified as a tsunami hazard area based primarily on historical tsunami data (CDMG, 1972).

DISCUSSION AND CONCLUSIONS

Options for Mitigation of Seismic Ground Movement Hazard

Mitigation measures for the site may take either a soil-improvement approach or a structural approach. The mitigation measures must take into account both the potential ground settlement and movement due to the earthquakes and the presence of uncompacted debris fill in the upper soil zones. Any foundation system selected for the site should be designed to withstand the anticipated ground settlement and distress due to liquefaction and lateral spreading. One or more of the following approaches to mitigate the seismic hazards could be considered for this site:

a) Soil Improvement: The soils beneath the site could be "improved" to minimize their potential for liquefaction, thus eliminating the seismic settlement and lateral spreading hazards. Soil improvement typically consists of densification techniques or hardening techniques (SCEC, 2002). Densification techniques include such measures as stone columns, deep dynamic compaction, and compaction grouting. Hardening techniques include such measures as deep soil mixing, chemical grouting and other measures.

b) Structural Mitigation: Structural mitigation of ground movement hazards for this site would have to consist of support for the proposed building on very deep piles that extend through the liquefiable soil zones. Considering that liquefiable soil was identified at depths as much as 48 feet below grade, it is anticipated that the pile foundations would have to be at least 60 feet deep to achieve the necessary load-carrying capacity. In addition to the typical loads applied by the building structure, it would be necessary to design the piles to resist the axial down-drag forces induced by liquefaction-related ground settlement and the lateral earth forces induced by lateral spreading. The building foundation for this option would include grade beams and a structural deck.

It is ESSC's opinion that the ground improvement option is likely the most feasible option from an engineering standpoint and likely the most cost effective option. If ground improvement is performed adequately, the potential for liquefaction and associated ground distress should be effectively

minimized. Even with the soil improvement, a structural mat foundation may be necessary to support the structure on the modified ground. If the mat foundation is placed at least seven feet below existing grade as proposed, the friction and passive resistance of the soils on the site of the "basement" walls could be considered to contribute to resistance to the structure's movement or settlement.

Foundation Design and Settlement

The proposed structure should be supported either by a structural mat foundation bearing on "improved ground" treated as discussed herein or by a structural deck with deep piles and pile-caps. As discussed above, earthquake-related (seismic) settlement of as much as 5.3 inches with related differential settlement of as much as 3.9 inches may be expected. Static (non-seismic) settlement of the proposed structure should not exceed approximately three quarters of an inch (3/4"). Static differential settlement of neighboring footings of varying loads, depths or sizes may be as high as fifty percent of the total settlement.

Site Grading

A partial-subterranean parking level is proposed for the structure. It will be necessary to remove at least 7 to 8 feet of the upper material in the northerly part of the site and at least 13 to 14 feet of the upper material in the northerly part of the site, to reach the proposed floor and foundation elevations (see Plates V and VI). Deeper excavations may be proposed to remove the existing fill to its full depth either for environmental reasons or to provide more suitable foundation support. As mentioned in the Soil Conditions Section, artificial fill from the old landfill is present across the project site to depths of approximately 12 to 14 feet below existing grade. Since the fill material is poorly compacted and contains significant amounts debris and other foreign matter, it is not suitable, as is, for support of foundations or for use as compacted fill. If any of the existing fill is left in place below the proposed foundation elevation, pile foundations must be used to transmit the structural loads to the natural soils under the fill unless it can be demonstrated by specific studies that the existing fill material can be made suitable by one or more ground "improvement" technique.

All excavated fill material should be removed from the site. Additional excess "spoil" material may be generated during ground improvement procedures such as stone-column installation. It will likely be necessary to remove that excess material from the site as well. Since the upper materials (existing waste fill) is not suitable for use as engineered fill, imported material may be necessary if fill is needed for support of sidewalks, ramps, parking areas or other exterior minor structures or pavements. Refer to Section A of the Recommendations of this report for more detailed discussions and recommendations regarding site preparation.

Temporary Cuts and Dewatering

The subterranean facilities are expected to be bottomed near or below the groundwater level. Dewatering may be required to perform site construction operations. Excavation bottoms at or below the groundwater level may not be firm and there may be a need to stabilize the excavation bottoms to provide a trafficable surface for construction. Refer to Section A of the

Recommendations of this report for more detailed discussions and recommendations regarding site preparation and grading.

As discussed in the Project Description section, temporary excavations up to 14 feet in depth are anticipated to be required for construction of the proposed subterranean parking facilities. Excavations will have to be shored or "laid back" to appropriate temporary slope angles. Refer to Section B of the Recommendations section of this report for more detailed discussions and recommendations regarding site excavations. If ground improvement is selected as the (or one of the) mitigation measures, a soil-cement cutoff wall created using deep soil mixing may be constructed around the perimeter of the site. The soil-cement cutoff wall could act as temporary shoring, as well as a cutoff wall for dewatering and a mitigation method for lateral spreading.

Hydrostatic Pressures and Waterproofing

It appears that the proposed parking level floor will be located just below the current groundwater table elevation and a few feet below the highest anticipated groundwater elevation. Thus, the subterranean portion of the structure will need to be designed and constructed as a "water-tight" structure able to resist anticipated hydrostatic uplift pressures. Alternatively, a continuously active dewatering system could be used to minimize water pressure around and beneath the structure. For the purposes of the is report, it is assumed that the foundation and parking level retaining walls will be designed to resist hydrostatic pressures and subdrains will not be used. The structure foundation and the parking level retaining walls should include water-stops in the joints, water-proof membranes and/or other measures to minimize moisture migration into the parking area. Consultation with a water-proofing specialist is recommended.

Los Angeles County Section 111 Statement

The subject project site is situated within a mapped seismic hazard zone (CDMG, 1999) and as such will be subject to seismic forces that will cause ground movement, liquefaction settlement, and lateral spreading of the site soil. Based on the findings summarized in this report, and provided the recommendations in this report are incorporated into the site preparation and building construction, it is ESSC's opinion that the proposed building foundations will not be subject to geologic hazards from landslides, slippage, or settlement beyond the estimated settlement discussed herein. It is also ESSC's opinion that the proposed building foundations will not adversely affect the geologic stability of the site or adjacent properties provided the recommendations of this report are followed. Test findings and statements of professional opinion do not constitute a guarantee or warranty, expressed or implied.

RECOMMENDATIONS

Based upon field exploration, laboratory testing, interpretation of the data, and past experience, the following recommendations should be incorporated into site preparation, design, and construction of the proposed residential development.

A. General Site Preparation

1. All vegetation, uncompacted fill, trash piles, pavements, abandoned underground utilities, and other debris should be removed from the proposed grading areas. **Underground utilities are anticipated within or adjacent to the proposed construction area. Specifically, easements have been identified on the site survey for sewer and electrical utilities. These utilities should be identified and relocated as required prior to performing excavations for any site grading or foundation excavations.**

2. Existing artificial fill at the site contains significant quantities of debris and other foreign matter. Based on the "refusal" of exploratory borings and CPT soundings, significant amounts of oversize material may also be present. The fill was found to be present to depths of 12 to 14 feet below the existing ground surface. It should be understood that deeper depths of fill could be found during excavation and grading.

3. **The existing fill material is not suitable for use in engineered fill at the site.** All strippings and debris should be removed from the site in order to preclude their incorporation in site fill or remedial excavation backfill. Depressions resulting from such removals should have debris and loose soils removed and filled with suitable soils placed as recommended below.

4. Soils beneath any proposed traffic-bearing pavement and any exterior non-traffic bearing concrete flatwork (sidewalks, patios, walkways etc.), should be excavated a minimum of 24 inches below the existing grade or finished subgrade, whichever is lower. The remedial excavation should extend a minimum lateral distance of at least two feet beyond pavement edges. The bottom of the remedial excavation should then be scarified (ripped) 6 inches. Suitable imported soils should be used to replace the excavated fill. The imported material should be moisture conditioned to near optimum moisture content and be uniformly compacted to at least 90% of maximum dry density using mechanical compaction equipment. Compaction should be verified by testing. **It should be understood that the new fill beneath such pavements and slabs will still be supported on at least 10 feet of non-engineered old debris fill, and as such may be subject to distress and shorter service life.**

5. Import soils should be equal to, or better than, the on-site soils in strength, expansion, compressibility, and soil chemistry characteristics. In general, import material should be free of organic matter and deleterious substances, have 100% passing a two inch sieve, 60% to 100% passing a #4 sieve, no more than 20% passing a #200 sieve, an Expansion Index less than 20, a Liquid Limit less than 35, and a Plasticity Index less than 12. Import soils can be evaluated prior to their use, but will not be prequalified by the geotechnical consultant. Approval of import soils will be given only after the material is on the project, either in-place, or stockpiled in adequate quantity to complete the project.

6. Backfill around or adjacent to confined areas (i.e. interior utility trench excavations, etc.) may be performed with a lean sand/cement slurry (minimum two sacks of cement per cubic yard) or "flowable fill" material (a mixture of sand/cement/fly ash). The fluidity and lift placement thickness of any such material should be controlled in order to prevent "floating" of any "submerged" structure.

7. Roof drainage systems for the proposed structure should be designed so that runoff water is diverted away from any structure.

8. Final site grades should be designed and constructed so that all water is diverted away from all structures and not allowed to pond on or near pavement. Drainage devices should be constructed to divert drainage from the project site.

9. It is recommended that ESSC be retained to provide geotechnical engineering services during the grading, excavation, and foundation phases of development. This continuity of services will allow for the geotechnical review of the design concepts and specifications relative to the recommendations of this report and will more readily allow for design changes in the event that subsurface conditions differ from those currently anticipated.

B. Excavations

1. Standard construction techniques should be sufficient for site excavations. All excavations should be made in accordance with applicable regulations (including CAL/OSHA). Project safety is the responsibility of the contractor and the owner. ESSC will not be responsible for project safety.

2. As previously discussed, groundwater may be anticipated to be as shallow as 5 feet below existing site grades; actual groundwater levels will fluctuate on a daily basis with changes in the tides. Vertical cuts for open (unshored) excavations in saturated soils will not stand.

3. Open, unshored, excavations above the groundwater table may be cut vertically to a maximum depth of no more than four feet. Excavations extending between 4 and 15 feet deep should be shored or sloped back from the base of the excavation to at least a one and one-half horizontal to 1 vertical (1.5H:1V) slope or flatter. If excavations dry out, sloughing will occur. No excavation should be made within a 1:1 line projected outward from the toe of any existing footing or structure.

4. During the time open (unshored) excavations are open, no heavy grading equipment or other surcharge loads (i.e. excavation spoils) should be allowed within a horizontal distance from the top of any slope equal to the depth of the excavation (both distances measured from the top of the excavation slope).

5. Adequate measures should be taken to protect any structural foundations, pavements, or utilities adjacent to any excavations.

C. Dewatering

1. As discussed previously, the groundwater table fluctuates significantly in response to the tides within the marina. The water table beneath the site can vary from as shallow as 5 feet to as deep as 16 feet below existing grade. Based on the depth of the proposed subterranean parking areas beneath the office building/parking structure (approximately 14 feet below existing grade), the structure excavation will be located below the water table and significant amounts of groundwater can be expected in the excavation.

2. Design and operation of any dewatering system will be the responsibility of the contractor. However, ESSC suggests that a sheet-pile cutoff wall be used as a cutoff wall to minimize entry of groundwater into the temporary basement excavation. Alternatively, a soil-cement cutoff wall may be used as the cutoff wall if it is also proposed as a mitigation measure for lateral spreading. Sumps, pumps, and or well points may also be necessary to remove groundwater from the basement excavation during construction. Sizing and operation of sumps and pumps or well points will be the responsibility of the contractor.

3. To minimize entry of moisture into the completed subterranean portions of the structures, a subdrain and backdrain system with sumps and sump pumps should be considered below the bottom floor slab and behind the retaining walls for the subterranean portions of the structure.

D. Soil Improvement

As discussed above, there are a variety of methods that can be used for soil improvement to minimize liquefaction potential. For this site, ESSC recommends: a) a combination of a soil-cement cutoff wall around most or all of the site perimeter and stone columns for soil densification and excess pore water pressure relief, or b) a cellular pattern of soil-cement cutoff walls to both mitigate the lateral spreading issue and to provide support for a mat-type foundation system.

It should be understood that if it is intended to leave some of the existing fill in place, soil improvement of that type of debris-filled irregular material may be difficult and may not result in adequate support for a mat foundation. Consideration should be given to doing complete removal of the existing fill and replacement to the proposed mat foundation elevation with imported granular engineered fill.

1. At a minimum, a soil-cement cutoff wall should be installed along the easterly site boundary (adjacent to the lagoon) to mitigate the potential for lateral spreading. The cutoff wall should be at least 30 feet deep to fully contain the soils with potential for lateral movement. Soil-cement cutoff walls may also be installed around the remaining portions of the site perimeter for temporary excavation support and groundwater control. Additionally, if stone columns are not used, some soil-cement cutoff walls may be recommended in the interior of the building footprint for form a "cellular" pattern for soil containment and support of a mat foundation.

2. Soil-cement cutoff walls should consist of overlapping "cylinders" of soil mixed in place at depth with Portland cement or other suitable cemetitious materials. The specific soil cement

mix design should be provided by a qualified ground improvement contractor under the review of the project geotechnical engineer.

3. Stone columns should be installed on a grid pattern to cover the building footprint plus at least 10 feet laterally beyond the building footprint. The exact spacing and depth of the stone columns is dependent on the amount of liquefying soil in a given part of the site.

4. As a preliminary estimate for the south part of the site, stone columns should be spaced at no further than 8 feet on center and should be at least 50 feet deep (below existing grade) to intersect all potentially liquefiable soil. In the northerly side of the site, stone columns should be at least 30 feet deep to intersect the deepest liquefying layer in that area.

5. Stone columns should be at least 18 inches in diameter and should consist of relatively clean gravel placed in a "column" by means of a crane-mounted vibrator.

6. Wick drains may be used to relieve excess pore pressure during stone-column installation and maximize ground densification. Wick drains should consist of a geosynthetic drain material typically about 4 inches wide corrugated plastic with a filter fabric wrapping. Wick drains would be installed to the same depth as the adjacent stone columns and are typically installed by hydraulic push methods.

7. Deep soil mixed soil-cement cutoff walls, stone columns, and wick drains (if used) should be installed by a qualified ground improvement contractor with experience in Southern California. The ground improvement contractor should be consulted for more specific estimates of the stone column specifications and for special limitations of the ground improvement methods.

8. Confirmation testing will be critical to verify that the ground improvement has achieved the minimum soil densities and strengths necessary to adequately reduce the liquefaction potential. At least 10 CPT soundings and 5 soil borings with SPT samples should be performed after installation of the stone columns (and wick drains if used) to demonstrate the "post ground improvement" soil density. ESSC recommends the following tentative criteria to demonstrate adequate densification: corrected SPT blow counts ($N_{1(60)cs}$) should exceed 30 blows per foot, and CPT tip resistance (Q_{tCN}) should exceed 160 tons per square foot (tsf) in all of the soils below the proposed building foundation that do not meet the "Chinese criteria' (clay content <15% or CPT Ic parameter <2.5).

9. An indicator program of soil-cement cutoff walls and stone columns is recommended at the beginning of the project (prior to full "production" of soil-cement and stone columns) to verify their effectiveness. For the indicator program, a soil-cement cutoff wall at least five feet wide by at least 20 feet long should be installed. Indicator stone columns should be installed in a 100 square foot area in the northerly part of the site and a 100 square foot area in the southerly part of the site. At least two borings with SPT samples and at least two CPT soundings should be completed in each of the two test areas to verify the effectiveness of the soil densification. Once the indicator program is complete, the ground improvement program can be finalized.

E. Utility Trenches

Standard construction techniques should be sufficient for site utility trench excavations. The surface of utility trench backfill frequently settles even when backfill is placed under optimum conditions. Structural units or pavement placed over such backfill should be designed to accommodate such movements. Jetting of utility trench backfill is not recommended.

1. Backfill of utilities within rights-of-way should be placed in strict conformance with the requirements of the governing agency. However, as a minimum it is recommended that utility trench backfill should be moisture conditioned to near optimum moisture content and be uniformly compacted to at least 90% of maximum dry density using mechanical compaction equipment. To aid in the compaction operation, utility trench backfill should be placed in lifts not exceeding six inches compacted thickness.

2. The provisions of this report relative to minimum compaction standards should govern utility trench backfill within the project boundary. In general, service lines extending inside the site should be backfilled with native soils that have been moisture conditioned and uniformly compacted to at least 90% of maximum dry density using mechanical compaction equipment. To aid in the compaction operation, utility trench backfill should be placed in lifts not exceeding six inches in compacted thickness.

3. Backfill operations should be reviewed and tested by the geotechnical engineer's representative to verify conformance with these recommendations.

F. Mat Foundations

Due to the soft, variable nature of the site soils and the potential for seismic-induced ground movement, a structural mat foundation is recommended for the building foundation. The proposed soil improvement will reduce but not eliminate all potential variability in ground support for building foundations. It is recommended that any building or structure constructed on this site be designed to at least the minimum standards for Seismic Zone 4 as designated by the 2001 edition of the California Building Code (CBC).

1. The mat may be conventionally reinforced or may consist of a post-tensioned slab system. Specific criteria for post-tensioned slab design can be provided if a post-tensioned system is selected.

2. The mat foundation for the proposed structure should be supported by improved ground as recommended in Section C of this report

3. An allowable "net" bearing capacity of 1,500 pounds per square foot (psf) may be utilized for dead and sustained live loads for design of the mat foundation. This value is a "net" value that includes the compensation for soil removal assuming a minimum 5-foot deep parking basement. This value may be increased by 1/3 when considering transient loads such as earthquake or wind forces.

4. The mat slab should be at least 6 inches thick and should include a perimeter beam extending a minimum of 24 inches below finished adjacent grade. The actual depth, width, and reinforcement requirements for the mat foundation depend on the Expansion Index of the bearing soils and should be specified by the structural engineer.

5. The mat foundation should be designed to accommodate differential movement of up to 1.5 inches in a 30-foot span (1:240 distortion ratio).

6. Resistance to lateral loading may be provided by friction acting along the mat foundation base. A coefficient of friction of 0.35 may be used for concrete foundations on site soils that have been "improved" as recommended in Section C, above. This value includes a safety factor of 1.5.

7. Additional resistance to lateral loading may be provided by passive earth pressure acting against the sides of foundations or grade beams. Based on the presence of "improved" soils around the perimeter of the proposed building, the passive pressure is estimated to be 350 Z PSF, where Z = Depth (in feet) below the finished ground elevation. In passive pressure calculations, the upper one-foot of soil should be subtracted from the depth, Z, unless confined by pavement or slab. The resisting pressure provided is an ultimate value. An appropriate factor of safety should be used for design calculations (minimum of 1.5 recommended).

8. The excavation for the mat foundation should be cleaned of all loose or unsuitable soils and debris prior to placement of concrete. Soil generated from the foundation excavations should not be placed below the mat slab unless properly moisture conditioned and compacted.

G. Building (Foundation) Piles

1. Building foundation piles, if used, should consist of precast, prestressed reinforced concrete driven piles. The piles may be round or square in cross-section. It is anticipated that piles would need to be at least 24-inches in diameter or square dimension.

2. Building piles should be embedded a minimum of 15-feet into dense sand (minimum tip depth of at least 60 ft below exist grade in the southerly part of the site). The actual total pile length and embedment may vary depending upon the requirements of the structural engineer and the results of the pile driving analysis (ie. evaluation of pile driving blow counts).

3. In general, the pile driving criteria provided by the Engineering News Record (ENR) formula (Public Works, 2000) should be satisfied for the last one foot of pile driving. If the required driving resistance is not achieved at the design depth, the pile may be allowed to "set" overnight and then driven an additional foot. If the required driving resistance is still not achieved, the pile may be lengthened or additional piles may be installed in accordance with the recommendations of the geotechnical and structural engineers.

4. The axial load carrying capacities of the foundation piles will depend on the final pile size and embedment depth selected. Deeper exploration of the site and further analysis of pile capacities would be necessary to provide allowable pile capacities. Preliminarily, skin friction for piles embedded below the lowest liquefying layer may be assumed to be approximately 0.9 tons per square foot (tsf). Down-drag forces of at least 0.5 tsf must be applied to all portions of the piles above the lowest liquefying soil layer.

5. The lateral load carrying capacity of foundation piles will be a function of the depth of liquefying soil at each pile location and the anticipated depth of lateral soil movement due to lateral spreading. Resistance to lateral movement can be provided by passive soil pressure below the lowest liquefying soil layer. Passive pressure may be taken as 500 pounds per square foot per foot of depth in firm soil below the liquefying layers. Driving lateral earth pressures must be applied to the portions of the piles within the depths where lateral spreading is anticipated. Specific lateral pile capacity calculations can be provided if pile foundations are selected for the project.

6. The design mix for the concrete to be used in the pile construction should be established and approved by the structural engineer prior to the time of construction. Concrete compression tests should be performed during pile casting in accordance with applicable codes or requirements of the structural engineer. Inspection by qualified personnel should be provided during the pile casing and/or reinforcement placing and tensioning.

7. An indicator pile program should be conducted for both proposed buildings prior to installation of the building foundation piles. The indicator pile program should include a minimum of ten (10) piles. The indicator piles should have the same cross-section and consist of the same construction as the piles selected for the building foundation and may be used as final building foundation piles ("production piles"). The indicator piles should be located at points distributed approximately uniformly across the two building footprints. The indicator piles should be a minimum of 60 feet in length (as delivered to the site) and should be driven to a minimum embedment of 15 feet into the dense sand below the lowest liquefying soil layer.

8. At least the first indicator pile should be driven with no pre-boring. Pre-boring up to ¾ of pile cross sectional area will be permitted for subsequent piles if necessary to achieve minimum embedment depth. The axial pile capacity for the last 2 feet of driving must be calculated based on blow counts to at least the required axial design load for the pile.

9. The geotechnical engineers, or their representatives, should be present during the installation of all pile foundations. This is to observe pile driving conditions and help identify variations in soil conditions that may require additional evaluation of the foundation criteria in this report.

10. Piles in groups or rows should be driven alternately before driving an adjacent pile.

11. Driven piles should not be more than two percent (2%) from the plumb position.

H. Slab-on-Grade Construction

1. Any exterior building concrete slab-on-grade construction should be supported by compacted soils prepared as recommended in Section A of this report. A minimum of four inches (4") of compacted sand or gravel should be placed over the finished compacted subgrade prior to placing concrete. This granular material should be moisture conditioned to near optimum moisture content and uniformly compacted using mechanical compaction equipment.

2. Reinforcement of slab-on-grade construction is contingent upon the structural engineer's recommendations and the Expansion Index of the supporting soils. Since the mixing of fill soils with native soils could change the Expansion Index, additional tests should be conducted during rough grading to determine the expansion characteristics of the new subgrade soils. Structural mat and post-tensioned slabs should be designed as outlined above under Section E of this report. It is recommended that all exterior concrete slab-on-grade construction be reinforced with at least #4 bars on 16-inch centers, each way. **Reinforcement should be placed at mid-depth of the slab.** Additional reinforcement may be required once the final expansion potential of the subgrade soils is known. Actual reinforcement requirements will be dependent on the Expansion Index of the bearing soils (Refer to Section J of Recommendations), applicable sections of the governing building code, and requirements of the structural engineer.

3. Cracks that develop in concrete slab-on-grade should be filled and sealed prior to placing floor coverings. Frequent control joints should be incorporated into the slab construction, particularly in the areas of re-entrant corners, to help control cracking.

4. In areas of moisture sensitive floor coverings, an appropriate vapor retarder should be installed in order to minimize vapor transmission from the subgrade soil to the slab. The vapor retarder should be centered within the four-inch thick sand layer. The vapor retarder should be evaluated for holes and/or punctures, and the edges overlapped and taped, prior to placement of sand. Any holes or punctures observed should be properly repaired. The retarder should be covered with two inches of sand to help protect it during construction. The sand should be lightly moistened and densified just prior to placing the concrete.

5. Relatively impervious floor coverings (i.e. vinyl, linoleum, etc.) that cover concrete slab-on-grade may block the passage of moisture vapor through the concrete slab, which could result in damage to the floor covering. It is suggested that after the concrete slab has sufficiently cured, the concrete slab surface be sealed with a commercial sealant prior to placing the floor covering. The compatibility, and recommendations for placing of the concrete sealer, mastic, and floor covering should be verified by the floor covering manufacturer prior to sealing the concrete or placing of the floor covering.

6. It is recommended that the proposed exterior perimeter slabs (sidewalks, patios, walkways, etc.) be designed to be relatively independent of foundation stems (free-floating) to help mitigate cracking due to foundation settlement and/or expansion.

7. Subgrade soils for all concrete flatwork should be moisture conditioned to near optimum moisture content within 24 hours prior to placement of concrete. Measures should be taken

to maintain optimum moisture until concrete is placed. Actual depths of pre-moistening will be dependent upon the actual Expansion Index of the subgrade soils.

I. Retaining Walls

1. The following lateral earth pressures may be used in the design of the proposed basement (partial subterranean parking level) retaining walls or similar structures at the site:

	Equivalent Fluid Earth Pressures (pcf)	
	Driving (Active) Earth Pressure (a)	Resisting (Passive) Earth Pressure (a)
Well drained, Level backfill soil	35	400 (d)
Well drained soil, 2H:1V slope backfill	48	-
At-rest (restrained) wall, Level backfill soil	53 (b)	-

a) Equivalent fluid pressure (psf) per foot of soil height.

b) For purposes of design, a wall is considered restrained if it is prevented from movement greater than 0.002H (H = height of wall in feet) at the top of the wall. **Basement walls such as the walls of the proposed partial subterranean parking level are typically considered restrained walls.**

c) Hydrostatic pressures should be added to the buoyant earth pressures for soils below the highest anticipated water table.

d) The upper one foot of soil should be neglected for passive pressure calculations unless confined by pavement or slab.

2. **The pressures recommended above were based on the assumption that select granular material will be imported to the site for use as wall backfill and will be compacted to approximately 90% of maximum dry density.** The resisting pressure provided is an ultimate value. An appropriate factor of safety should be used for design calculations (minimum of 1.5 recommended).

3. The basement (partial subterranean parking level) retaining walls should be supported by the structural mat foundation as recommended herein.

4. The lateral earth pressure to be resisted by retaining should be increased to allow for surcharge loads. The surcharge considered should include the loads from any structures or vehicle traffic within a distance approximately equal to the height of the retaining wall.

5. Backfill immediately behind any retaining structure should be a free-draining granular material. Comments on the characteristics of import soils will be given by the geotechnical consultant after the material is on the project, either in place, or stockpiled in adequate quantities to complete the project.

6. Backfill behind retaining walls should be with soils that have been properly moisture conditioned to approximately optimum moisture content and uniformly compacted to at least 90% of maximum dry density as determined by ASTM D 1557 test procedures using mechanical compaction equipment. To aid in the compaction operation, retaining wall backfill should be placed in lifts not exceeding six inches compacted thickness.

7. Compaction within the area of a 1H:1V slope from the bottom of wall excavations should be performed by hand operated compaction equipment. This is intended to reduce potential "locked-in" lateral pressures caused by compaction with heavy grading equipment.

8. Backdrains or an equivalent system of backfill drainage should be incorporated into the retaining wall design unless the walls are designed to resist full hydrostatic pressure and properly waterproofed. See Plate VII for recommended backdrain details. Waterproofing of retaining walls should be provided to help reduce the potential for efflorescent formation.

9. The final grade should be such that all water is diverted away from the retaining wall's foundation or backfill.

J. Expansive Soil

1. The Expansion Index (ASTM D 4829) of the subgrade soils should be considered when designing foundations. As stated in the Soil Conditions section, the on-site soils are considered to have a "very low" (EI = 0 to 20) expansion potential. The foundation and slab-on-grade design recommendations provided in Sections E and F of this report include generally used guidelines in the Los Angeles County area for foundation design for soils with the indicated degree of expansiveness.

2. The design recommendations included in this report are minimums and comply with normally accepted geotechnical engineering practices. However, actual foundation and slab-on-grade construction reinforcement should be determined by the structural engineer based upon site specific conditions such as foundation loading and engineering characteristics of the subgrade soils.

3. If the site soils are thoroughly mixed and/or additional fill is added during site preparation, the expansion potential may change. The expansion potential of the new subgrade soils should be determined after the site preparation has been completed, and the final foundation design adjusted accordingly.

mix designs should be carefully considered for foundations and other concrete structures in contact with soil.

2. The test results provided in Appendix C should be distributed to the design team for their interpretations pertaining to the corrosivity or reactivity of various construction materials (such as concrete and piping) with the soils. Tests should be conducted of the surface soils in the final graded pad to verify these interpretations, especially if the soils are mixed and additional fill is added during site preparation.

L. Slope Stability

Slope stability calculations were not performed because of anticipated minimal slope heights. If slope heights exceed five feet, engineering calculations should be performed to substantiate the stability of cut or fill slopes. Fill slopes should be constructed to a gradient not exceeding two horizontal to one vertical (2H:1V) and should be overfilled and trimmed back to compacted material.

CLIENT OPTIONAL SERVICES

This report was based on the assumption that an adequate program of client consultation, construction monitoring, and testing will be performed during the final design and construction phases to check conformance with the recommendations of this report. Maintaining ESSC as the geotechnical engineering consultant from beginning to end of this project will help provide continuity of services. The recommended services include, but are not necessarily limited to, the following:

a. Consultation as required during the final design stages of the project.

b. Review of grading and/or building plans.

c. Observation and testing during site preparation, grading, placement of engineered fill, and backfill of utility trenches.

d. Consultation as required during construction.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

The conclusions and recommendations submitted in this report relative to the proposed development are based, in part, upon the data obtained from site observations during the field exploration operations, and past experience. The nature and extent of variations between the borings and CPT soundings may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

In the event of any change in the assumed nature or design of the proposed project as planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing. This report is issued with the understanding that it is the responsibility of Prestige Homes, Inc., or of its representatives, to insure that the information and recommendations contained in this report are called to the attention of the architects and engineers for the project and incorporated into the plan. It is also the responsibility of Prestige Homes, or of its representatives, to insure that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

As the geotechnical engineers for this project, ESSC strives to provide its services in accordance with generally accepted geotechnical engineering practices in this community at this time. No warranty or guarantee is expressed or implied. This report was prepared for the exclusive use of Prestige Homes, Inc. and its authorized agents.

It is recommended that ESSC be provided the opportunity for a general review of final design and specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design specifications. If ESSC is not accorded the privilege of making this recommended review, it can assume no responsibility for misinterpretation of the recommendations.

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

The statements contained in this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or to the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards occur, whether they result from legislation or the broadening of knowledge. Accordingly, the conclusions of this report may be invalidated, wholly or partially, by changes outside of ESSC's control, and should therefore be reviewed after one year.

CLOSURE

Earth Systems Southern California trusts this report is sufficient at this time and meets your current needs. Earth Systems Southern California appreciates this opportunity to provide professional geotechnical engineering services for this project. If you have any questions regarding the information contained in this report, or if you require additional geotechnical engineering services, please contact the undersigned.

Respectfully submitted,

Earth Systems
Southern California

David J. Murray
Project Manager

Mark L. Russell, G.E.
Project Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
MARK LEWIS RUSSELL
No. 2393
EXP 12/31/05
GEOTECHNICAL
STATE OF CALIFORNIA

END OF TEXT

REFERENCES

PLATES

APPENDICES

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PLATES

Plate I Site Location Map
Plate II Seismic Hazards Map
Plate III Site Sketch
Plate IV SPT Blow Count Profile
Plate V Cross Section A-A'
Plate VI Cross Section B-B'
Plate VII Retaining Wall Back Drain Details

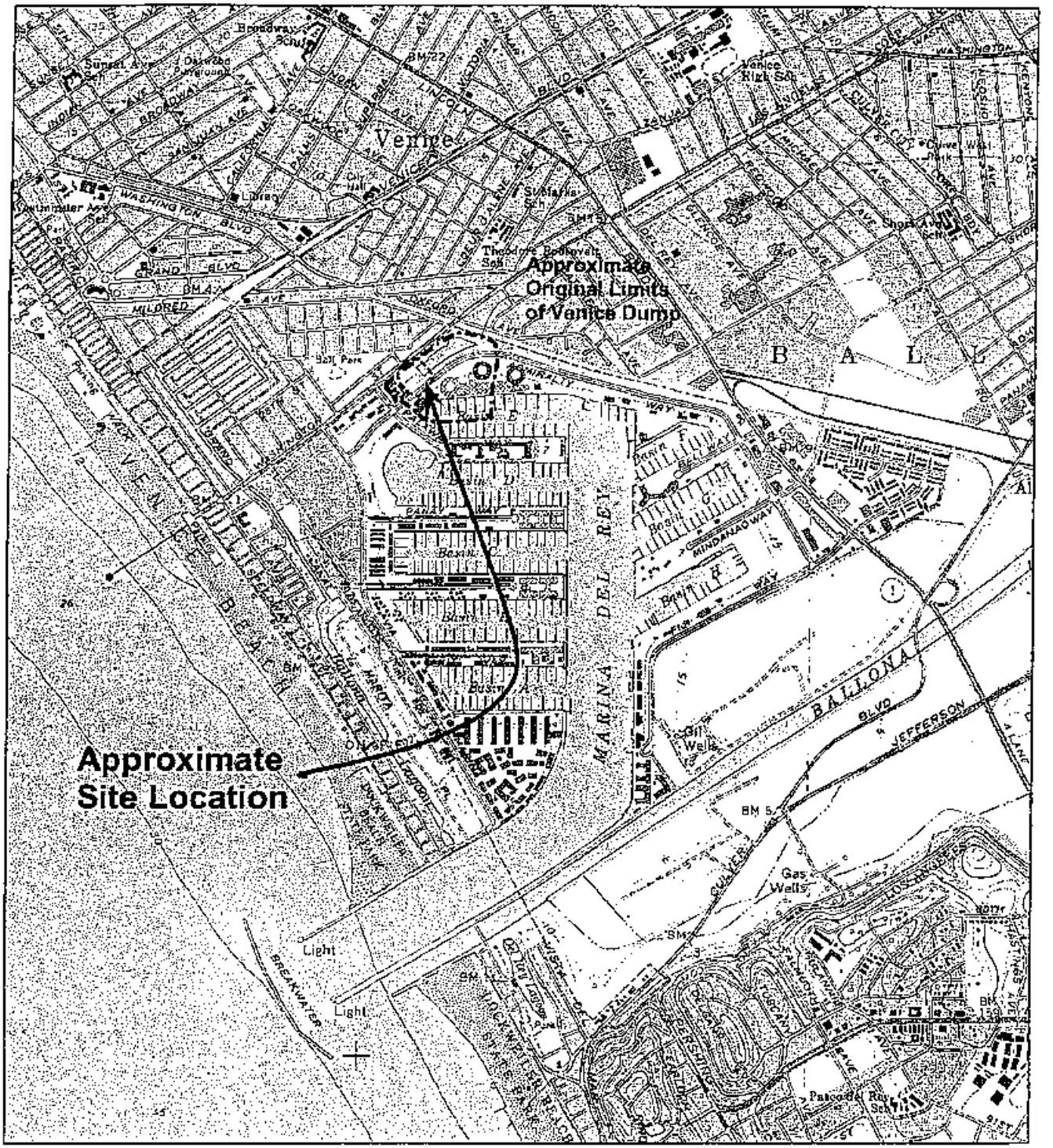


PLATE I

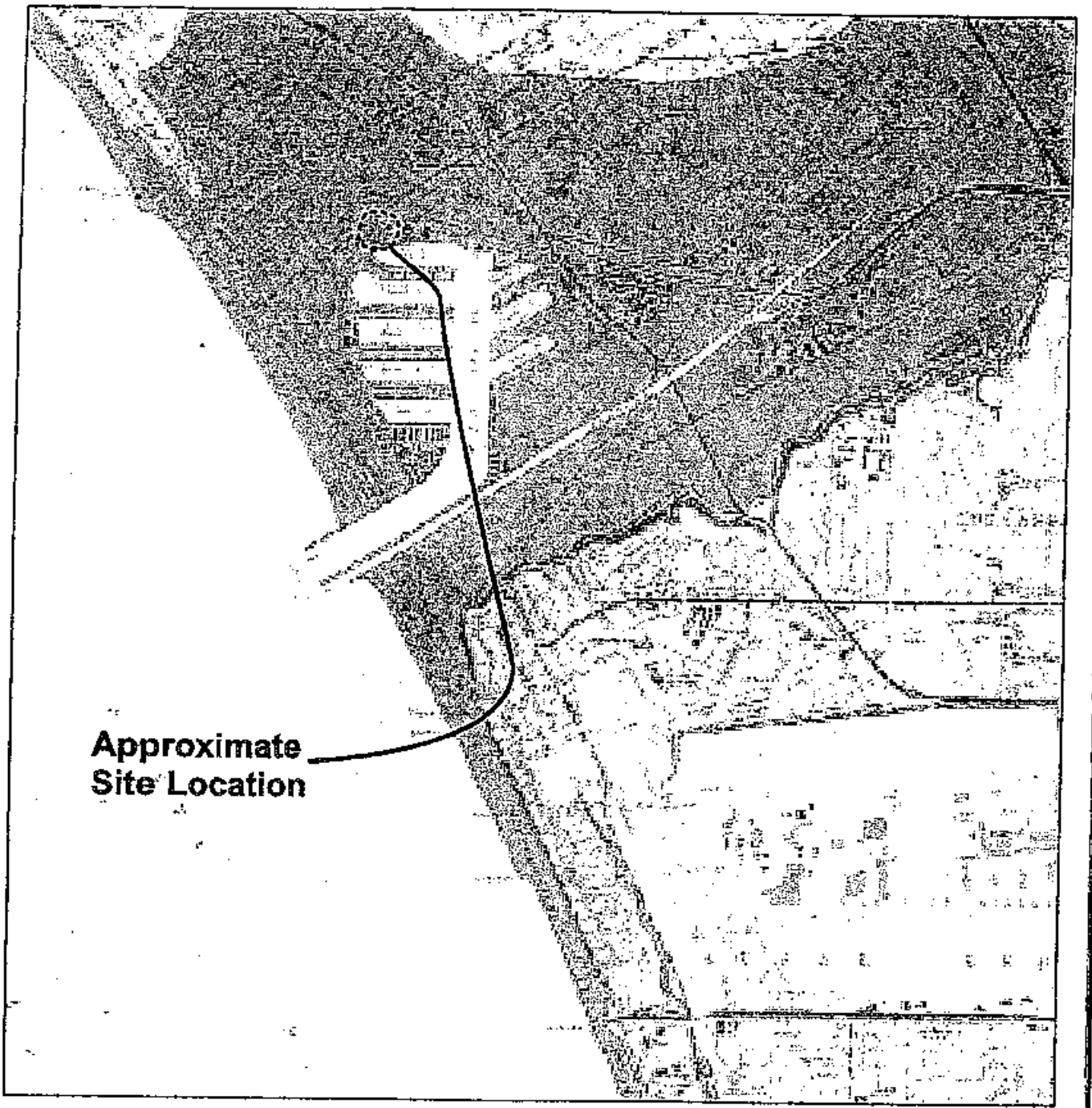
Base Map: 7.5 Minute Venice Quadrangle, dated 1964, photorevised, 1981.

LOCATION MAP

PROPOSED RESIDENTIAL DEVELOPMENT
ADMIRALTY WAY PARCEL OT APN 4224-006-900
MARINA DEL REY, CALIFORNIA

Earth Systems
Southern California

6-15-2004	PL-06242-01



Approximate Scale: 1" = 4000'

0 4000' 8000'

N

Reference: Seismic Hazards Zone Map of the Venice Quadrangle, CDMG, dated March 25, 1999.

MAP EXPLANATION:

LIQUEFACTION
Areas where historic occurance of liquefaction or local geological, geotechnical or groundwater conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 26939(c) would be required.

PLATE II

SEISMIC HAZARD ZONE MAP

PROPOSED RESIDENTIAL DEVELOPMENT
ADMIRALTY WAY PARCEL OT APN 4224-006-900
MARINA DEL REY, CALIFORNIA

Earth Systems
Southern California

6-15-2004	PL-06242-01

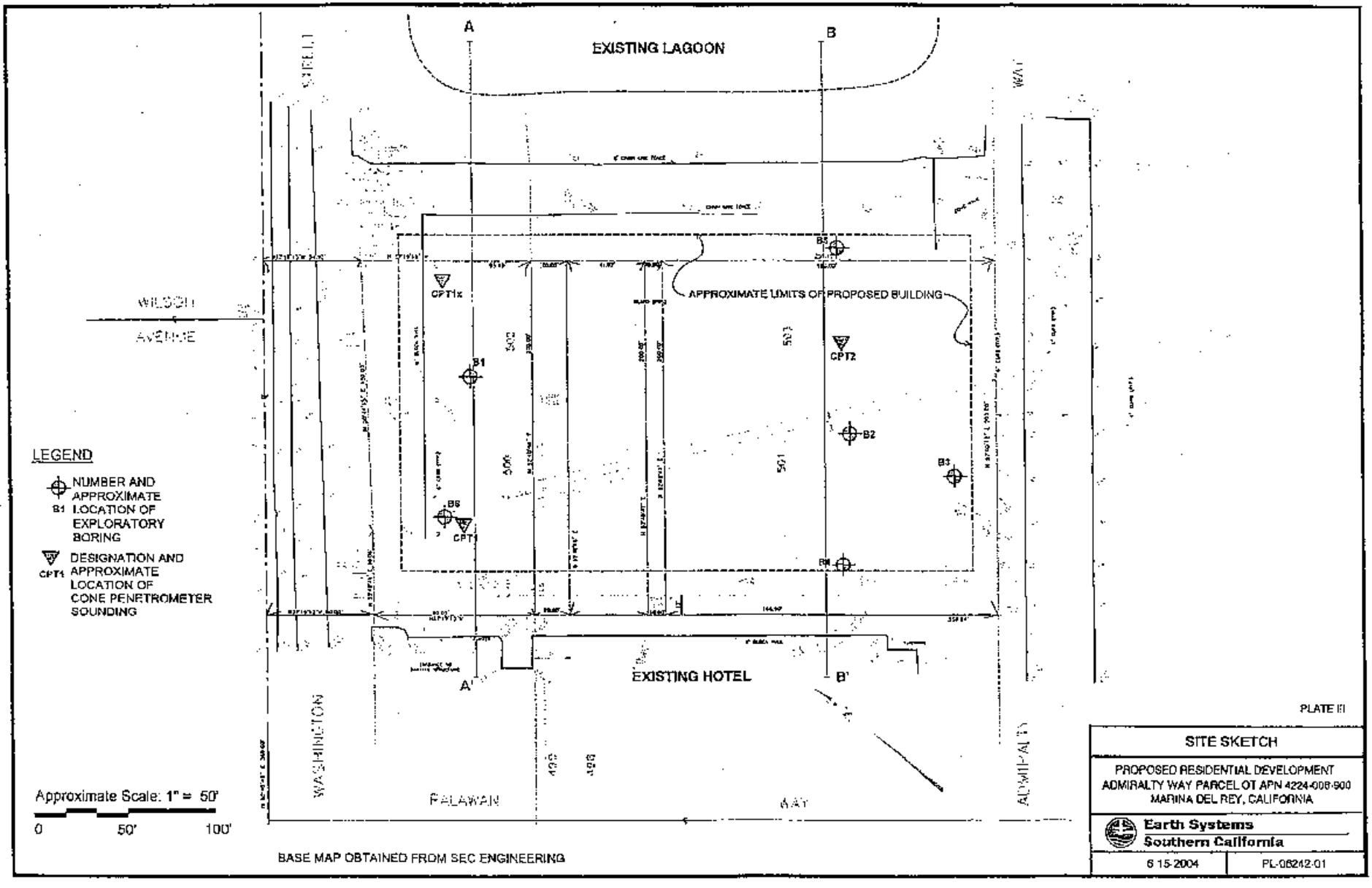


PLATE II

SITE SKETCH

PROPOSED RESIDENTIAL DEVELOPMENT
ADMIRALTY WAY PARCEL OT APN 4224-008-900
MARINA DEL REY, CALIFORNIA

Earth Systems Southern California

6-15-2004 | PL-08242-01

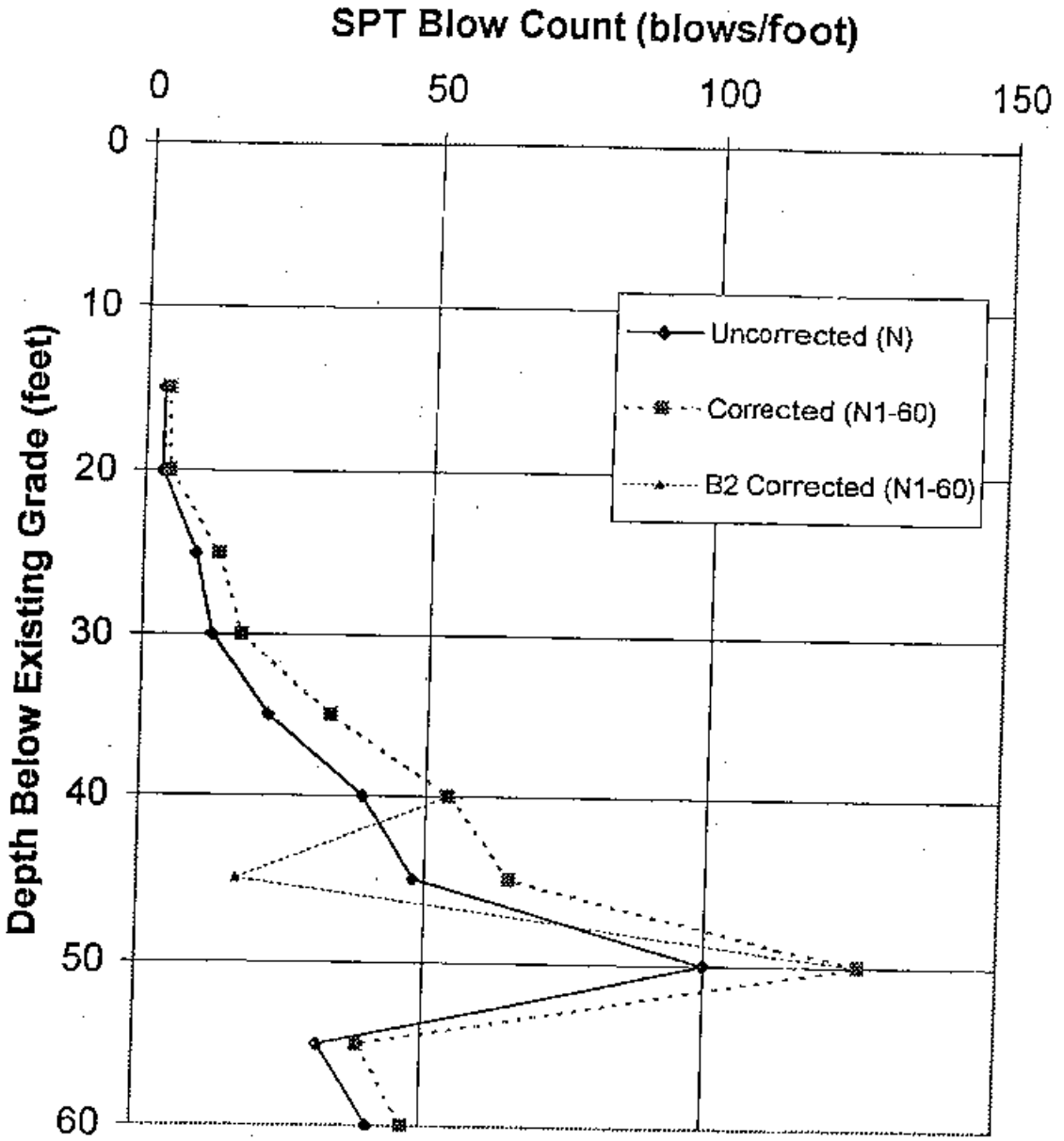


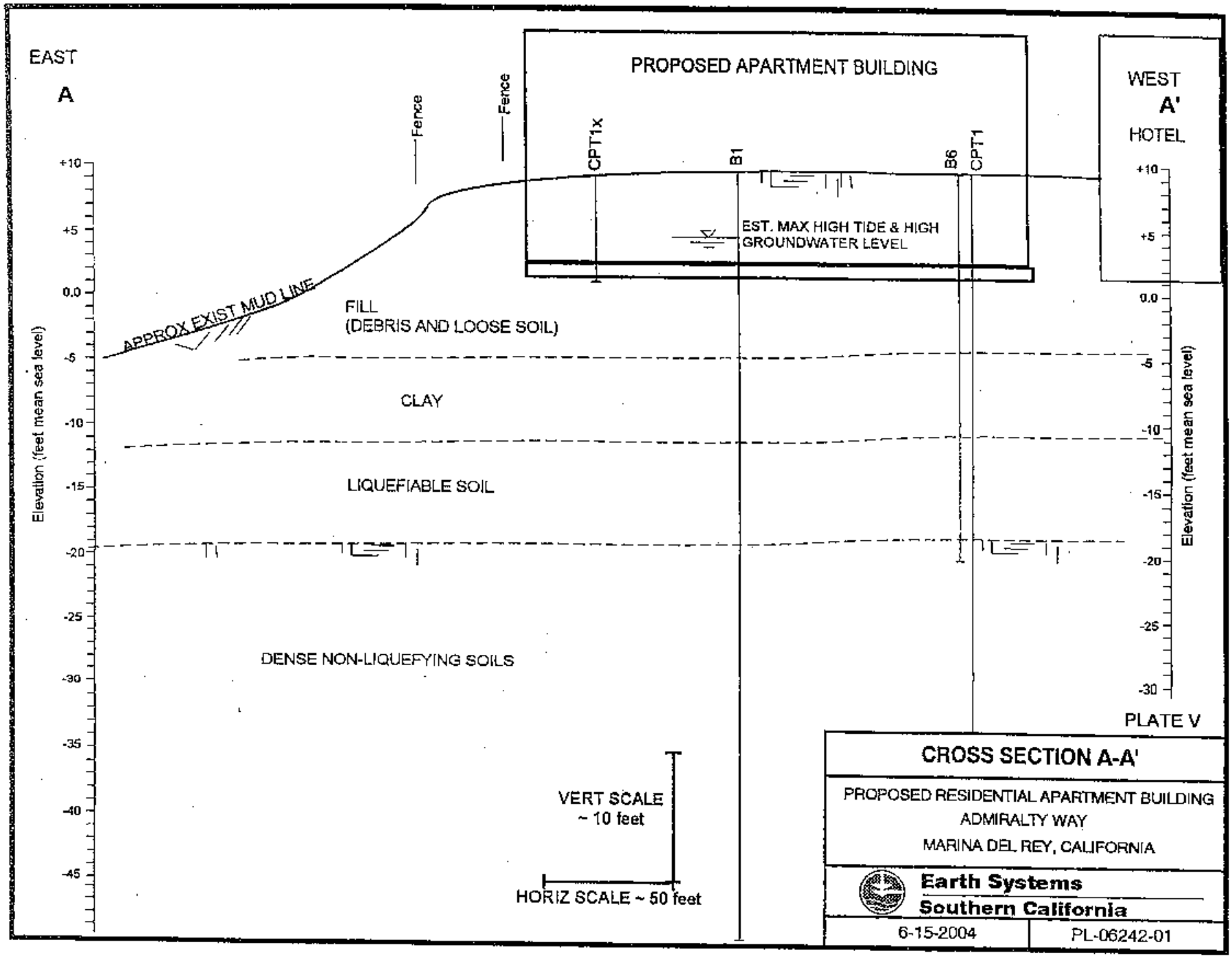
PLATE IV

SPT BLOW COUNT PROFILE

Admiralty Way
Marina del Rey, California

Earth Systems
Southern California

6-15-2004 PL-06242-01


EAST
A
WEST
A'
HOTEL
PROPOSED APARTMENT BUILDING
Fence
Fence
CPT1x
B1
B6
CPT1
EST. MAX HIGH TIDE & HIGH GROUNDWATER LEVEL
APPROX EXIST MUD LINE
FILL
(DEBRIS AND LOOSE SOIL)
CLAY
LIQUEFIABLE SOIL
DENSE NON-LIQUEFYING SOILS
Elevation (feet mean sea level)
+10
+5
0.0
-5
-10
-15
-20
-25
-30
-35
-40
-45
VERT SCALE
~ 10 feet
HORIZ SCALE ~ 50 feet
PLATE V
CROSS SECTION A-A'
PROPOSED RESIDENTIAL APARTMENT BUILDING
ADMIRALTY WAY
MARINA DEL REY, CALIFORNIA
Earth Systems
Southern California
6-15-2004
PL-06242-01

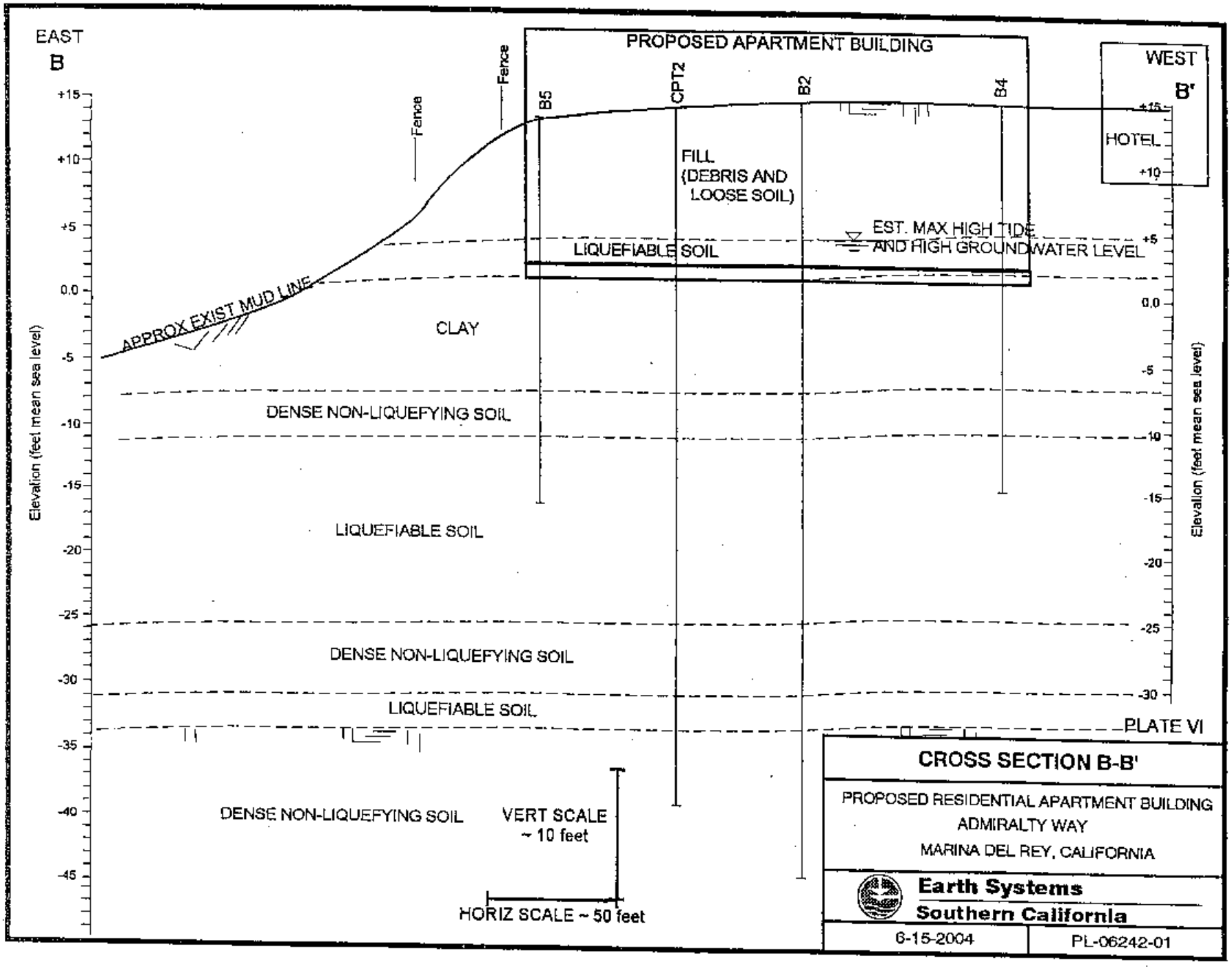


PLATE VI

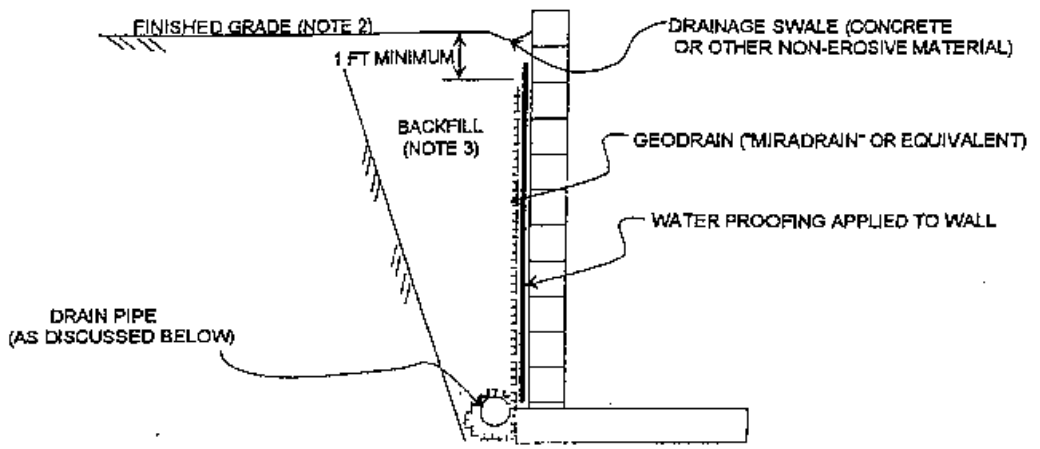
CROSS SECTION B-B'

PROPOSED RESIDENTIAL APARTMENT BUILDING
ADMIRALTY WAY
MARINA DEL REY, CALIFORNIA

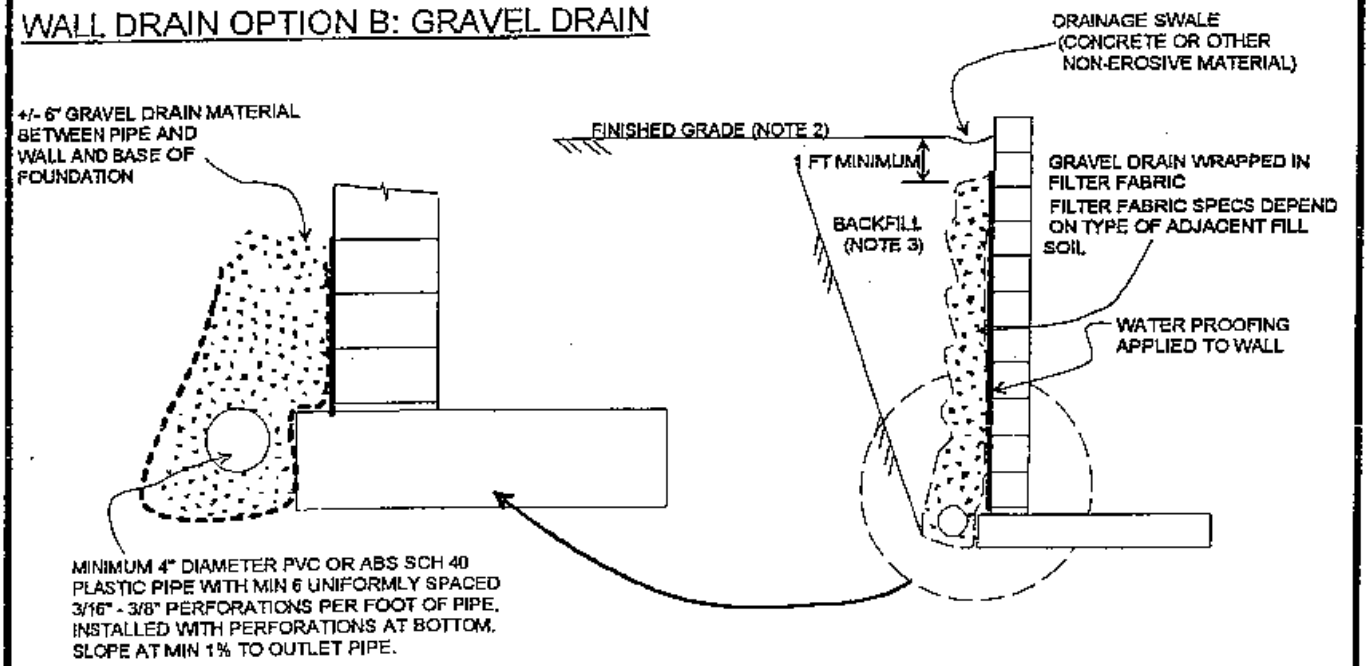
Earth Systems
Southern California

6-15-2004	PL-06242-01

WALL DRAIN OPTION A: SYNTHETIC GEODRAIN



WALL DRAIN OPTION B: GRAVEL DRAIN



NOTE 1)

GRAVEL DRAIN MATERIAL SHALL CONSIST OF CLEAN PEA GRAVEL OR ¾" GRAVEL WRAPPED IN APPROPRIATE FILTER FABRIC* OR CALIFORNIA CLASS II PERMEABLE MATERIAL

NOTE 2)

USE DRAINAGE SWALE OR GRADE TO DRAIN AWAY FROM WALL.

NOTE 3)

ENGINEERED BACKFILL COMPACTED AS RECOMMENDED IN GEOTECHNICAL REPORT. SPECIAL PROVISIONS WILL APPLY TO MODERATELY OR HIGHLY EXPANSIVE BACKFILL.

NOTE 4)

WEEP HOLES IN BASE BLOCK COURSE ARE NOT RECOMMENDED FOR BASEMENT RETAINING WALLS. BACK-DRAINS PIPES SHOULD DAYLIGHT OR DISCHARGE TO A SUITABLE PUMP.

NOT TO SCALE

PLATE VII

BACKDRAIN DETAILS - BASEMENT WALLS

PROPOSED RESIDENTIAL APARTMENT BUILDING
ADMIRALTY WAY
MARINA DEL REY, CALIFORNIA

Earth Systems
Southern California

6-15-2004	PL-06242-01

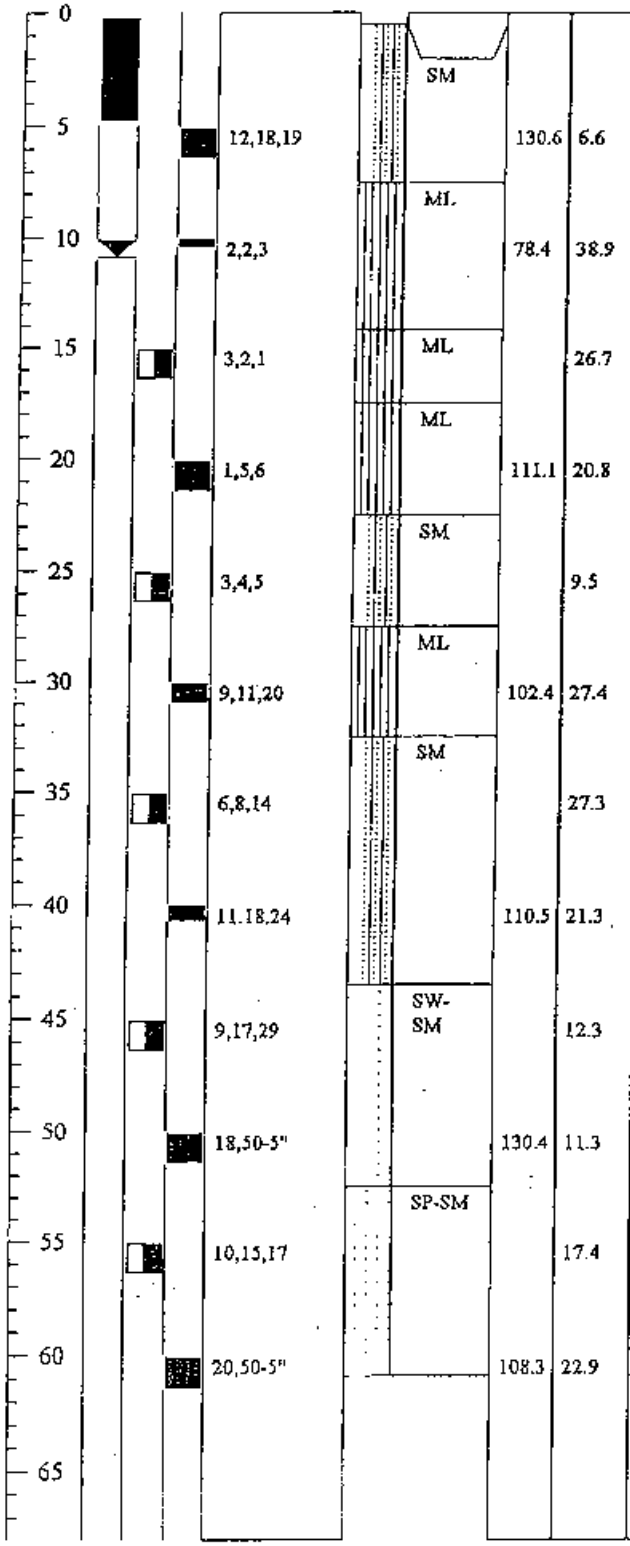
APPENDIX A

Unified Soil Classification System
Soil Consistency Terms
Boring Log Symbols
Logs of Test Borings

Earth Systems
Southern California
7949 Woodley Ave., Van Nuys, CA 91406
(818) 779-1999 / (818) 779-1990

Boring No:B1
Project Name: Admiralty Way, Marina Del Rey
Project Number: PL-06242-01
Boring Location: Per Plan

Drilling Date: March 10, 2004
Drilling Method: 8" Hollow Stem Auger
Drill Type: Mobile B-61
Logged By: Bill Shofner



DESCRIPTION OF UNITS

Asphalt Pavement

FILL - Dark olive gray silty fine sand with medium and coarse sand, moist, poorly compact, debris including brick.

FILL - Olive gray clayey silt, very moist, low plasticity, abundant asphalt chunks, soft.

At 11 feet, no asphalt debris in fill, low plasticity, wet.

Dark greenish gray clayey silt, saturated, soft - Possible FILL.

Dark greenish gray fine sandy silt with clay, very moist to wet, non plastic, weak cementation, stiff.

Dark yellowish brown silty fine to coarse sand and fine gravels to 3/4", saturated, loose.

Moderate yellowish brown fine sandy silt, saturated, medium dense.

Dark yellowish orange silty fine sand with clay, saturated, medium dense.

Pale yellowish brown, dense.

Dark yellowish orange slightly silty fine to coarse sand, saturated, dense.

Olive gray, fine gravel to 1/2", very dense.

Light olive gray slighlty silty fine to coarse sand, saturated, dense.

Olive gray, very dense.

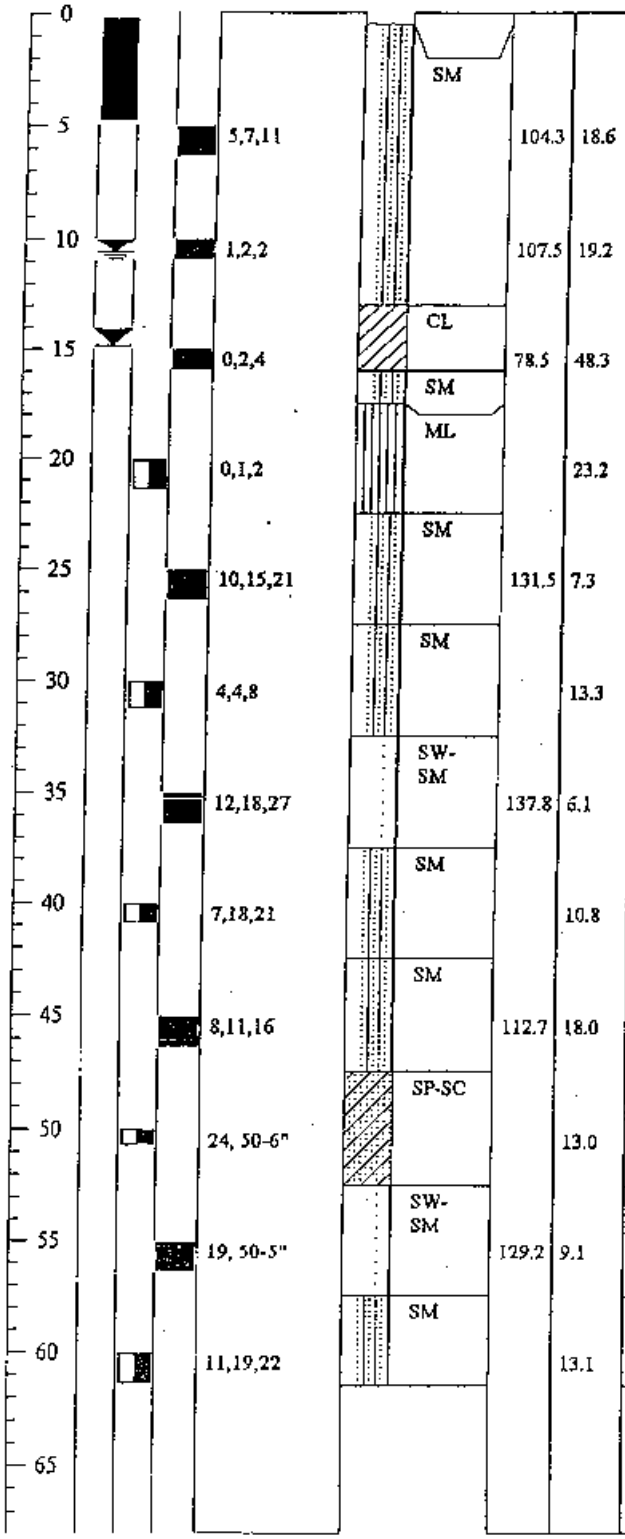
Total Depth = 60.9 feet.
Free groundwater first encountered at 11 feet, and later observed at 10.5 feet.

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradational.

Earth Systems
Southern California
7949 Woodley Ave., Van Nuys, CA 91406
(818) 779-1999 / (818) 779-1990

Boring No:B2
Project Name: Admiralty Way, Marina Del Rey
Project Number: PL-06242-01
Boring Location: Per Plan

Drilling Date: March 10, 2004
Drilling Method: 8" Hollow Stem Auger
Drill Type: Mobile B-61
Logged By: Bill Shofner



DESCRIPTION OF UNITS

Asphalt Pavement

FILL - Olive black silty fine to medium sand, slightly moist, poorly compact, debris including brick and wood.

FILL - Dusky yellowish brown very silty fine sand, abundant glass, metal and brick, poorly compact.

Dark greenish gray slightly silty clay, very moist, low to medium plasticity, abundant rootlets, soft.

Dark greenish gray fine silty sand, wet, non plastic.

Medium dark gray silt with fine sand, non plastic, very moist, soft.

Dark olive gray silty fine to coarse sand with abundant fine gravel to 1/2", saturated, medium dense.

Olive gray silty fine to medium sand with coarse sand and fine gravel to 1/8", saturated, medium dense.

Light olive gray slightly silty fine to coarse sand with fine gravel to 3/4", saturated, dense.

Light olive gray silty fine to medium sand interbedded with coarse sand, dense saturated.

Light olive gray silty fine to coarse sand, saturated, medium dense.

Dark yellowish orange to olive gray slighlty clayey sand with abundant fine gravel, saturated, very dense.

Olive gray slightly silty fine to coarse sand with fine gravel to 1/2", saturated, very dense.

Dark gray silty fine to coarse sand and fine gravel to 1/2", saturated, dense.

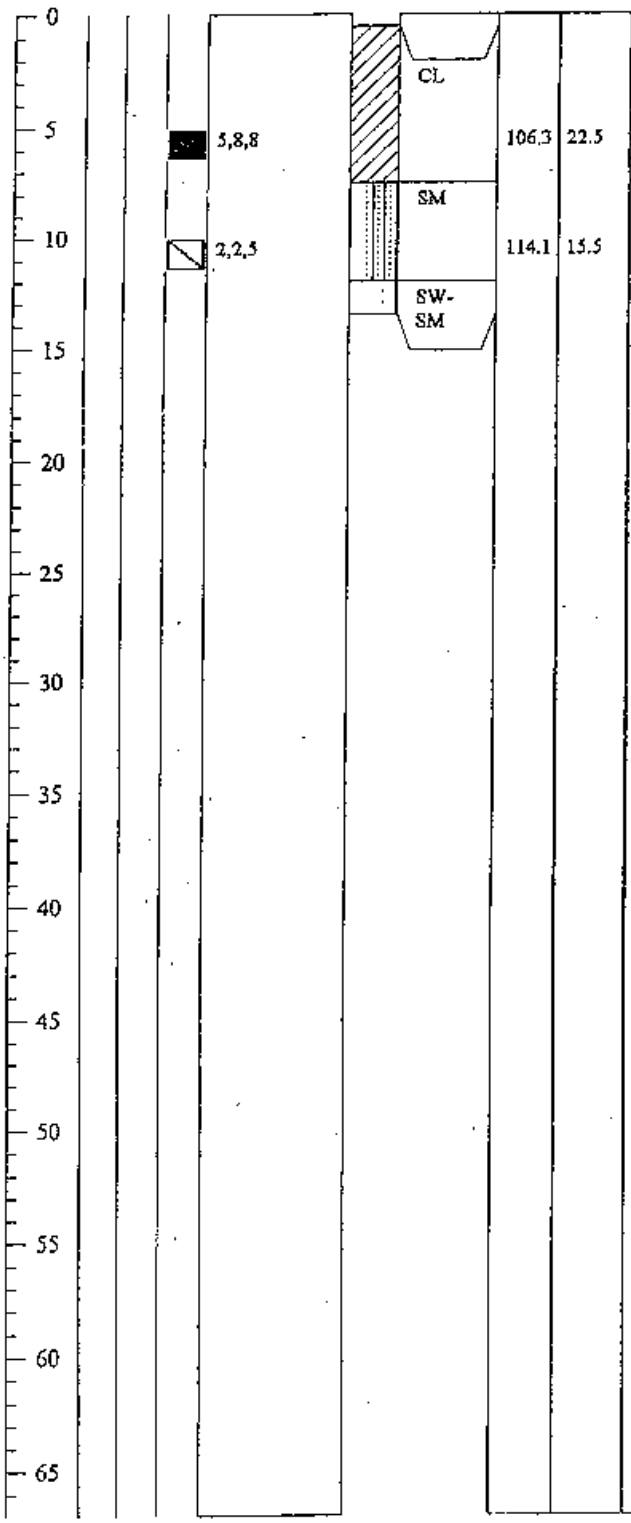
Total Depth = 61.5 feet.
Free groundwater first encountered at 15 feet, and later observed at 11 feet.

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradational.

Earth Systems
Southern California
7949 Woodley Ave., Van Nuys, CA 91406
(818) 779-1999 / (818) 779-1990

Boring No:B3
Project Name: Admiralty Way, Marina Del Rey
Project Number: PL-06242-01
Boring Location: Per Plan

Drilling Date: March 10, 2004
Drilling Method: 8" Hollow Stem Auger
Drill Type: Mobile B-61
Logged By: Bill Shofner



DESCRIPTION OF UNITS

Asphalt Pavement

FILL - Dark gray very silty clay, moist, poorly compact, low to medium plasticity, abundant debris including asphalt, brick and wood.

FILL - Dark olive gray silty fine to coarse sand and fine gravel to 1/2", moist, poorly compact, abundant debris including wood, wire, brick and asphalt.

FILL - Fine to coarse sand with interbedded fine to coarse gravel, moist. No recovery, logged from cuttings. Drilling "refusal."

Total Depth = 13.0 feet.

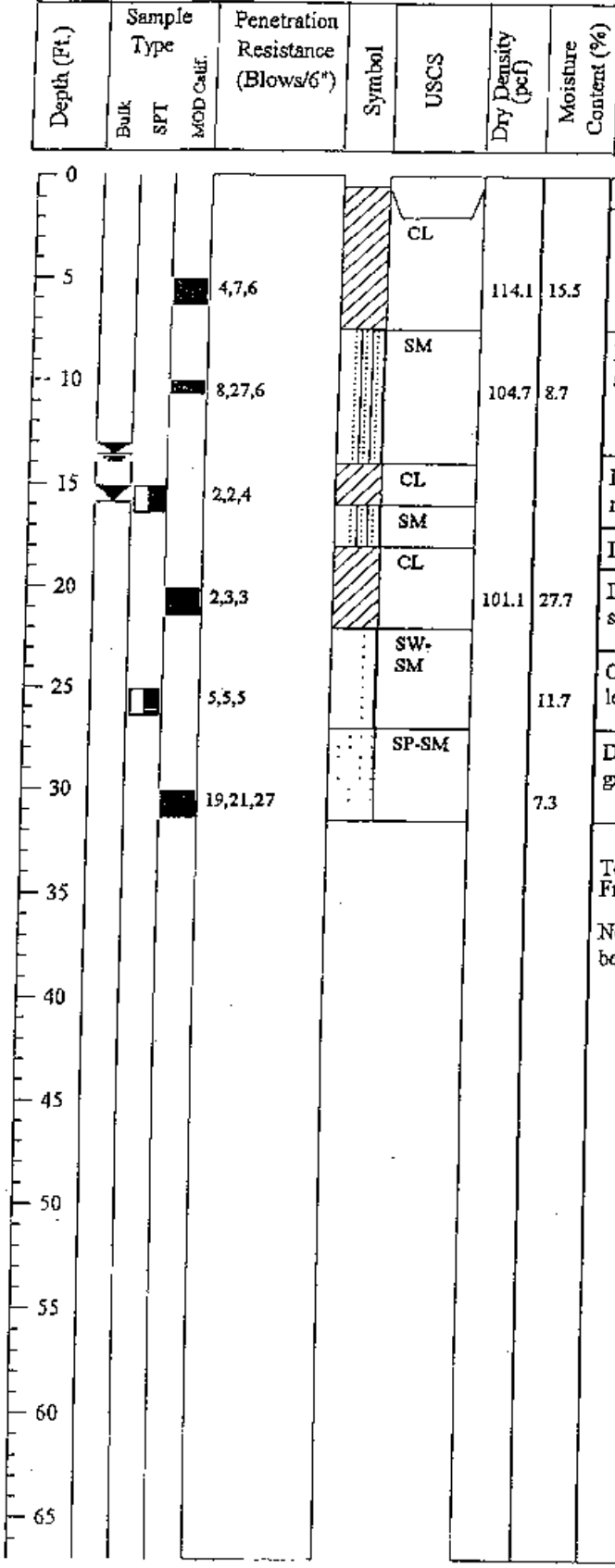
No free groundwater encountered during drilling.

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradational.

Earth Systems
Southern California
7949 Woodley Ave., Van Nuys, CA 91406
(818) 779-1999 / (818) 779-1990

Boring No:B4
Project Name: Admiralty Way, Marina Del Rey
Project Number: PL-06242-01
Boring Location: Per Plan

Drilling Date: March 11, 2004
Drilling Method: 8" Hollow Stem Auger
Drill Type: Mobile B-61
Logged By: Bill Shofner



DESCRIPTION OF UNITS

Asphalt Pavement.

FILL - Mottled olive black to dark greenish gray clay with silt, moist, poorly compact, moderate plasticity, abundant debris including brick.

FILL - Dark olive gray very silty fine sand with trace clay and trace coarse sand, moist, poorly compact, abundant brick and wood.

Dark greenish gray clay with silt, medium plasticity, wet, abundant rootlets, medium stiff.

Dark greenish gray silty fine sand, saturated.

Dark greenish gray silty clay, slight iron staining, medium plasticity, saturated, medium stiff.

Olive gray slighlty silty fine to coarse sand with fine gravel to 1/4", saturated, loose.

Dark yellowish brown slighlty silty fine to coarse sand with abundant fine gravel to 2", saturated, dense.

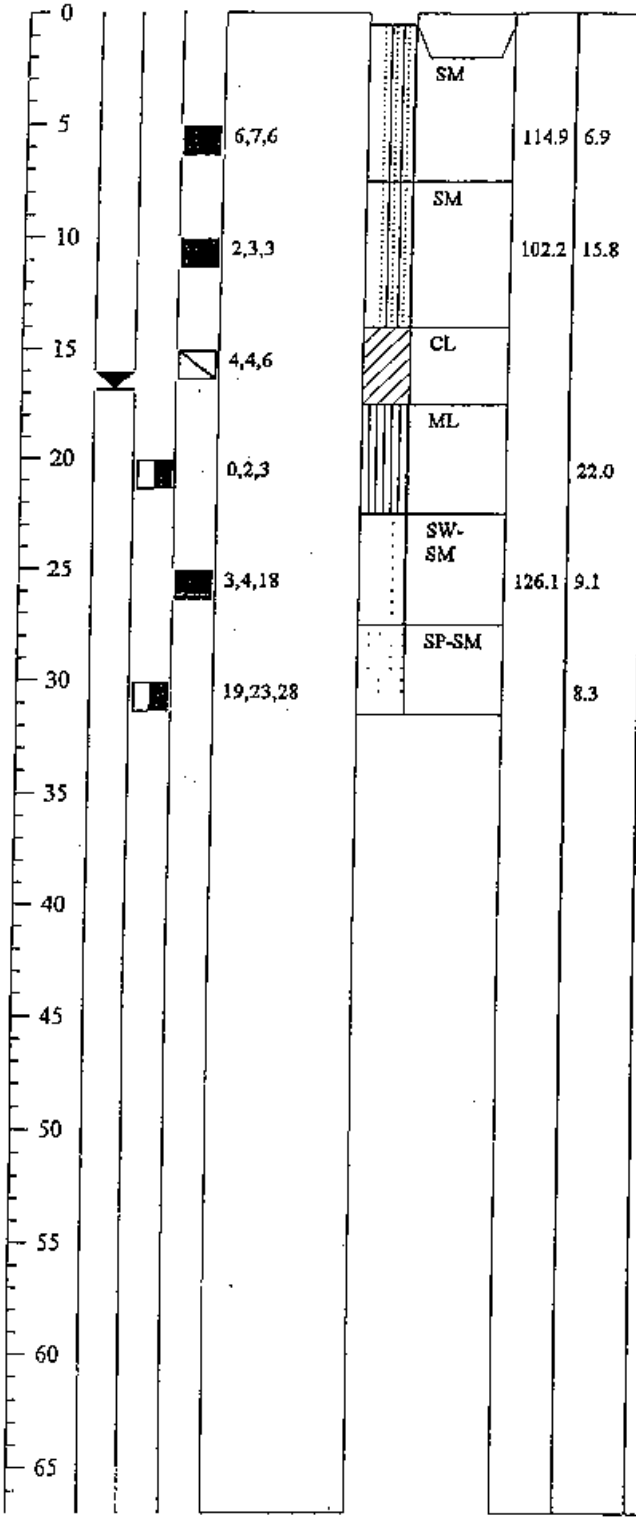
Total Depth = 31.5 feet.
Free groundwater first encountered at 16 feet, and later observed at 14 feet.

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradational.

Earth Systems
Southern California
7949 Woodley Ave., Van Nuys, CA 91406
(818) 779-1999 / (818) 779-1990

Boring No:B5
Project Name: Admiralty Way, Marina Del Rey
Project Number: PL-06242-01
Boring Location: Per Plan

Drilling Date: March 11, 2004
Drilling Method: 8" Hollow Stem Auger
Drill Type: Mobile B-61
Logged By: Bill Shofner



DESCRIPTION OF UNITS

Asphalt Pavement

FILL - Moderate yellow brown silty fine sand, moist, poorly compact, abundant debris including brick, wood, asphalt and glass.

FILL - Dark olive gray very silty fine sand, moist, poorly compact, abundant brick, wood, glass and asphalt.

Dark greenish gray silty clay, medium plasticity, moist to very moist, medium stiff.

Dark greenish gray clayey silt, low plasticity, wet, medium stiff.

Olive gray slightly silty fine to medium sand with coarse sand and fine gravel to 3/4", saturated, medium dense.

Dark yellowish brown slightly silty fine to coarse sand with fine gravel to 3/4", saturated, very dense.

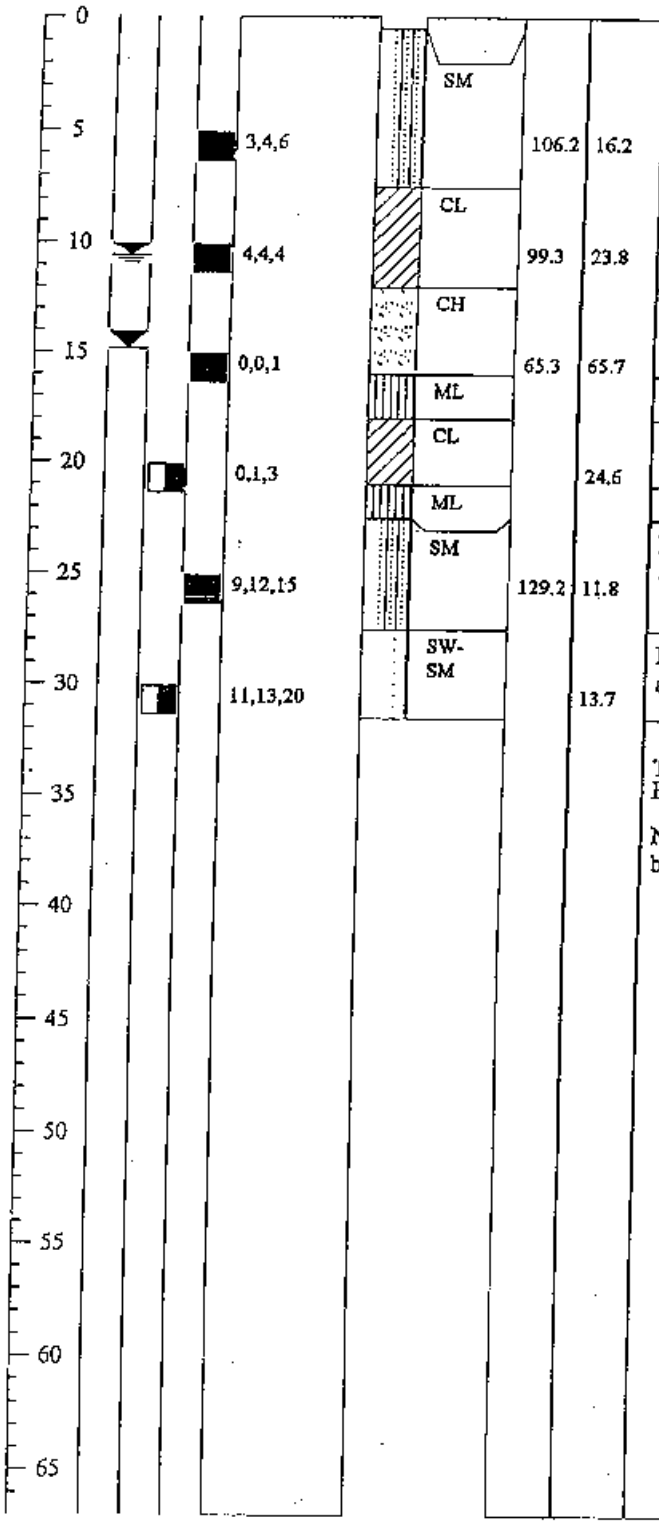
Total Depth = 31.5 feet.
Free groundwater encountered at 17 feet.

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradational.

Earth Systems
Southern California
7949 Woodley Ave., Van Nuys, CA 91406
(818) 779-1999 / (818) 779-1990

Boring No:B6
Project Name: Admiralty Way, Marina Del Rey
Project Number: PL-06242-01
Boring Location: Per Plan

Drilling Date: March 11, 2004
Drilling Method: 8" Hollow Stem Auger
Drill Type: Mobile B-61
Logged By: Bill Shofner



DESCRIPTION OF UNITS

Asphalt Pavement

FILL - Dark olive gray silty fine sand, moist, poorly compact, some debris including brick and wood.

FILL - Dark yellowish brown silty clay with fine sand, very moist, poorly compact. LL=30, PI=16.

Light olive gray silty clay, wet, very soft. LL=59, PI=37.

Dark gray clayey silt, non to low plasticity, saturated, very soft.

Medium dark gray silty clay, low plasticity, saturated, very soft.

Medium dark gray fine sandy silt with clay, non plastic, saturated, soft.

Moderate yellowish brown silty fine to coarse sand and fine gravel to 3/4", saturated, medium dense.

Moderate yellowish brown sighlty silty fine to medium sand with coarse sand and fine gravel to 1/4", saturated, dense.

Total Depth = 31.5 feet.
Free groundwater first encountered at 15 feet, and later observed at 11 feet.

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradational.

APPENDIX B

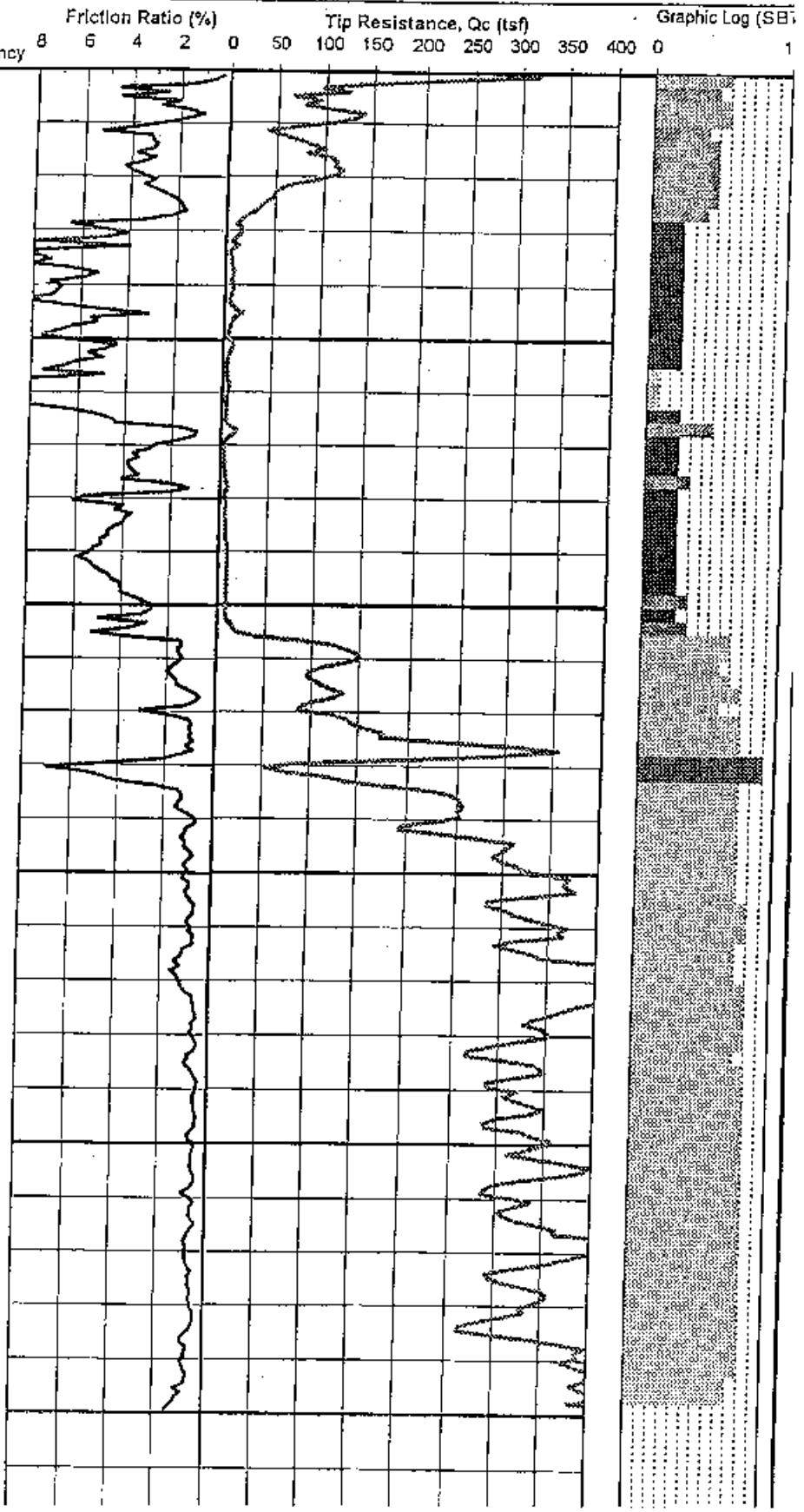
Logs of CPT Soundings

Earth Systems
Southwest

CPT No: CPT-1
Project Name: Admiralty Way - Prestige
Project No.: PL-06242-01
Location: See Site Exploration Plan

CPT Vendor: Holguin Fahan & Associates
Truck Mounted Electric
Cone with 23-ton reaction
Date: 3/10/2004

DEPTH (FEET)	Interpreted Soil Stratigraphy Robertson & Campanella ('89)	Density/Consistency
	Silty Sand to Sandy Silt	very dense
	Silty Sand to Sandy Silt	very dense
	Sandy Silt to Clayey Silt	dense
	Sandy Silt to Clayey Silt	very dense
5	Sandy Silt to Clayey Silt	dense
	Silty Clay to Clay	very stiff
	Clay	firm
	Clay	firm
	Clay	stiff
10	Clay	firm
	Clay	firm
	Organic Material	firm
	Clay	soft
	Clayey Silt to Silty Clay	firm
15	Clay	soft
	Clay	firm
	Clay	firm
	Clay	firm
	Clay	firm
20	Clay	firm
	Silty Clay to Clay	stiff
	Sand to Silty Sand	dense
	Silty Sand to Sandy Silt	dense
	Sand to Silty Sand	medium dense
25	Sand	dense
	Silty Sand to Sandy Silt	very dense
	Silty Sand to Sandy Silt	very dense
	Sand	dense
	Sand	very dense
30	Sand	very dense
	Sand	very dense
	Sand	very dense
	Sand	very dense
	Gravelly Sand to Sand	very dense
35	Gravelly Sand to Sand	dense
	Gravelly Sand to Sand	dense
	Gravelly Sand to Sand	dense
	Gravelly Sand to Sand	dense
40	Gravelly Sand to Sand	dense
	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	dense
	Gravelly Sand to Sand	dense
	Gravelly Sand to Sand	very dense
45	Gravelly Sand to Sand	dense
	Gravelly Sand to Sand	dense
	Gravelly Sand to Sand	dense
	Gravelly Sand to Sand	dense
	Gravelly Sand to Sand	very dense
50		



End of Sounding @ 50.0 feet

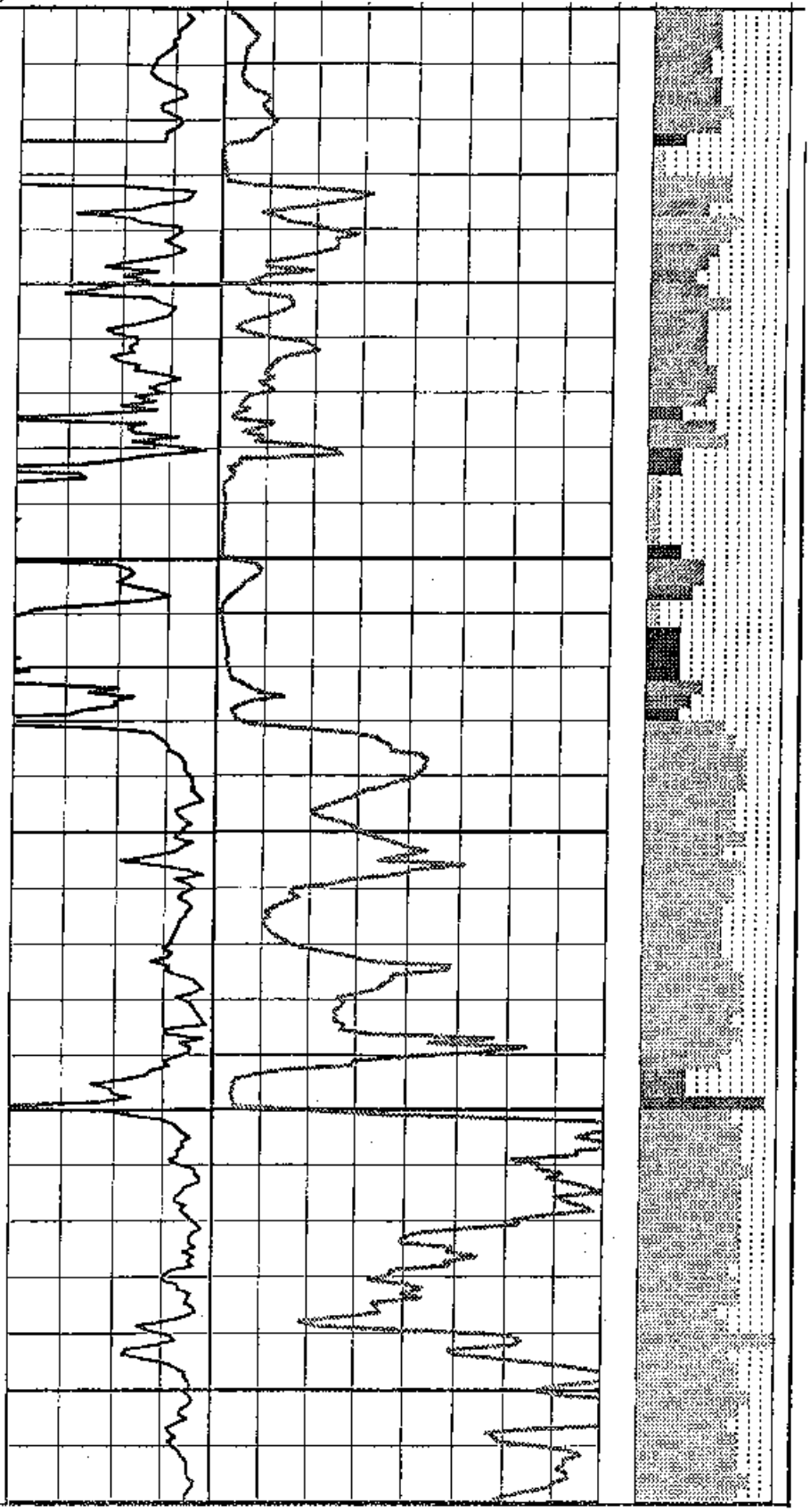
Earth Systems
Southwest

CPT No: CPT-2
Project Name: Admiralty Way - Prestige
Project No.: PL-06242-01
Location: See Site Exploration Plan

CPT Vendor: Holguin Fahan & Associates
Truck Mounted Electric
Cone with 23-ton reaction
Date: 3/10/2004

DEPTH (FEET)	Interpreted Soil Stratigraphy Robertson & Campanella ('89)	Density/Consistency
	Sandy Silt to Clayey Silt	medium dense
	Clayey Silt to Silty Clay	medium dense
	Sandy Silt to Clayey Silt	medium dense
	Sandy Silt to Clayey Silt	dense
	Clay	very stiff
5	Organic Material	soft
	Silty Sand to Sandy Silt	very dense
	Sandy Silt to Clayey Silt	very dense
	Silty Sand to Sandy Silt	dense
	Clayey Silt to Silty Clay	dense
10	Sandy Silt to Clayey Silt	dense
	Clayey Silt to Silty Clay	medium dense
	Clayey Silt to Silty Clay	dense
	Sandy Silt to Clayey Silt	medium dense
	Silty Clay to Clay	very stiff
15	Sandy Silt to Clayey Silt	dense
	Clay	stiff
	Organic Material	firm
	Organic Material	firm
	Clay	stiff
20	Clayey Silt to Silty Clay	very stiff
	Clay	firm
	Organic Material	firm
	Clay	stiff
	Clay	very stiff
25	Clay	very stiff
	Silty Sand to Sandy Silt	very dense
	Sand	dense
	Sand	medium dense
	Sand to Silty Sand	dense
30	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
	Silty Sand to Sandy Silt	medium dense
	Silty Sand to Sandy Silt	medium dense
	Sand to Silty Sand	dense
35	Sand	medium dense
	Sand	medium dense
	Sand	dense
	Sandy Silt to Clayey Silt	medium dense
	Overconsolidated Soil	hard
40	Sand	very dense
	Sand	very dense
	Sand	very dense
	Sand	very dense
	Sand	dense
45	Sand	dense
	Sand	dense
	Sand to Silty Sand	dense
	Silty Sand to Sandy Silt	very dense
	Sand	very dense
50	Sand	very dense
	Sand	dense
	Sand	very dense

End of Sounding @ 55.0 feet

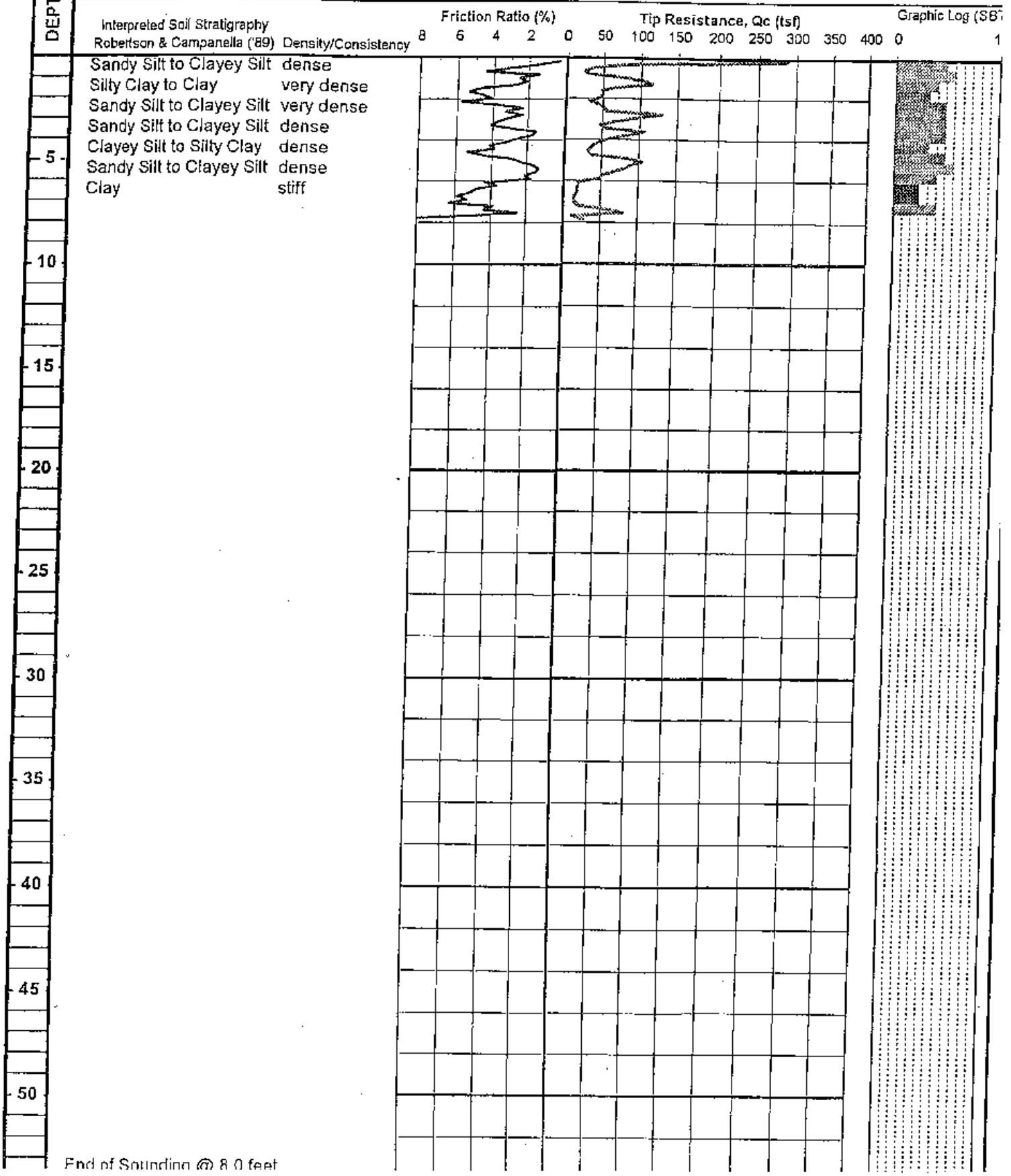


Earth Systems
Southern California

CPT No: CPT-1x
Project Name: Admiralty Way - Prestige
Project No.: PL-06242-01
Location: See Site Exploration Plan

CPT Vendor: Holguin Fahan & Associates
Truck Mounted Electric
Cone with 23-ton reaction
Date: 3/10/2004

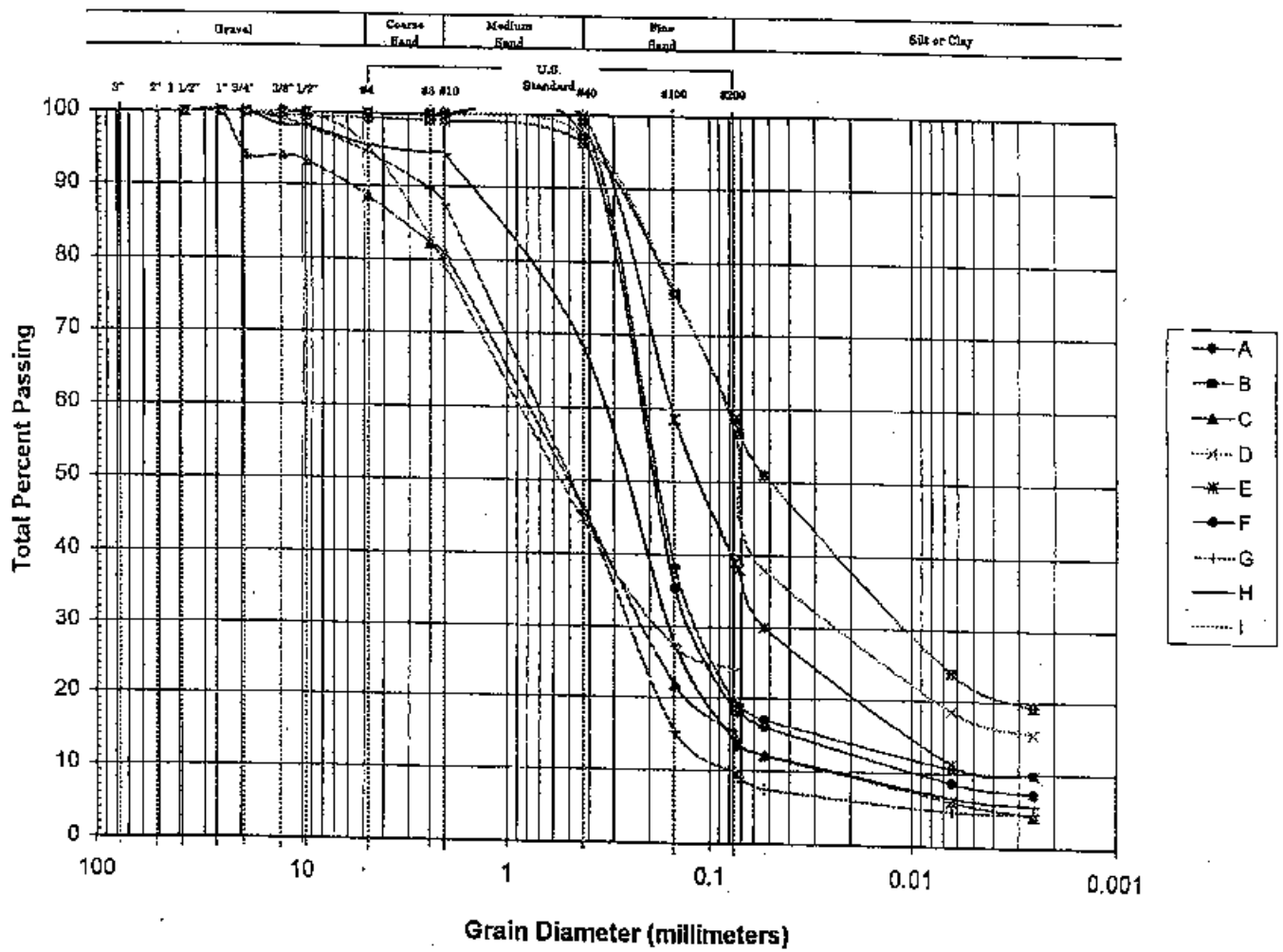
Interpreted Soil Stratigraphy Robertson & Campanella ('89)	Density/Consistency
Sandy Silt to Clayey Silt	dense
Silty Clay to Clay	very dense
Sandy Silt to Clayey Silt	very dense
Sandy Silt to Clayey Silt	dense
Clayey Silt to Silty Clay	dense
Sandy Silt to Clayey Silt	dense
Clay	stiff



End of Sounding @ 8.0 feet

APPENDIX C

Summary of Laboratory Test Results



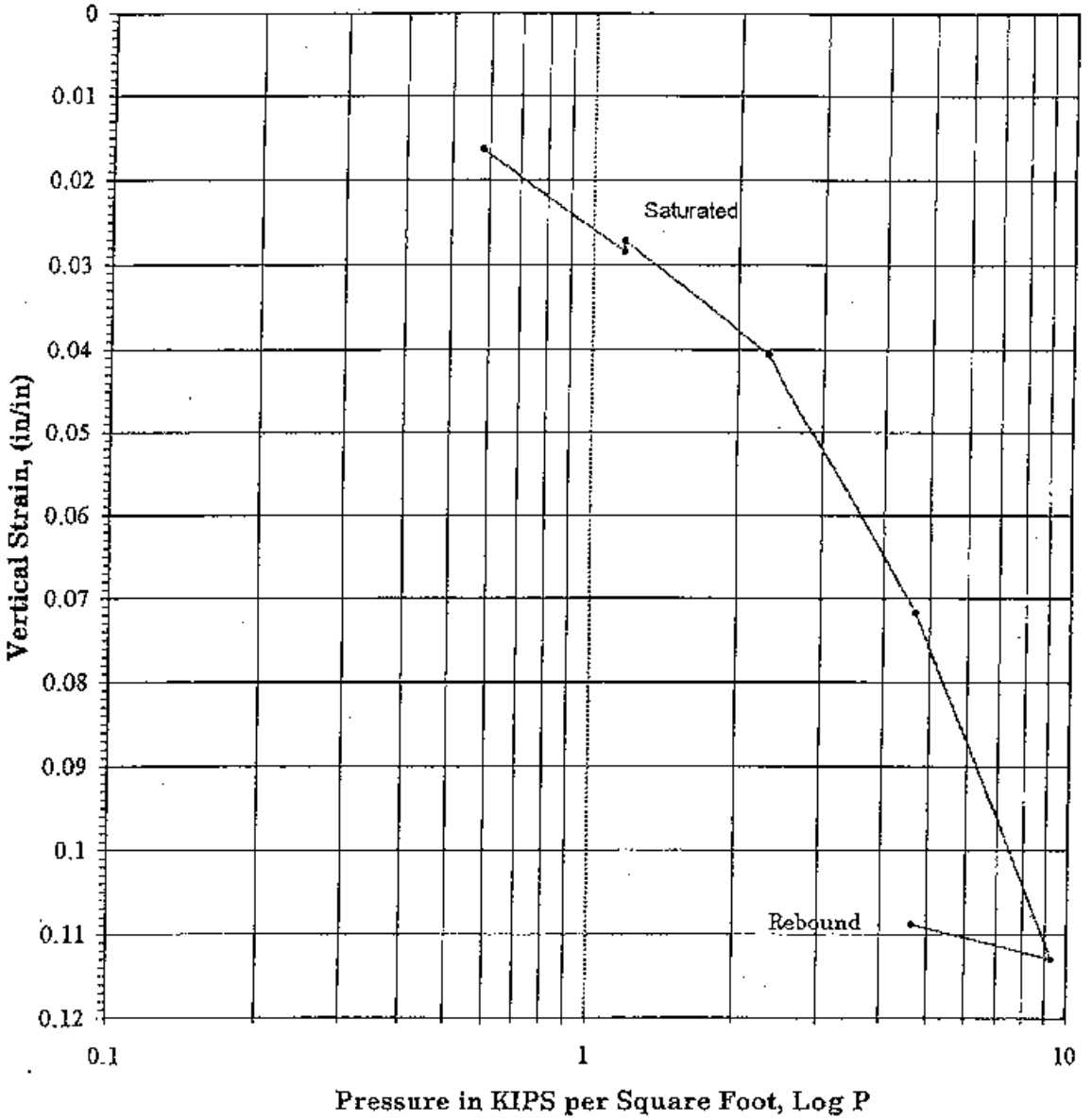
	Sample Location	Soil Type	% Fines	% Clay
A	Boring B1 at 15 feet	Silty fine sand (SM)	19	10
B	Boring B1 at 20 feet	Sandy silt with clay (ML)	59	22
C	Boring B1 at 25 feet	Silty Fine to Coarse Sand (SM)	15	5
D	Boring B1 at 30 feet	Fine sandy silt with clay (ML)	57	17
E	Boring B1 at 35 feet	Silty fine sand with clay (SM)	39	11
F	Boring B1 at 40 feet	Silty fine sand with clay (SM)	18	8
G	Boring B1 at 45 feet	Slightly silty fine to medium sand (SW-SM)	10	5
H	Boring B1 at 55 feet	Slightly silty fine to coarse sand (SW-SM)	14	6
I	Boring B2 at 45 feet	Silty fine to coarse sand (SM)	24	

Grain Size Analysis Summary

Proposed Residential Development
Admiralty Way, Parcel OT
Marina Del Rey, California

Earth Systems Southern California

6/15/2004 | PL-06242-01



Sample Location: B4 at 20 feet

Material: Silty Clay (CL)

Initial Dry Density: 101.1 PCF

Moisture Content: 27.7%

Percent Hydroconsolidation: 0.1%

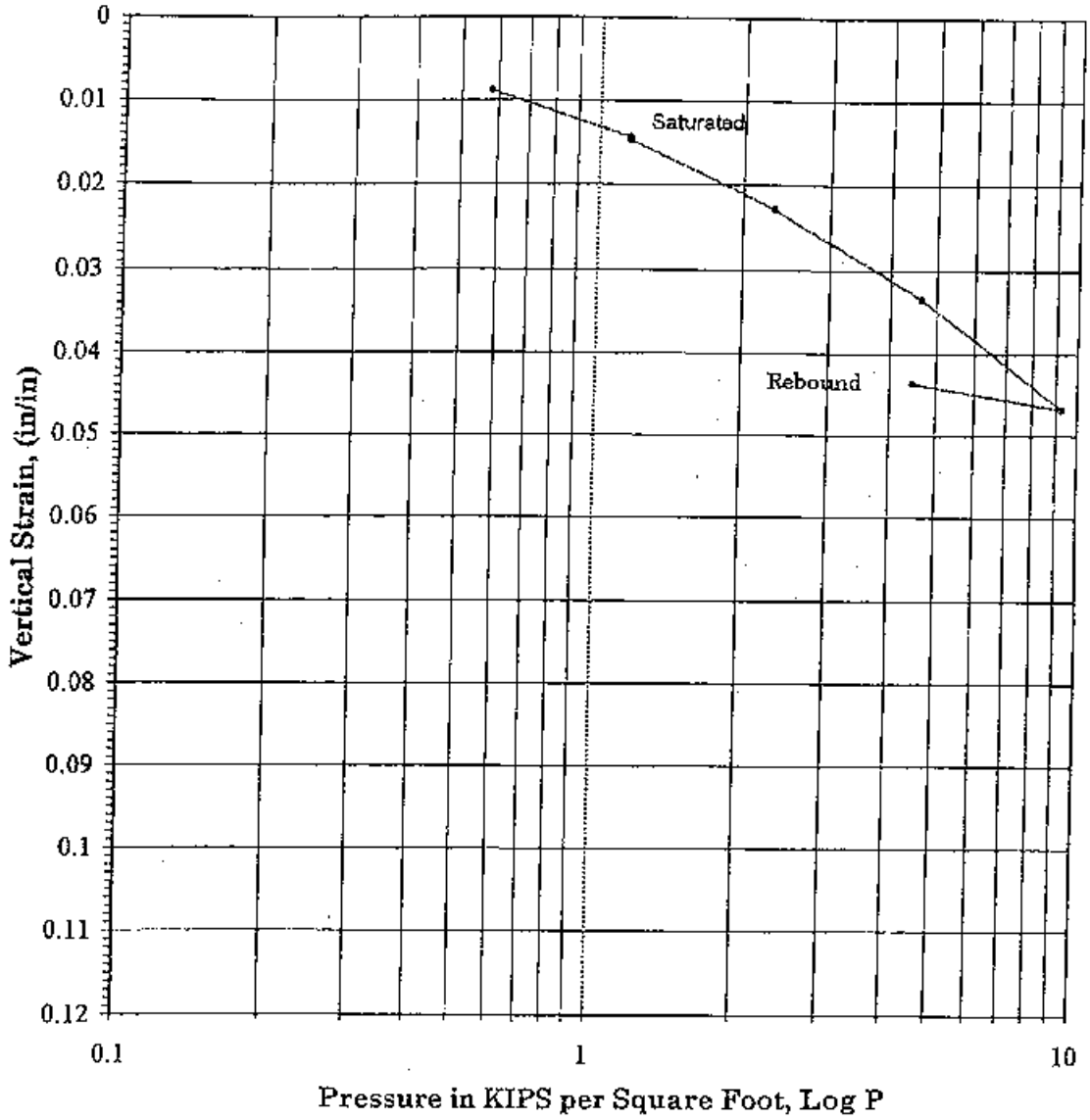
* Test Method: ASTM D-2435

Consolidation Test

Admiralty Way
Marina del Rey, California

Earth Systems
Southern California

6/15/2004	PL-06242-01



Sample Location: B2 at 45 feet

Material: Silty Sand (SM)

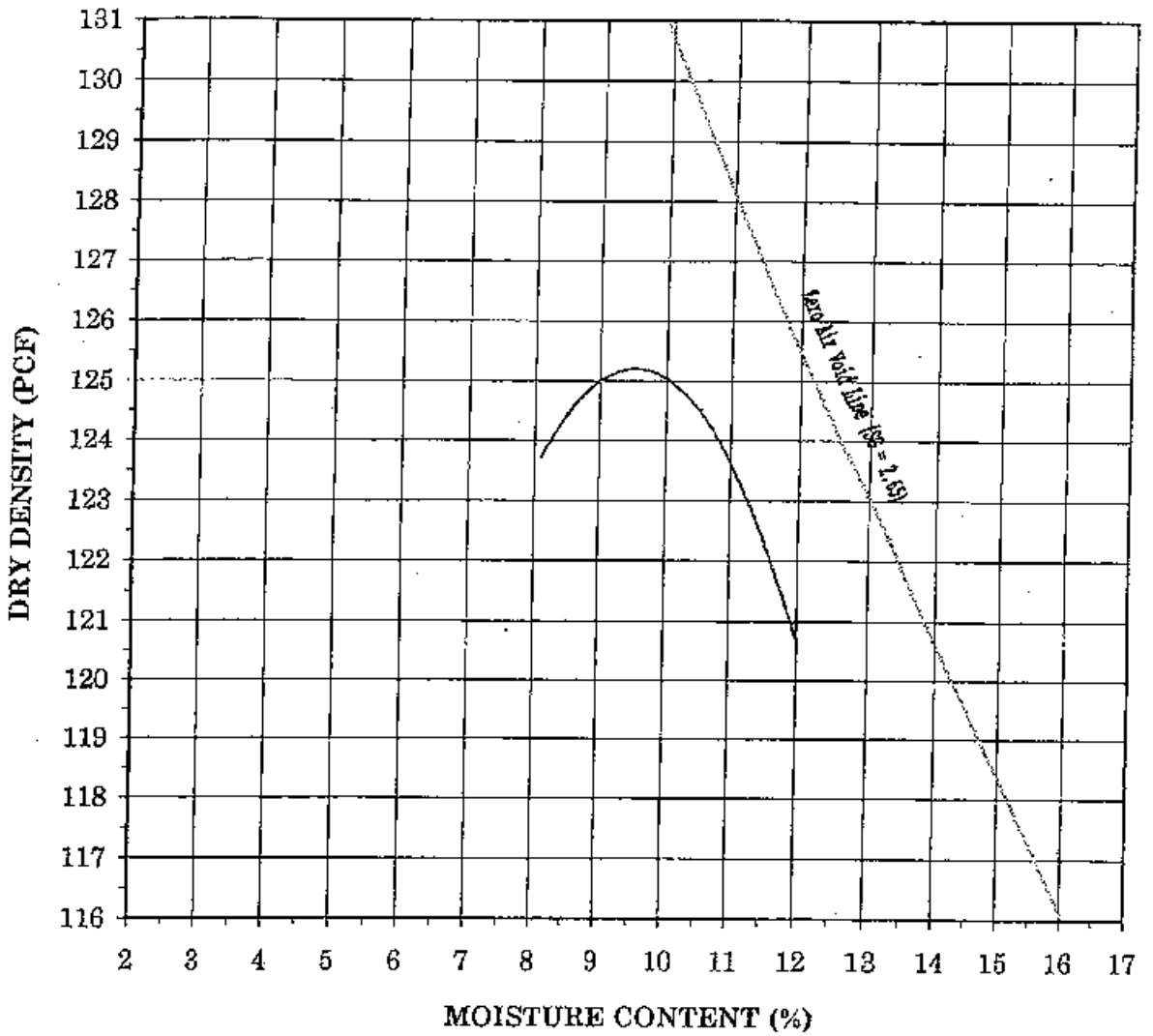
Initial Dry Density: 112.7 PCF

Moisture Content: 18.0%

Percent Hydroconsolidation: 0.0%

* Test Method: ASTM D-2435

Consolidation Test	
Admiralty Way Marina del Rey, California	
Earth Systems Southern California	
6/15/2004	PL-06242-01



Maximum Density - Optimum Moisture Characteristics*

Sample Location: B1 at 0 to 5 feet

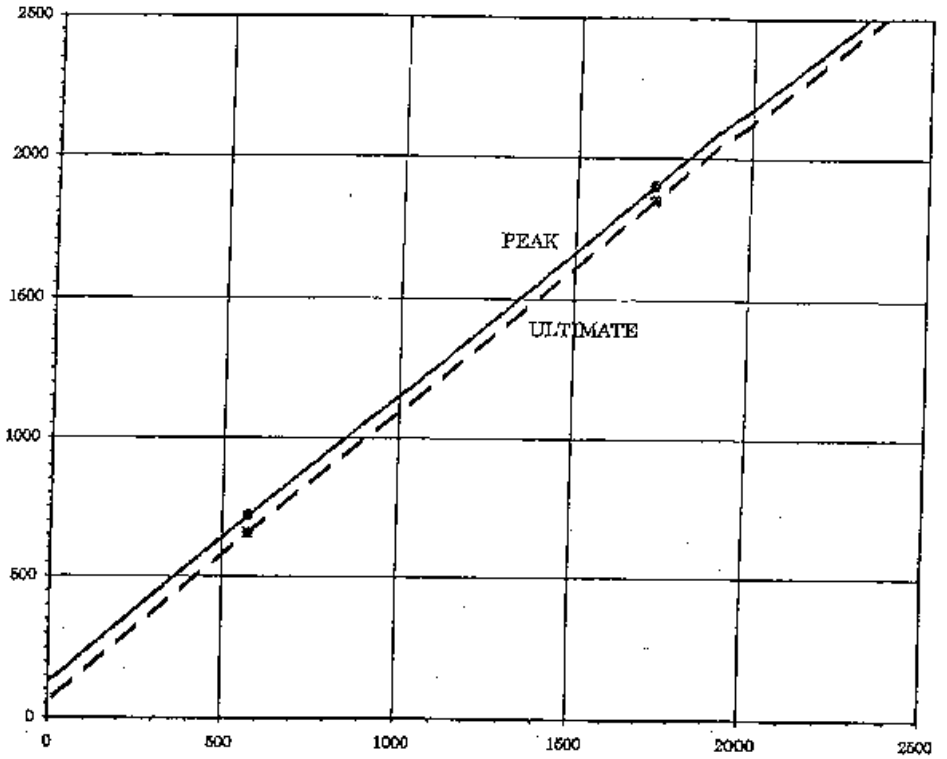
Material: Silty Fine to Coarse Sand (SM)

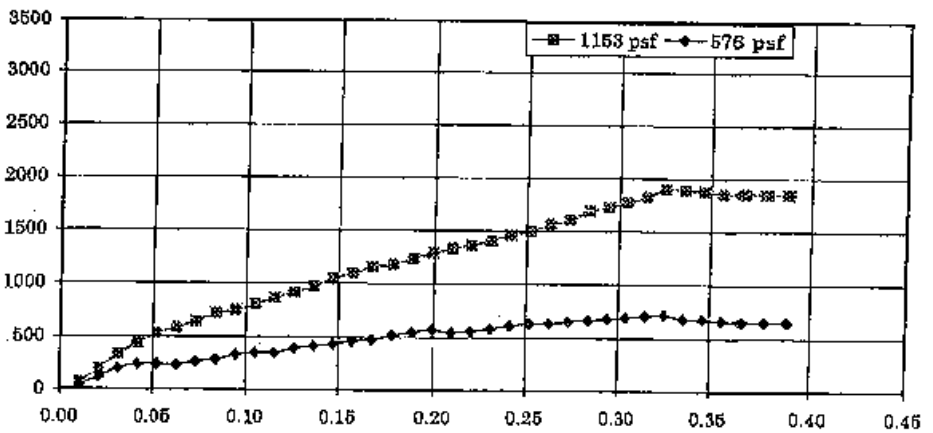
Maximum Density (pcf): 125.5

Optimum Moisture: 10.0%

* Test Method: ASTM D-1557

MAXIMUM DENSITY - OPTIMUM MOISTURE	
Admiralty Way Marina Del Rey, California	
Earth Systems Southern California	
6/15/2004	PL-06242-01





DIRECT SHEAR DATA*

Sample Location: B2 at 10 feet

Material: Fill - Silty sand with debris

		Peak	Ultimate
Dry Density (pcf):	107.5		
ϕ Angle of Friction (degrees):		46	46
c Cohesive Strength (psf):		120	50

Test Type: Peak and Ultimate

* Test Method: ASTM D-3080

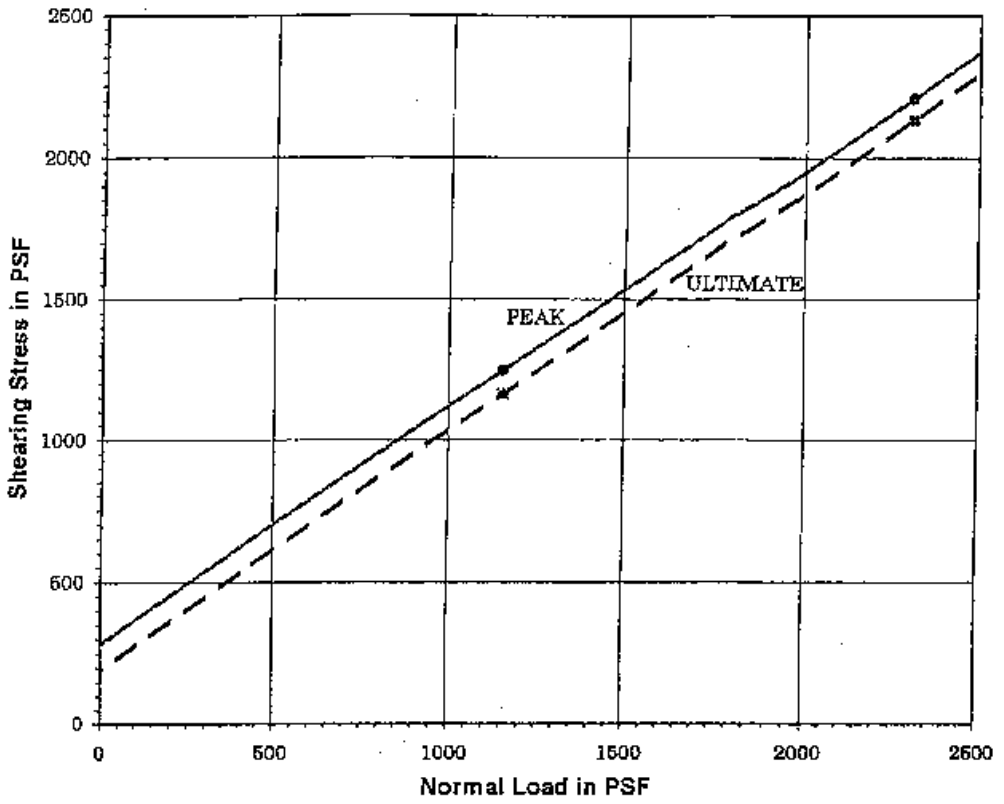
DIRECT SHEAR TEST

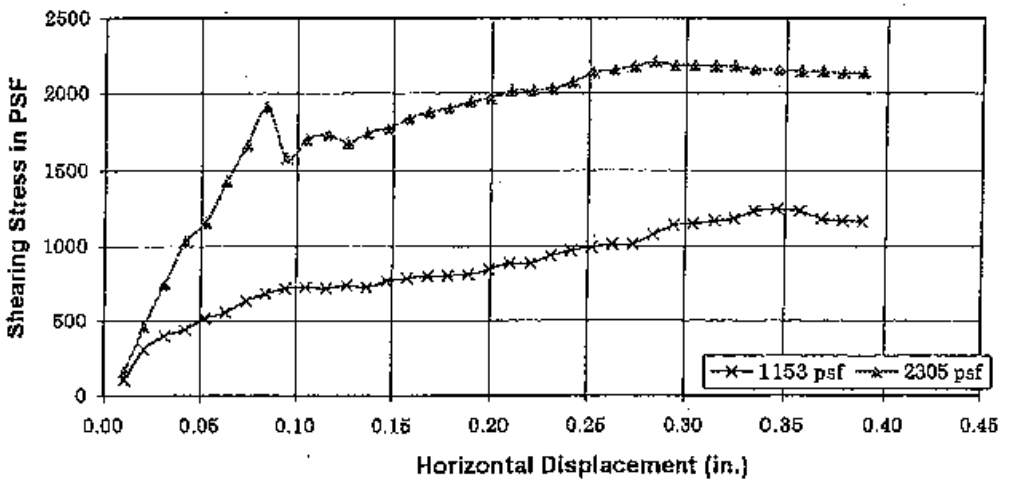
Admiralty Way

Marina del Rey, California

Earth Systems
Southern California

6/15/2004	PL-06242-01





DIRECT SHEAR DATA*

Sample Location: B2 at 25 feet
Material: Silty Sand (SM)

		Peak	Ultimate
Dry Density (pcf):	131.1		
ϕ Angle of Friction (degrees):		40	32
c Cohesive Strength (psf):		280	180

Test Type: Peak and Ultimate

* Test Method: ASTM D-3080

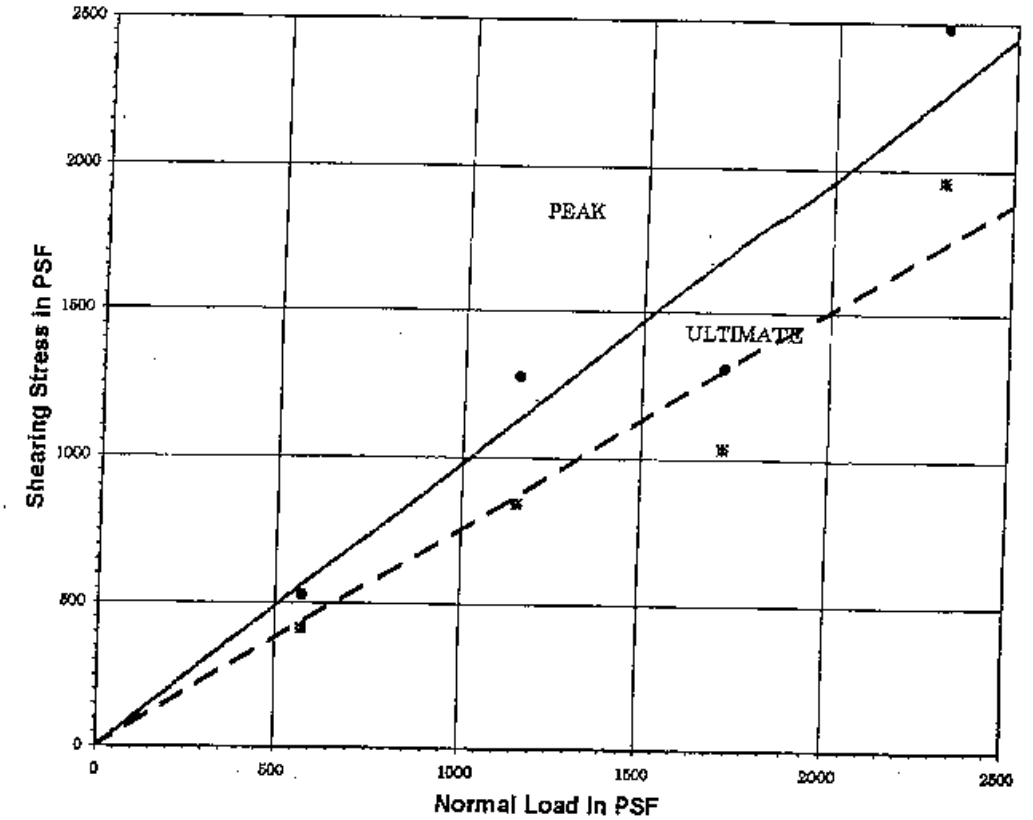
DIRECT SHEAR TEST

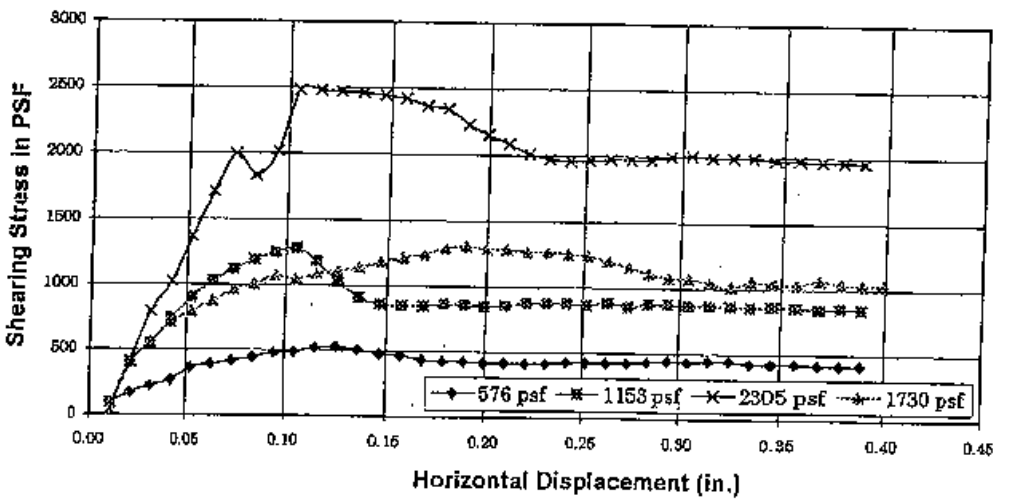
Admiralty Way

Marina del Rey, California

Earth Systems
Southern California

6/15/2004	PL-06242-01





DIRECT SHEAR DATA*

Sample Location: B1 at 60 feet
Material: Slightly Silty Sand (SP-SM)

		Peak	Ultimate
Dry Density (pcf):	108.3		
ϕ Angle of Friction (degrees):		46	40
c Cohesive Strength (psf):		0	0

Test Type: Peak and Ultimate

* Test Method: ASTM D-3080

DIRECT SHEAR TEST

Admiralty Way

Marina del Rey, California

Earth Systems
Southern California

6/15/2004 | PL-06242-01

M. J. Schiff & Associates, Inc.
Consulting Corrosion Engineers - Since 1959
431 W. Baseline Road
Claremont, CA 91711
Phone: (909) 626-0967 Fax: (909) 626-3316
E-mail lab@mjschiff.com
website: mjschiff.com

Table 1 - Laboratory Tests on Soil Samples

Admiralty Way, Manna del Rey, CA
Your #PL-06242-01, MJS&A #04-0386LAB
23-Mar-04

Sample ID			B1 @ 0-5' (SM)
Resistivity		Units	
as-received		ohm-cm	4,400
saturated		ohm-cm	530
pH			7.7
Electrical Conductivity		mS/cm	1.32
Chemical Analyses			
Cations			
calcium	Ca^{2+}	mg/kg	966
magnesium	Mg^{2+}	mg/kg	83
sodium	Na^{1+}	mg/kg	181
Anions			
carbonate	CO_3^{2-}	mg/kg	ND
bicarbonate	HCO_3^{1-}	mg/kg	128
chloride	Cl^{1-}	mg/kg	220
sulfate	SO_4^{2-}	mg/kg	2,620
Other Tests			
ammonium	NH_4^{1+}	mg/kg	2.1
nitrate	NO_3^{1-}	mg/kg	2.7
sulfide	S^{2-}	qual	na
Redox		mV	na

Electrical conductivity in millisiemens/cm and chemical analysis were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

TABLE C-I

SUMMARY OF EXPANSION INDEX* TESTING

Sample Location	Material Description	Expansion Index	Expansion Potential
Boring B1 at 0 to 5 feet	Silty Sand (Fill)	6	Very Low

*ASTM D 4829 Test Method

TABLE C-II

SUMMARY OF ATTERBERG LIMITS ** TESTING

Sample Location	Material Description	Liquid Limit (LL)	Plasticity Index (PI)
Boring B6 at 10 feet	Silty Clay with Sand (CL)	30%	16%
Boring B6 at 15 feet	Silty Clay (CH)	59%	37%

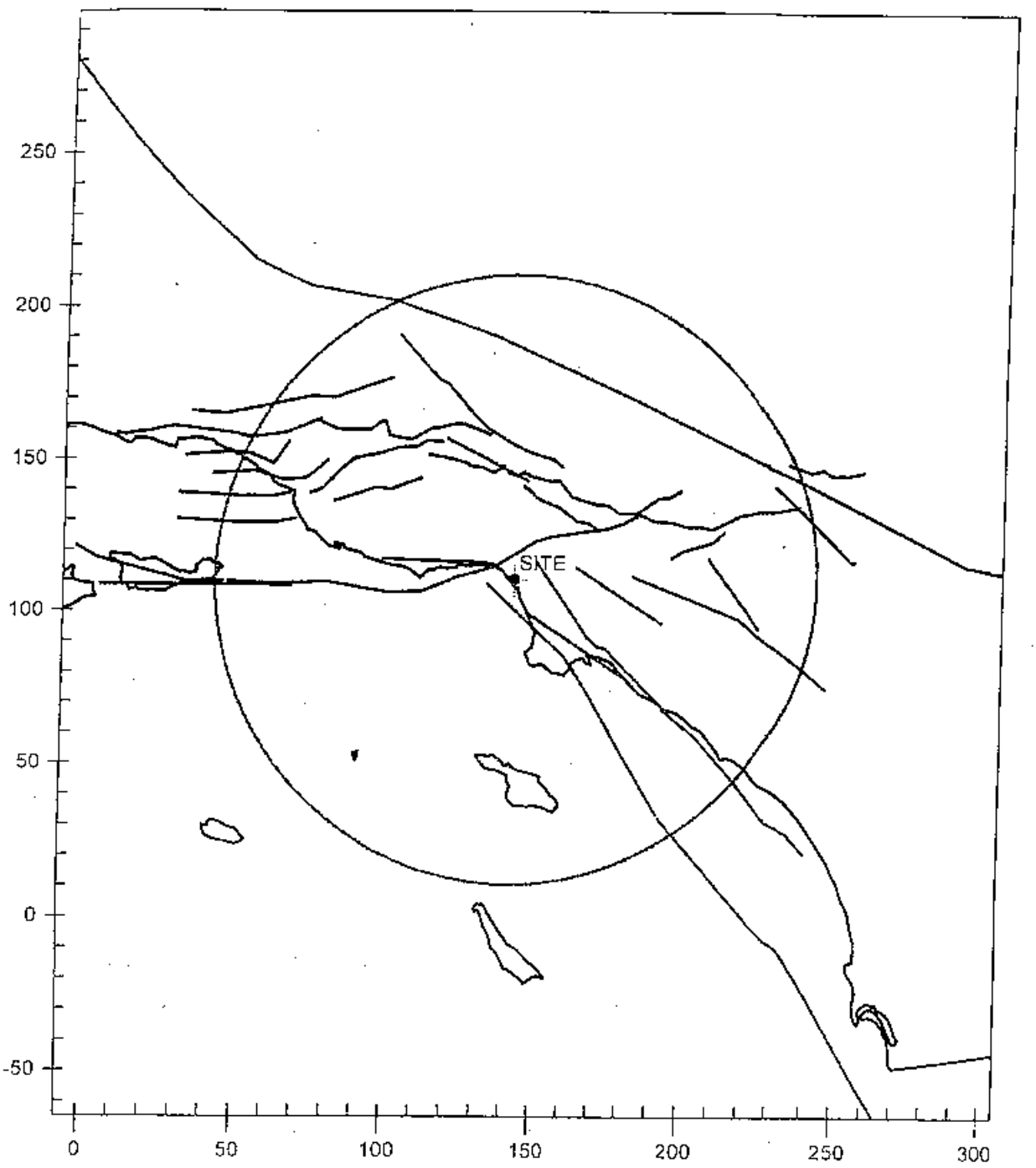
**ASTM D 4318 Test Method

APPENDIX D

Seismic Data

CALIFORNIA FAULT MAP

Admiralty Way



CLOSEST DISTANCES BETWEEN SITE AND FAULT RUPTURES

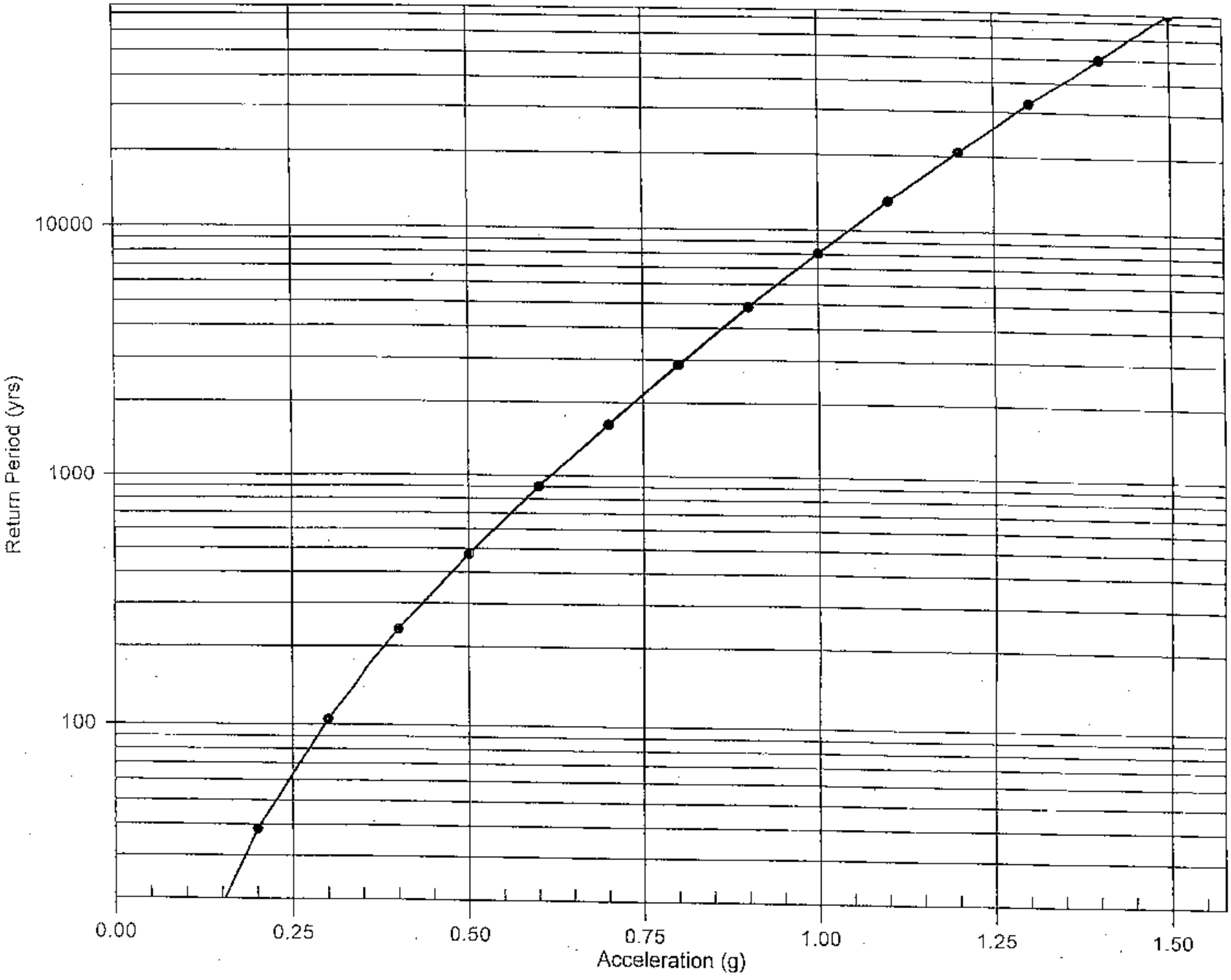
NO.	FAULT NAME	CD_1DRP	CD_2DRP	CDIST	CLODIS	CD_EPI	CD_HYPO	
1	SANTA MONICA	7.1	7.1	7.1	7.1	7.4	7.5	km
2	PALOS VERDES	7.3	7.3	7.3	7.3	7.3	7.4	km
3	MALIBU COAST	8.7	8.7	8.7	8.7	9.8	9.8	km
4	NEWPORT-INGLEWOOD (L.A.Basin)	9.5	9.5	9.5	9.5	9.6	9.6	km
5	HOLLYWOOD	11.9	11.9	11.9	11.9	13.0	13.0	km
6	COMPTON THRUST	12.2	10.1	12.4	12.4	11.2	13.3	km
7	ELYSIAN PARK THRUST	21.4	21.4	23.6	23.6	22.9	25.1	km
8	ANACAPA-DUME	21.9	21.9	21.9	21.9	23.2	23.2	km
9	RAYMOND	26.4	26.4	26.4	26.4	27.5	27.5	km
10	VERDUGO	27.7	27.7	27.7	27.7	28.5	28.5	km
11	NORTHRIDGE (E. Oak Ridge)	33.0	18.4	26.9	26.9	19.7	27.4	km
12	SIERRA MADRE	33.3	33.3	33.3	33.3	34.5	34.5	km
13	SIERRA MADRE (San Fernando)	34.4	34.4	34.4	34.4	35.1	35.1	km
14	SANTA SUSANA	36.1	36.1	36.1	36.1	37.1	37.1	km
15	SAN GABRIEL	40.5	40.5	40.5	40.5	40.8	40.8	km
16	WHITTIER	40.4	40.4	40.4	40.4	41.4	41.5	km
17	SIMI-SANTA ROSA	46.3	46.3	46.3	46.3	47.2	47.3	km
18	CLAMSHELL-SAWPIT	47.3	46.9	47.1	47.1	48.0	48.2	km
19	HOLSER	48.9	44.0	45.8	45.8	45.0	46.5	km
20	OAK RIDGE (Onshore)	52.1	47.2	49.2	49.2	48.3	49.9	km
21	SAN JOSE	53.6	52.3	53.3	53.3	53.4	54.3	km
22	SAN CAYETANO	57.6	57.6	57.6	57.6	58.1	58.1	km
23	CHINO-CENTRAL AVE. (Elsinore)	65.8	59.7	61.7	61.7	60.7	62.4	km
24	NEWPORT-INGLEWOOD (Offshore)	66.4	66.4	66.4	66.4	67.5	67.5	km
25	CUCAMONGA	68.9	67.4	68.2	68.2	68.5	69.3	km
26	SAN ANDREAS - 1857 Rupture	70.5	70.5	70.5	70.5	70.5	70.6	km
27	SAN ANDREAS - Mojave	70.5	70.5	70.5	70.5	70.5	70.5	km
28	VENTURA - PITAS POINT	74.8	74.8	74.8	74.8	75.4	75.4	km
29	CHANNEL IS. THRUST (Eastern)	74.7	74.6	74.8	74.8	75.7	75.9	km
30	OAK RIDGE(Blind Thrust Offshore)	76.9	70.7	72.3	72.3	72.0	73.5	km
31	ELSINORE-GLEN IVY	76.9	76.9	76.9	76.9	77.9	77.9	km
32	SANTA YNEZ (East)	78.7	76.5	77.6	77.6	77.0	77.9	km
33	SAN ANDREAS - Carrizo	79.8	79.8	79.8	79.8	80.2	80.2	km
34	MONTALVO-OAK RIDGE TREND	81.2	81.2	81.3	81.3	82.6	82.8	km
35	M.RIDGE-ARROYO PARIDA-SANTA ANA	84.8	84.8	84.8	84.8	85.8	85.8	km
36	RED MOUNTAIN	89.0	89.0	89.0	89.0	89.6	89.6	km
37	SAN JACINTO-SAN BERNARDINO	92.1	92.1	92.1	92.1	92.6	92.6	km
38	SAN ANDREAS - San Bernardino	92.9	92.9	92.9	92.9	93.6	93.6	km
39	SAN ANDREAS - Southern	92.9	92.9	92.9	92.9	93.6	93.6	km
40	CORONADO BANK	93.4	93.4	93.4	93.4	94.5	94.5	km
41	SANTA CRUZ ISLAND	97.6	97.6	97.6	97.6	98.7	98.7	km
42	CLEGHORN	98.4	98.4	98.4	98.4	99.2	99.2	km

EXPLANATION

CD_1DRP = Closest distance to projection of rupture area along fault trace.
CD_2DRP = Closest distance to surface projection of the rupture area.
CDIST = Closest distance to seismogenic rupture.
CLODIS = Closest distance to subsurface rupture.
CD_EPI = Closest epicentral distance.
CD_HYPO = Closest hypocentral distance.

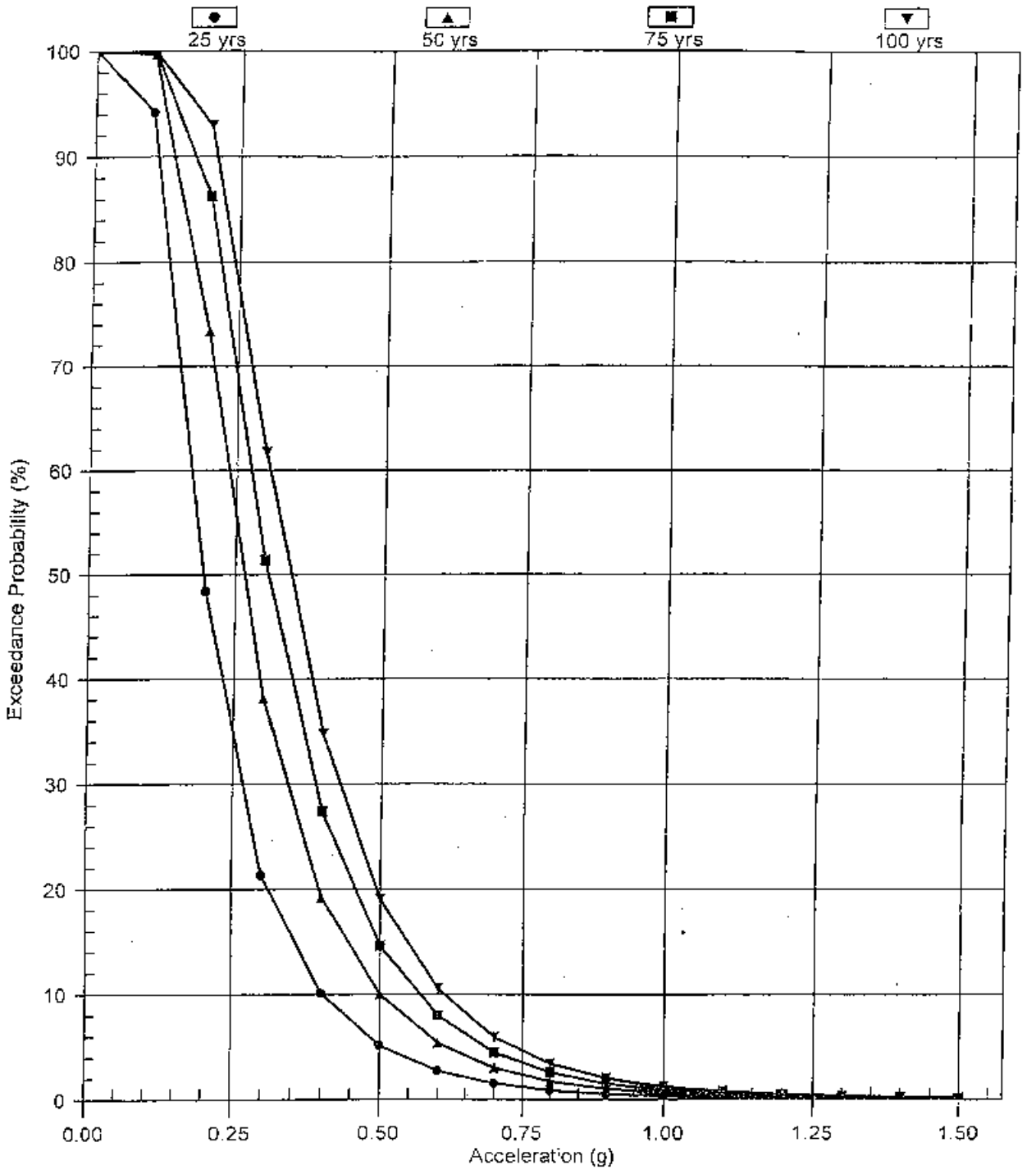
RETURN PERIOD vs. ACCELERATION

BOORE ET AL. (1997) SOIL (310)1



PROBABILITY OF EXCEEDANCE

BOORE ET AL. (1997) SOIL (310)1



APPENDIX E

Liquefaction Analyses

LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ANALYSIS OF LIQUEFACTION POTENTIAL AND INDUCED GROUND SUBSIDENCE

Developed 2003 by Shelton L. Stringer, GE - Earth Systems Southwest

Project: Admiralty Way
Job No: PL-06242-01
Date: 6/10/2004
Boring: B1 Data Set: 1

Methods: Liquefaction Analysis using 1996 & 1998 NCEER workshop method (Youd & Idriss, editors)
Journal of Geotechnical and Environmental Engineering (JGEE), October 2001, Vol 127, No. 10, ASCE
Settlement Analysis from Tokimatsu and Seed (1987),JGEE ,Vol 113, No.8, ASCE
Modified by Pradel, JGEE, Vol 124, No. 4, ASCE

EARTHQUAKE INFORMATION:

Magnitude: 7.1 7.5
PGA, g: 0.50 0.43
MSF: 1.15
GWT: 11.0 feet
Calc GWT: 9.9 feet

SPT N VALUE CORRECTIONS:

Energy Correction to N60 (C_E): 1.25
Drive Rod Corr. (C_R): 1 Default
Rod Length above ground (feet): 3.0
Borehole Dia. Corr. (C_B): 1.10
Sampler Liner Correction for SPT?: 1 Yes
Cal Mod/ SPT Ratio: 0.83

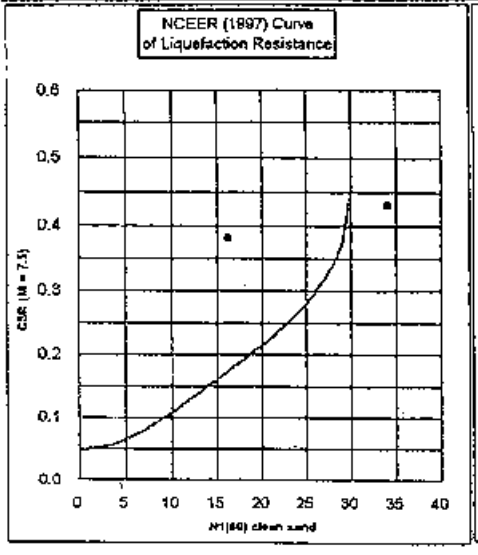
Total (ft) Liquefied Thickness: 5
Total (in.) Induced Subsidence: 1.2

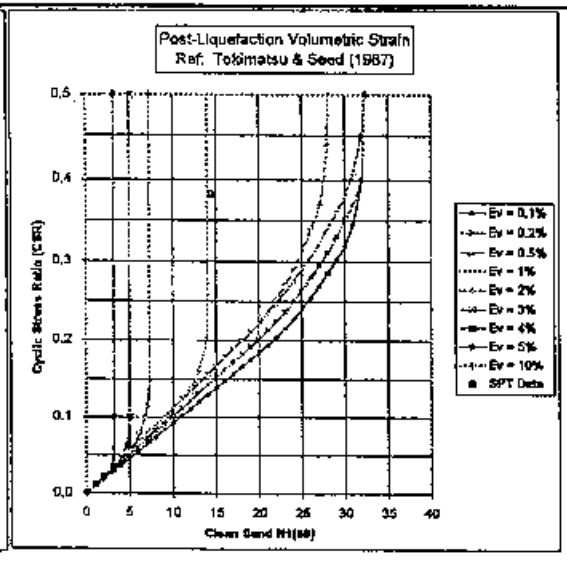
Required SF: 1.25
Threshold Accelar., g: 0.23 Minimum Calculated SF: 0.46

SETTLEMENT (SUBSIDENCE) OF DRY SANDS

Nc = 11.6

Base Depth (feet)	Cal Mod N	SPT N	Liquef. Suscept. (0 or 1)	Total Unit Wt. (pcf)	Fines Content (%)	Depth of SPT (feet)	Rod Length (feet)	Tot.Stress at SPT po (tsf)	Eff.Stress at SPT p'o (tsf)	rd	C_N	C_R	C_S	$N_{1(60)}$	Ref. Dens. Dr (%)	Trigger FC Adj. $\Delta N_{1(60)}$	Equiv. Sand $N_{1(60)cs}$	Kσ	M = 7.5 Available CRR	M =7.5 Induced CSR*	Liquefac. Safety Factor	Post FC Adj. $\Delta N_{1(60)}$	$N_{1(60)cs}$	Volumetric Strain (%)	Induced Subsidence (in.)	p (tsf)	G_{max} (tsf)	τ_{av} (tsf)	Shear Strain γ	Strain E_{15}	Strain Enc	Dry Sand Subsidence (in.)
								0.000																								
7.0	27	17	1	139	30	5.0	8.0	0.348	0.348	0.99	1.70	0.75	1.00	29.8	65	9.3	39.1	1.00	1.200	0.280	Non-Liq.	9.3	39.1	0.03	0.02	0.233	733	0.112	3.2E-04	1.4E-04	1.3E-04	0.02
13.0	5	3		109	30	10.0	13.0	0.651	0.651	0.98	1.00	0.76	1.00	3.3				1.00	Infin.	0.276	Non-Liq.		3.3	0.00	0.00	0.438						
18.0		3		139	19	15.0	18.0	0.953	0.829	0.97	1.00	0.88	1.10	3.9				1.00	Infin.	0.329	Non-Liq.		3.9	0.00	0.00	0.639						
23.0	11	7		134	59	20.0	23.0	1.291	1.011	0.96	1.00	0.93	1.00	8.9				1.00	Infin.	0.358	Non-Liq.		8.9	0.00	0.00	0.865						
28.0		9	1	120	15	25.0	28.0	1.806	1.170	0.94	0.95	0.96	1.13	13.1	43	3.1	16.2	0.99	0.175	0.382	0.46	1.3	14.4	1.97	1.18	1.076	1,174	0.492	1.1E-03			
33.0	31	20		130	57	30.0	33.0	1.922	1.330	0.92	1.00	1.00	1.00	26.9				0.96	Infin.	0.402	Non-Liq.		26.9	0.00	0.00	1.298						
38.0		22	1	134	39	35.0	38.0	2.253	1.505	0.89	0.84	1.00	1.30	33.0	89	10.0	43.0	0.91	1.200	0.426	2.82	10.0	43.0	0.00	0.00	1.510	1,824	0.652	5.7E-04			
43.0	42	26	1	134	16	40.0	43.0	2.568	1.683	0.85	0.78	1.00	1.00	28.8	84	5.1	34.0	0.88	1.200	0.431	2.78	5.1	34.0	0.00	0.00	1.734	1,907	0.716	6.5E-04			
48.0		48	1	135	10	45.0	48.0	2.924	1.863	0.80	0.75	1.00	1.30	64.7	96	2.3	66.9	0.80	1.200	0.452	2.66	2.3	66.9	0.00	0.00	1.959	2,540	0.764	4.3E-04			
53.0	100	63	1	145	14	50.0	53.0	3.271	2.054	0.75	0.72	1.00	1.00	62.2	94	4.8	67.0	0.77	1.200	0.446	2.69	4.8	67.0	0.00	0.00	2.192	2,886	0.800	4.2E-04			
58.0		32	1	141	14	55.0	58.0	3.690	2.257	0.70	0.68	1.00	1.30	39.2	75	3.8	43.0	0.74	1.200	0.437	2.75	3.8	43.0	0.00	0.00	2.432	2,443	0.830	5.0E-04			
63.0	100	63	1	133	14	60.0	63.0	3.974	2.445	0.66	0.66	1.00	1.00	57.0	90	4.6	91.6	0.72	1.200	0.427	2.81	4.6	91.6	0.00	0.00	2.863	2,681	0.851	4.0E-04			





$N_{1(60)} = C_N * C_E * C_B * C_R * C_S * N$

C_R = 0.75 for Rod lengths < 3m, 1.0 for > 10m
= min(1,max(0.75,1.4688-2.558/(z(ft))$^{0.5}$))

$C_N = (1\ atm/p'o)^{0.5}$, max 1.7

C_S = max(1.1,min(1.3,1+$N_{1(60)}$/100)) for SPT without liners

$MSF = 10^{2.24}/M^{2.56}$

z = Depth (m)

pa = 1 atm = 101 KPa = 1.056 tsf

p = 0.67*po

τ_{av} = 0.65*PGA*po*rd

$G_{max} = 447 * N_{1(60)cs}^{[333]} * p^{0.5}$

a = 0.0389*(p/1)+0.124

b = 6400*(p/1)$^{[-0.5]}$

$\gamma = [1+a*EXP(b*\tau_{av}/G_{max})]/[(1+a)*\tau_{av}/G_{max}]$

$E_{15} = \gamma * (N_{1(60)cs}/20)^{-1.2}$

$E_{nc} = (Nc/15)^{0.45} * E15$

$Nc = (MAG-4)^{2.47}$

$S = 2 * H * E_{nc}$

rd = (1-0.4113*z^0.5+0.04052*z+0.001753*z^1.5)/(1-0.4177*z^0.5+0.05729*z-0.006205*z^1.5+0.00121*z^2))

$\Delta N_{1(60)}$ = min(10,IF(FC<35,exp(1.76-(190/FC^2)),5)+IF(FC<=5,1,IF(FC<35,0.99+(FC^1.5/1000),1.2))*N1(60) - N1(60)

$N_{1(60)cs} = N_{1(60)cs} + \Delta N_{1(60)}$

Kσ = min of 1.0 or (σv/1.058)$^{0.3}$

$Dr = (N_{1(60)}/70)^{0.5}$

CSReq = 0.65*PGA*(po/p'o)*rd

CSR* = CSReq/MSF/Kσ

$CRR_{7.5} = (0.048-0.004721*N+0.0006154*N^2-0.0000673*N^3)/(1-0.1344*N+0.009578*N^2-0.0003285*N^3+0.0000037*N^4))$

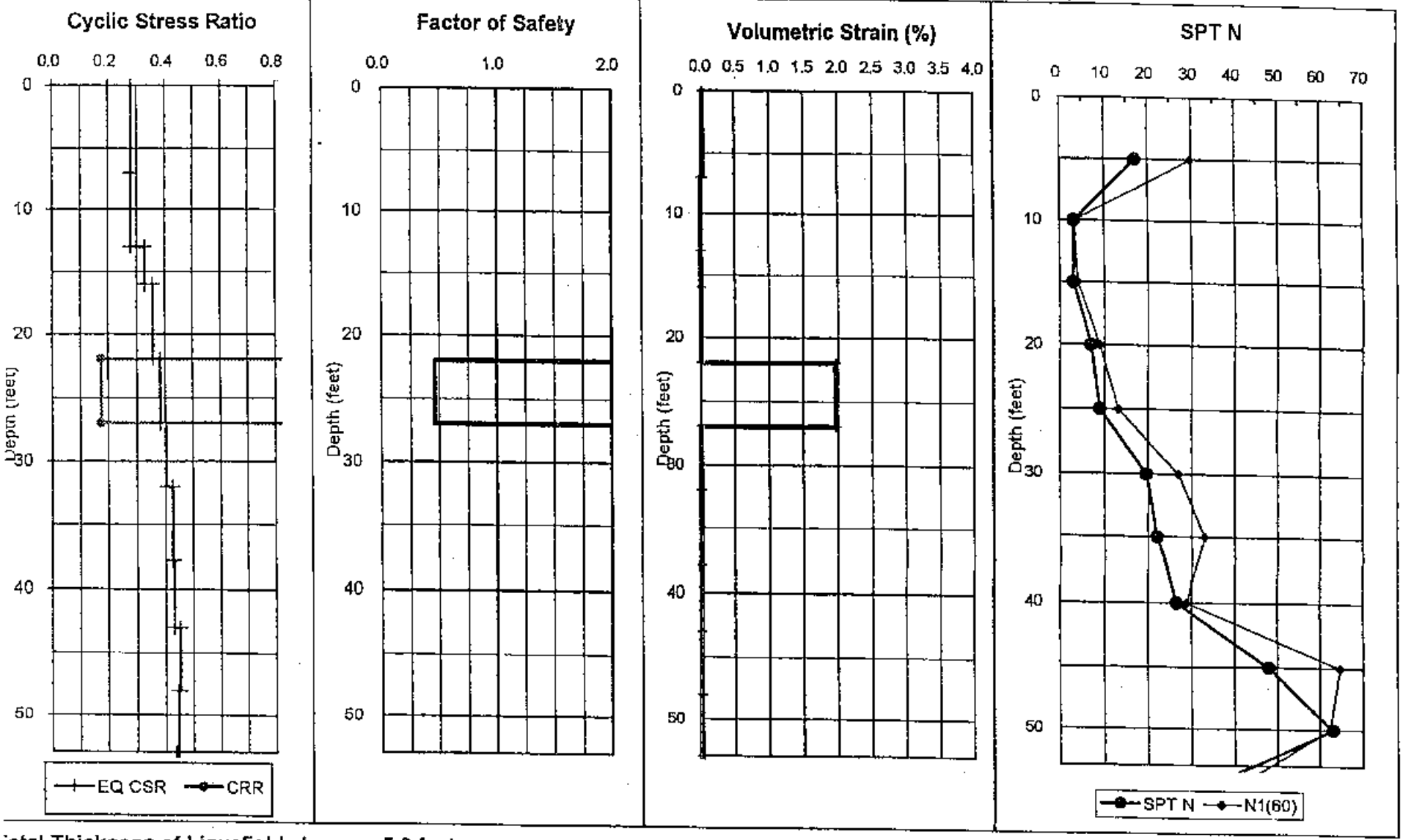
N = $N_{1(60)cs}$

$SF = CRR_{7.5,1atm}/CSR^*$

EARTH SYSTEMS - EVALUATION OF LIQUEFACTION POTENTIAL AND INDUCED SUBSIDENCE

Admiralty Way **Project No: PL-06242-01** 1996/1998 NCEER Method

Boring: B1 Earthquake Magnitude: 7.1 PGA, g: 0.50 Calc GWT (feet): 10



Total Thickness of Liquefiable Layers: 5.0 feet

Estimated Total Ground Subsidence: 1.2 inches

LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ANALYSIS OF LIQUEFACTION POTENTIAL AND INDUCED GROUND SUBSIDENCE

Developed 2003 by Shelton L. Stringer, GE - Earth Systems Southwest

Project: Admiralty Way
Job No: PL-06242-01
Date: 6/14/2004
Boring: B2 Data Set: 2

Methods: Liquefaction Analysis using **1996 & 1998 NCEER workshop method (Youd & Idriss, editors)**
Journal of Geotechnical and Environmental Engineering (JGEE), October 2001, Vol 127, No. 10, ASCE
Settlement Analysis from Tokimatsu and Seed (1987),JGEE ,Vol 113, No.8, ASCE
Modified by Pradel, JGEE, Vol 124, No. 4, ASCE

EARTHQUAKE INFORMATION:

Magnitude:	7.1	7.5
PGA, g:	0.50	0.43
MSF:	1.15	
GWT:	11.0	feet
Calc GWT:	9.9	feet

SPT N VALUE CORRECTIONS:

Energy Correction to N60 (C_E):	1.25	
Drive Rod Corr. (C_R):	1	Default
Rod Length above ground (feet):	3.0	
Borehole Dia. Corr. (C_B):	1.10	
Sampler Liner Correction for SPT?:	1	Yes
Cal Mod/ SPT Ratio:	0.63	

Total (ft) Liquefied Thickness: 13

Total (in.) Induced Subsidence: 1.3

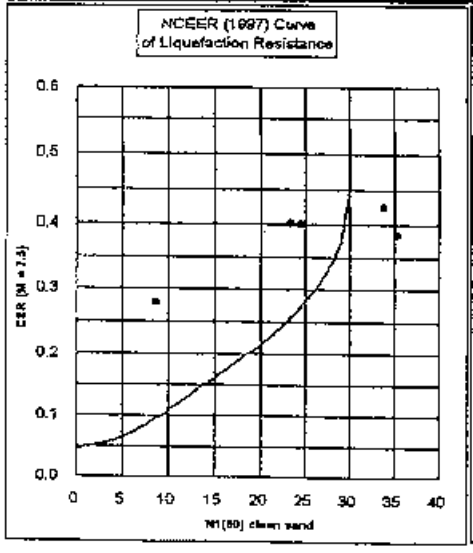
Threshold Accelar., g: 0.17 Required SF: 1.25 Minimum Calculated SF: 0.34

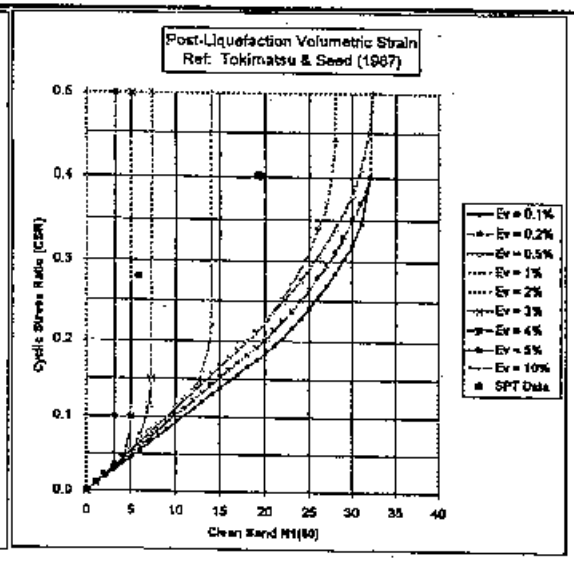
SETTLEMENT (SUBSIDENCE) OF DRY SANDS

Nc = 11.6

Base Depth (feet)	Cal Mod N	SPT N	Liquef. Suscept. (D or 1)	Total Unit Wt. (pcf)	Fines Content (%)	Depth of SPT (feet)	Rod Length (feet)	Tot. Stress at SPT po (tsf)	Eff. Stress at SPT p'o (tsf)	rd	C_N	C_R	C_S	$N_{1(60)}$	Rel. Dens. Dr (%)	Trigger FC Adj. $\Delta N_{1(60)}$	Equiv. Sand $N_{1(60)cs}$	Kσ	M = 7.5 Available CRR	M =7.5 Induced CSR*	Liquefac. Safety Factor	Post FC Adj. $\Delta N_{1(60)}$	Post FC Adj. $N_{1(60)cs}$	Volumetric Strain (%)	Induced Subsidence (in.)
								0.000																	
7.0	18	11	1	124	30	5.0	8.0	0.309	0.309	0.98	1.70	0.75	1.00	19.9	53	7.8	27.7	1.00	0.334	0.260	Non-Liq.	7.8	27.7	0.05	0.04
10.0	4	3	1	128	30	9.9	12.9	0.619	0.619	0.98	1.31	0.75	1.00	3.4	22	5.2	8.7	1.00	0.095	0.277	Non-Liq.	5.2	8.7	0.00	0.00
13.0	4	3	1	128	30	10.1	13.1	0.832	0.832	0.98	1.29	0.76	1.00	3.4	22	5.2	8.6	1.00	0.095	0.279	0.34	2.4	5.8	3.86	1.32
16.0	6	4		116	70	15.0	18.0	0.934	0.809	0.97	1.00	0.86	1.00	4.5				1.00	Infin.	0.330	Non-Liq.		4.5	0.00	0.00
22.0		3		129	60	20.0	23.0	1.251	0.970	0.96	1.00	0.93	1.10	4.2				1.00	Infin.	0.361	Non-Liq.		4.2	0.00	0.00
27.0	36	23	1	141	20	25.0	28.0	1.592	1.155	0.94	0.96	0.98	1.00	29.4	85	5.9	35.3	0.98	1.200	0.385	3.12	5.9	35.3	0.00	0.00
32.0		12	1	142	30	30.0	33.0	1.945	1.352	0.92	0.88	1.00	1.17	17.1	49	7.3	24.4	0.96	0.274	0.401	0.68	2.4	19.5	1.59	0.96
38.0	45	28	1	146	10	35.0	38.0	2.306	1.557	0.89	0.82	1.00	1.00	32.1	88	1.6	33.7	0.90	1.200	0.425	2.82	1.6	33.7	0.00	0.00
43.0		39	1	139	20	40.0	43.0	2.664	1.759	0.85	0.78	1.00	1.30	54.1	88	7.9	62.0	0.82	1.200	0.452	2.66	7.9	62.0	0.00	0.00
48.0	27	17	1	133	24	45.0	48.0	3.005	1.944	0.80	0.74	1.00	1.00	17.3	50	6.0	23.3	0.89	0.257	0.402	0.64	1.9	19.2	1.62	0.97
53.0		100	1	141	14	50.0	53.0	3.345	2.129	0.75	0.70	1.00	1.30	######	###	7.5	######	0.76	1.200	0.448	2.69	7.5	######	0.00	0.00
58.0	69	45	1	141	14	55.0	58.0	3.898	2.325	0.70	0.67	1.00	1.00	40.3	76	3.9	44.2	0.73	1.200	0.437	2.75	3.9	44.2	0.00	0.00
65.0		41	1	141	14	60.0	63.0	4.051	2.522	0.66	0.65	1.00	1.30	47.5	82	4.2	51.7	0.71	1.200	0.427	2.81	4.2	51.7	0.00	0.00

p (tsf)	G_{max} (tsf)	τ_{av} (tsf)	Shear Strain γ	Strain E_{15}	Strain E_{NC}	Dry Sand Subsidence (in.)
0.207	815	0.100	4.1E-04	2.6E-04	2.5E-04	0.04
0.415	581	0.197	1.6E-03			
0.423	597	0.201	1.8E-03			
0.628						
0.838						
1.066	1,514	0.467	6.1E-04			
1.303	1,481	0.582	8.3E-04			
1.545	1,795	0.688	6.8E-04			
1.785	2,383	0.737	4.7E-04			
2.019	1,811	0.785	8.1E-04			
2.241	3,421	0.818	3.0E-04			
2.478	2,468	0.845	4.9E-04			
2.714	2,743	0.868	4.4E-04			





$N_{1(60)} = C_N * C_E * C_B * C_R * C_S * N$

C_R = 0.75 for Rod lengths < 3m, 1.0 for > 10m
= min(1,max(0.75,1.4688-2.556/(z(ft))^0.5))

$C_N = (1\ atm/p'o)^{0.5}$, max 1.7

C_S = max(1.1,min(1.3,1+$N_{1(60)}$/100)) for SPT without liners

$MSF = 10^{2.24}/M^{2.56}$

z = Depth (m)

pa = 1 atm = 101 KPa = 1.058 tsf

p = 0.67*po

τ_{av} = 0.65*PGA*po*rd

$G_{max} = 447 * N_{1(60)cs}^{(0.5)} * p^{0.5}$

a = 0.0388*(p/1)+0.124

$b = 6400 * (p/1)^{0.40}$

$\gamma = [1+a*EXP(b*\tau_{av}/G_{max})]/[(1+a)*\tau_{av}/G_{max}]$

$E_{15} = \gamma * (N_{1(60)cs}/20)^{-1.2}$

$E_{NC} = (Nc/15)^{0.45} * E15$

$Nc = (MAG-4)^{2.13}$

$S = 2 * H * E_{NC}$

rd = (1-0.4113*z^0.5+0.04052*z+0.001753*z^1.5)/(1-0.4177*z^0.5+0.05729*z-0.006205*z^1.5+0.00121*z^2))

$\Delta N_{1(60)}$ = min(10,IF(FC<35,exp(1.76-(190/FC^2)),5)+IF(FC<=5,1,IF(FC<35,0.99+(FC^1.5/1000),1.2))*N1(60) - N1(60)

$N_{1(60)cs} = N_{1(60)cs} + \Delta N_{1(60)}$

Kσ = min of 1.0 or $(\sigma v/1.058)^{0F(Dr>0.7,0.8,IF(Dr<0.6,0.8,0.7))-1}$

$Dr = (N_{1(60)}/70)^{0.5}$

CSReq = 0.65*PGA*(po/p'o)*rd

CSR* = CSReq/MSF/Kσ

$CRR_{7.5} = (0.048-0.004721*N+0.0006136*N^2-0.00001673*N^3)/(1-0.1364*N+0.009578*N^2-0.0003285*N^3+0.0000037*N^4))$

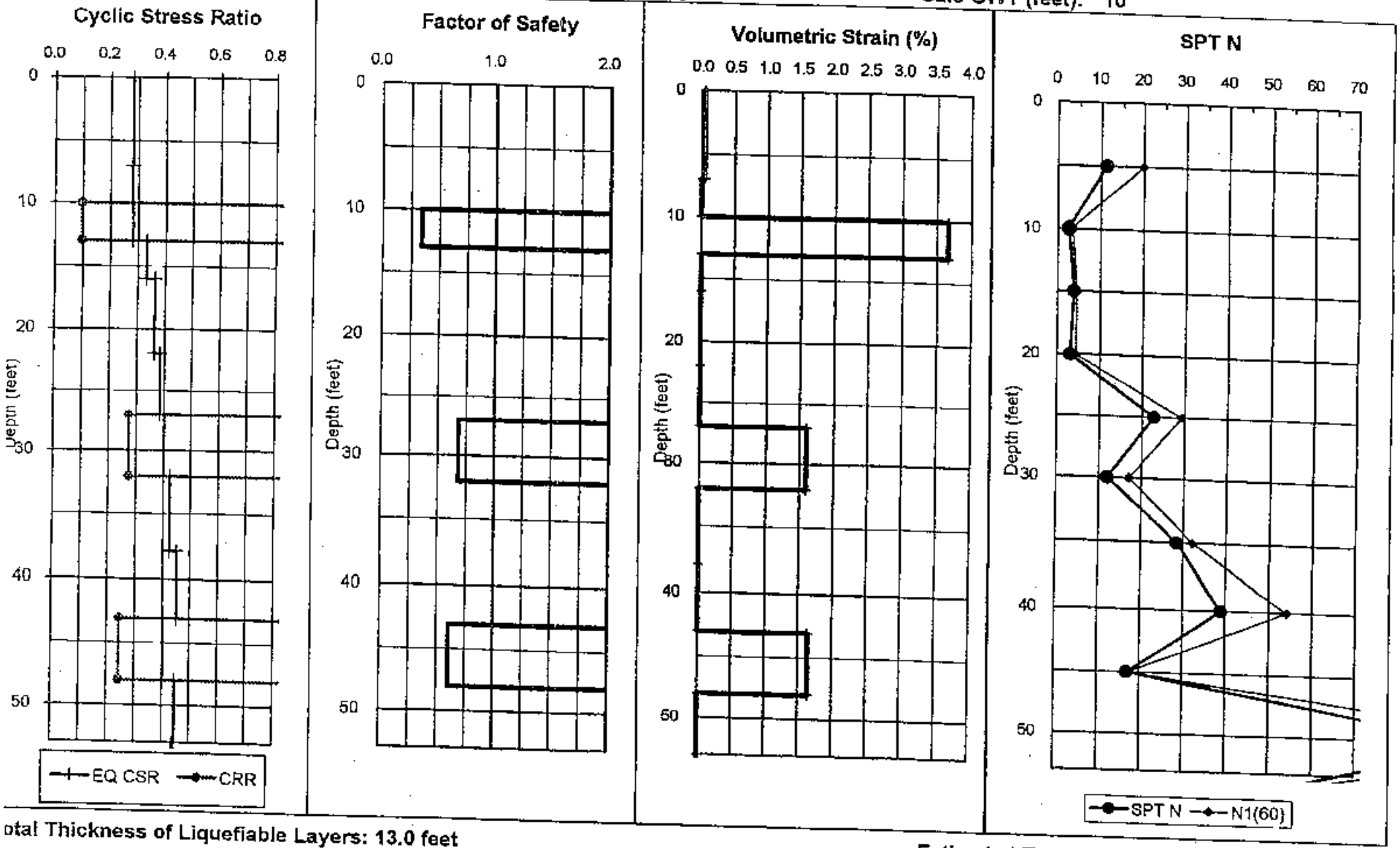
$N = N_{1(60)cs}$

$SF = CRR_{7.5,1atm}/CSR*$

EARTH SYSTEMS - EVALUATION OF LIQUEFACTION POTENTIAL AND INDUCED SUBSIDENCE

Admiralty Way Project No: PL-06242-01 1996/1998 NCEER Method

Boring: B2 Earthquake Magnitude: 7.1 PGA, g: 0.50 Calc GWT (feet): 10



Total Thickness of Liquefiable Layers: 13.0 feet

Estimated Total Ground Subsidence: 3.3 inches

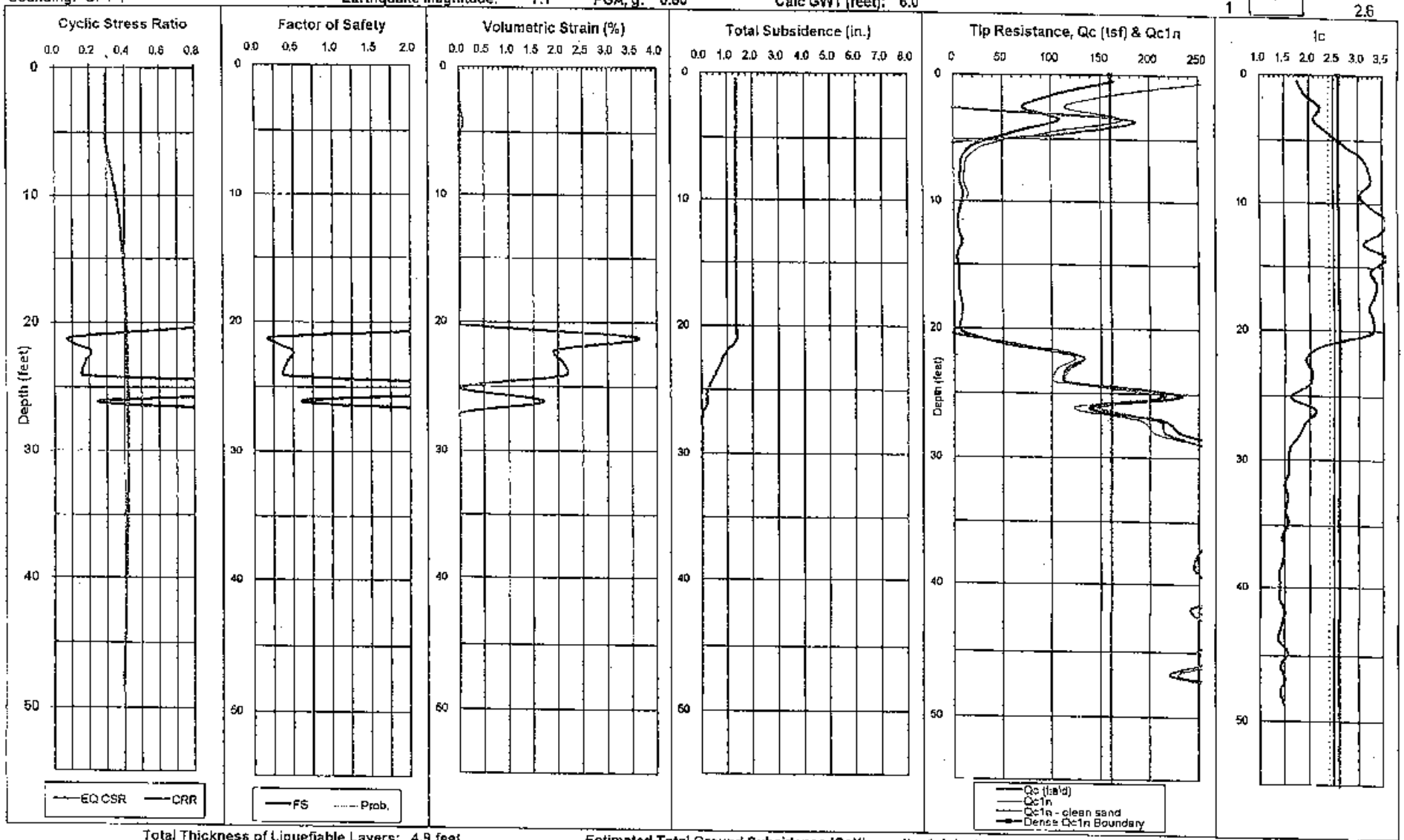
EARTH SYSTEMS - EVALUATION OF LIQUEFACTION POTENTIAL AND INDUCED GROUND SUBSIDENCE

Admiralty Way - Prestige Project No: PL-06242-01 Method Used: 3 Idriss & Boulanger, 2004 & Moss 2003

Settlement Analysis using Ishihara and Yoshimine (1992)

Sounding: CPT-1 Earthquake Magnitude: 7.1 PGA, g: 0.50 Calc GWT (feet): 6.0

Plot 1 Limiting Ic: 2.6



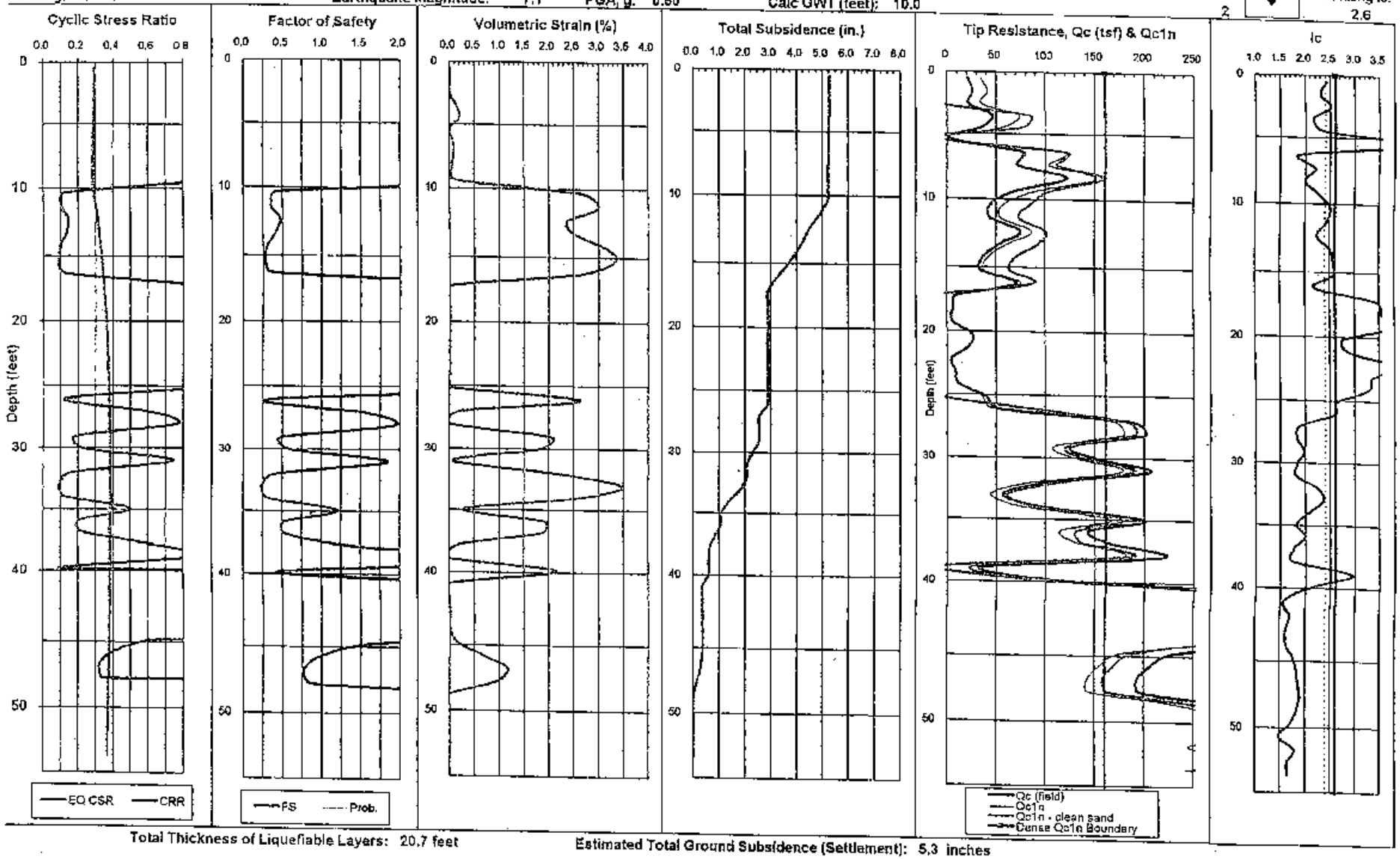
Total Thickness of Liquefiable Layers: 4.9 feet

Estimated Total Ground Subsidence (Settlement): 1.4 inches

EARTH SYSTEMS - EVALUATION OF LIQUEFACTION POTENTIAL AND INDUCED GROUND SUBSIDENCE

Admiralty Way - Prestige Project No: PL-06242-01 Method Used: 3 Idriss & Boulanger, 2004 & Moss 2003

ounding: CPT-2 Earthquake Magnitude: 7.1 PGA, g: 0.50 Settlement Analysis using Ishihara and Yoshimine (1992) Calc GWT (feet): 10.0 Plot 2 Limiting Ic: 2.6



Total Thickness of Liquefiable Layers: 20.7 feet Estimated Total Ground Subsidence (Settlement): 5.3 inches

APPENDIX F

Lateral Spreading Analyses

Job Number:	PL-06242-01
Job Name:	Admiralty Way
Boring Number:	B1
Date:	April 26, 2004
Calculated By:	mlr

Prediction of Liquefaction Induced Lateral Spreading with Ground Slope Conditions

Based on Equations by Leslie T. Youd, Corbett M. Hansen, and Steven Bartlett, Journal of Geotechnical and Geoenvironmental Engineering, December 2002, vol 128, no. 12.

Variables Used in Calculation Defined

Earthquake Magnitude (M)
Horizontal Distance to Nearest Seismic Energy Source, km (R)
Percent Slope (S)
Cumulative Thickness in Meters of Saturated Cohesionless Sediments with SPT $(N1)_{60}$ Values <= 15 (T_{15})
Average Fines Content in Percent (F_{15})
Mean Grain size in milimeters ($D50_{15}$)

$$\text{Log } D_H = -16.213 + 1.532M - 1.406\text{Log}(R^*) - 0.012R + 0.338\text{Log}S + 0.540\text{Log}T_{15} + 3.413\text{Log}(100 - F_{15}) - 0.795\text{Log}(D50_{15} + 0.1\text{mm})$$

where, $R^* = R + Ro$ $\quad Ro = 10^{(0.89M - 5.64)}$

Requirements and Limitations Used to Develop this Model

Soils must be Liquefiable
Saturated Cohesionless Sediments with SPT $(N1)_{60}$ less than 15
Earthquake Magnitude (M) must be between 6 and 8
Percent Slope (S) must be between 0.1% and 6%
Cumulative Thickness (T15) must be between 1 and 15 meters
Depth to top of Liquefied layer must be between 1 and 10 meters

Input Values			
M =	6.9		
R (km) =	7	R^* =	10.17
S (%) =	6		
$T_{15\,(m)}$ =	1.5		
$F_{15\,(\%)}$ =	15		
$D50_{15\,(mm)}$ =	0.1		

Horizontal Ground Displacement in meters (D_H) =	2.27
Horizontal Ground Displacement in feet (D_H) =	7.5

** If $R < R_{min}$ The Predicted Displacement May Be Less Reliable Due To Extrapolation Of MLR Model

Job Number:	PL-06242-01
Job Name:	Admirally Way
Boring Number:	B1
Date:	April 26, 2004
Calculated By:	mln

Prediction of Liquefaction Induced Lateral Spreading with Free Face Conditions

Based on Equations by Leslie T. Youd, Corbett M. Hansen, and Steven Bartlett, Journal of Geotechnical and Geoenvironmental Engineering, December 2002, vol 128, no. 12.

Variables Used in Calculation Defined

Earthquake Magnitude (M)
Horizontal Distance to Nearest Seismic Energy Source, km (R)
Free Face Ratio (i.e., 100*(Height of the Free Face/Distance from the Free Face)) (%), (W)
Cumulative Thickness in Meters of Saturated Cohesionless Sediments with SPT $(N1)_{60}$ Values <= 15 (T_{15})
Average Fines Content in Percent (F_{15})
Mean Grain size in milimeters ($D50_{15}$)

$\text{Log } D_H = -16.713 + 1.532M - 1.406\text{Log}(R^*) - 0.012R + 0.592\text{Log}W + 0.547\text{Log}T_{15} + 3.413\text{Log}(100 - F_{15}) - 0.795\text{Log}(D50_{15} + 0.1\text{mm})$

where, $R^* = R + Ro$ $\quad Ro = 10^{(0.89M - 5.64)}$

Requirements and Limitations Used to Develop this Model

Soils must be Liquefiable
Saturated Cohesionless Sediments with SPT $(N1)_{60}$ less than 15
Earthquake Magnitude (M) must be between 6 and 8
Free Face Ratio (W) must be between 1%and 20%
Cumulative Thickness (T15) must be between 1 and 15 meters
Depth to top of Liquefied layer must be between 1 and 10 meters

Input Values			
M =	6.9		
R (km) =	7	R^* =	10.17
W (%) =	10		
$T_{15\,(m)}$ =	1.5		
$F_{15\,(\%)}$ =	15		
$D50_{15\,(mm)}$ =	0.1		

Horizontal Ground Displacement in meters (D_H) =	1.53
Horizontal Ground Displacement in feet (D_H) =	5.0

** If R < R_{min} The Predicted Displacement May Be Less Reliable Due To Extrapolation Of MLR Model

Project Number	PL-06242-01
Project Name	Admiralty Way
Project Location	Marina del Rey, CA
Date	6/15/2004

ESTIMATION OF PERMANENT SEISMIC DISPLACEMENT USING THE BRAY AND RATHJE (1998) PROCEDURE.

INPUT PARAMETERS:

Yield Acceleration, ky (g):	0.11		Normalized MHEA Sigma:	0
Vertical Thickness, h (m):	10		Mean Period Sigma:	0
Shear Wave Vel., Vs (m/s):	200		Significant Duration Sigma:	0
Earthquake Magnitude, M:	7.10	*	Normalized Displacement Sigma:	0
Earthquake Accel., Rock (g):	0.5	*		
Earthquake Distance, r (km):	7	*	Allowable screen displacement (cm):	5 *

CALCULATIONS:

Site Period (s):	0.200
NRF Factor:	0.921
Mean Period (s):	0.518
Duration, D05-95 (s):	15.226
Ts/Tm:	0.3864
MHEA/MHA*NRF:	1.000
MHEA, kmax:	0.4607
ky/kmax:	0.2388
Normalized Disp. (cm/sec):	10.9591

(Input values marked with asterisks are used for calculation of seismic coefficient for screen)

Estimated Displacement (cm):	76.872	**Median f_{eq} for Screen Procedure:**	0.534 *
Estimated Displacement (in):	30.265	**Seismic Coefficient for Screen Procedure:**	0.267 *

Admiralty Way PL-06242-01 Section AA Flow Failure Potential

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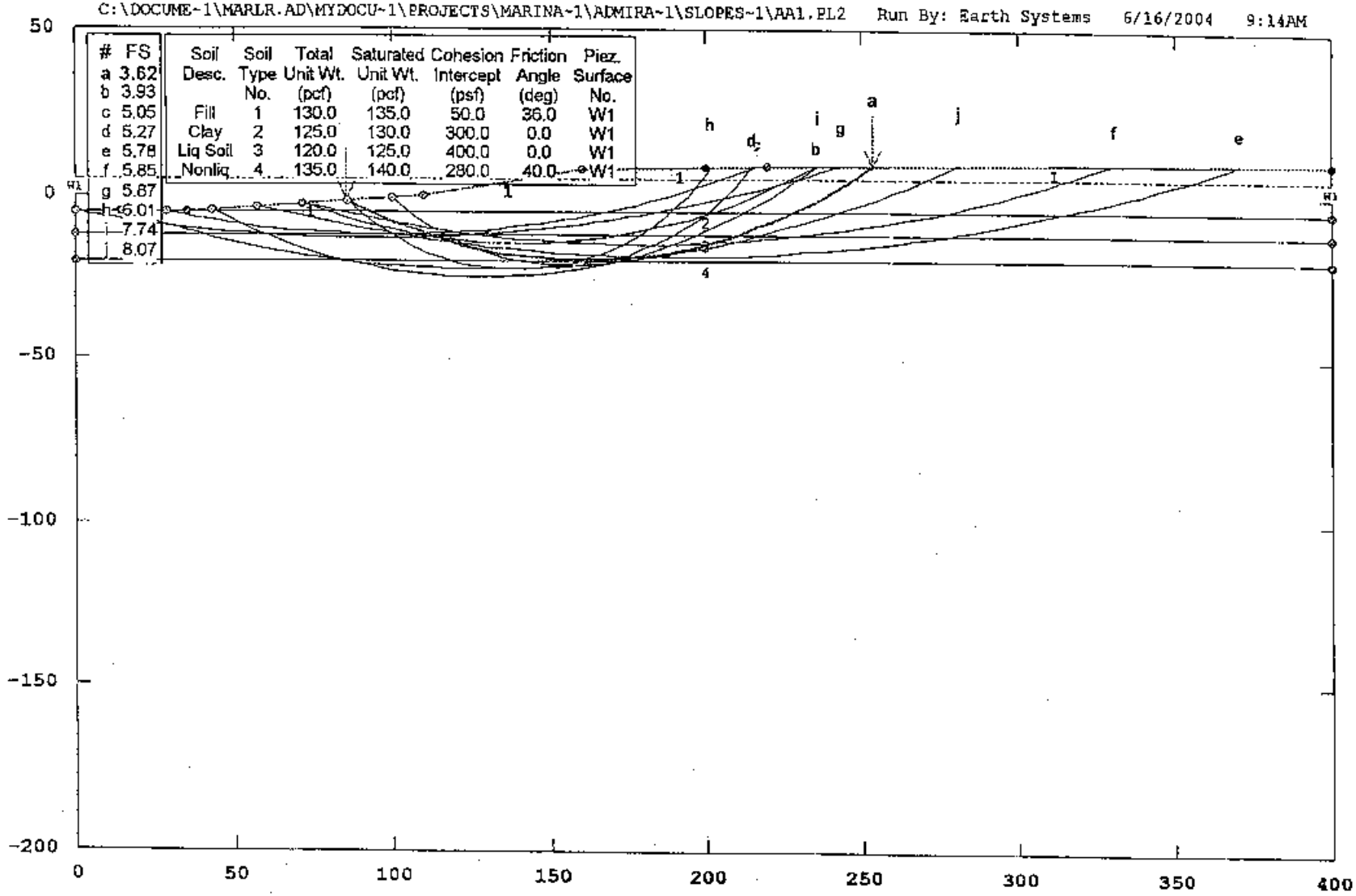
#	FS
a	3.62
b	3.93
c	5.05
d	5.27
e	5.78
f	5.85
g	5.87
h	6.01
i	7.74
j	8.07

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Fill	1	130.0	135.0	50.0	36.0	W1
Clay	2	125.0	130.0	300.0	0.0	W1
Liq Soil	3	120.0	125.0	400.0	0.0	W1
Nonliq	4	135.0	140.0	280.0	40.0	W1



STABL6H FSmin=3.62

Safety Factors Are Calculated By The Modified Bishop Method

STED

Admiralty Way PL-06242-01 Section AA Flow Failure Potential

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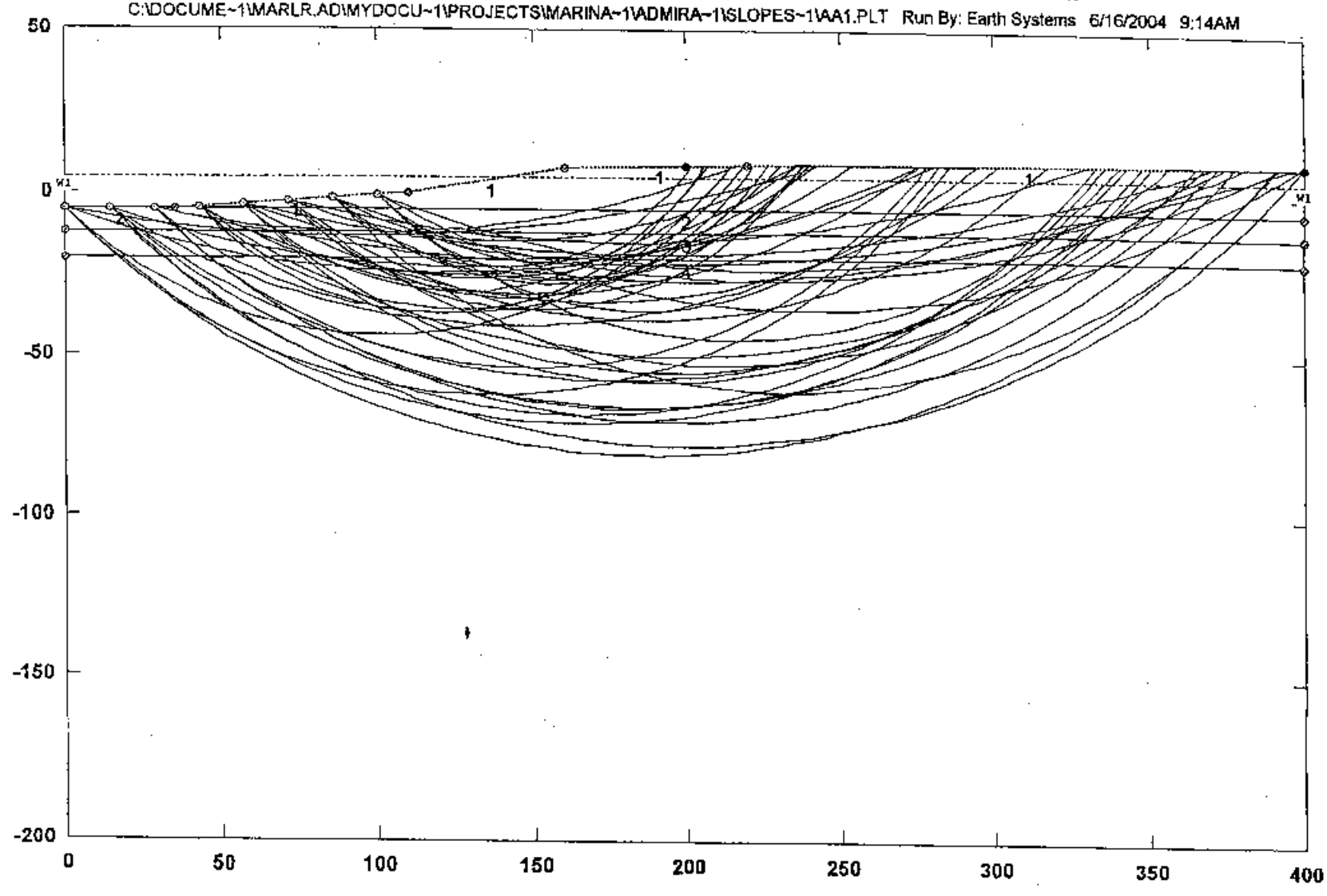

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Admiralty Way PL-06242-01 Section BB Flow Failure Potential

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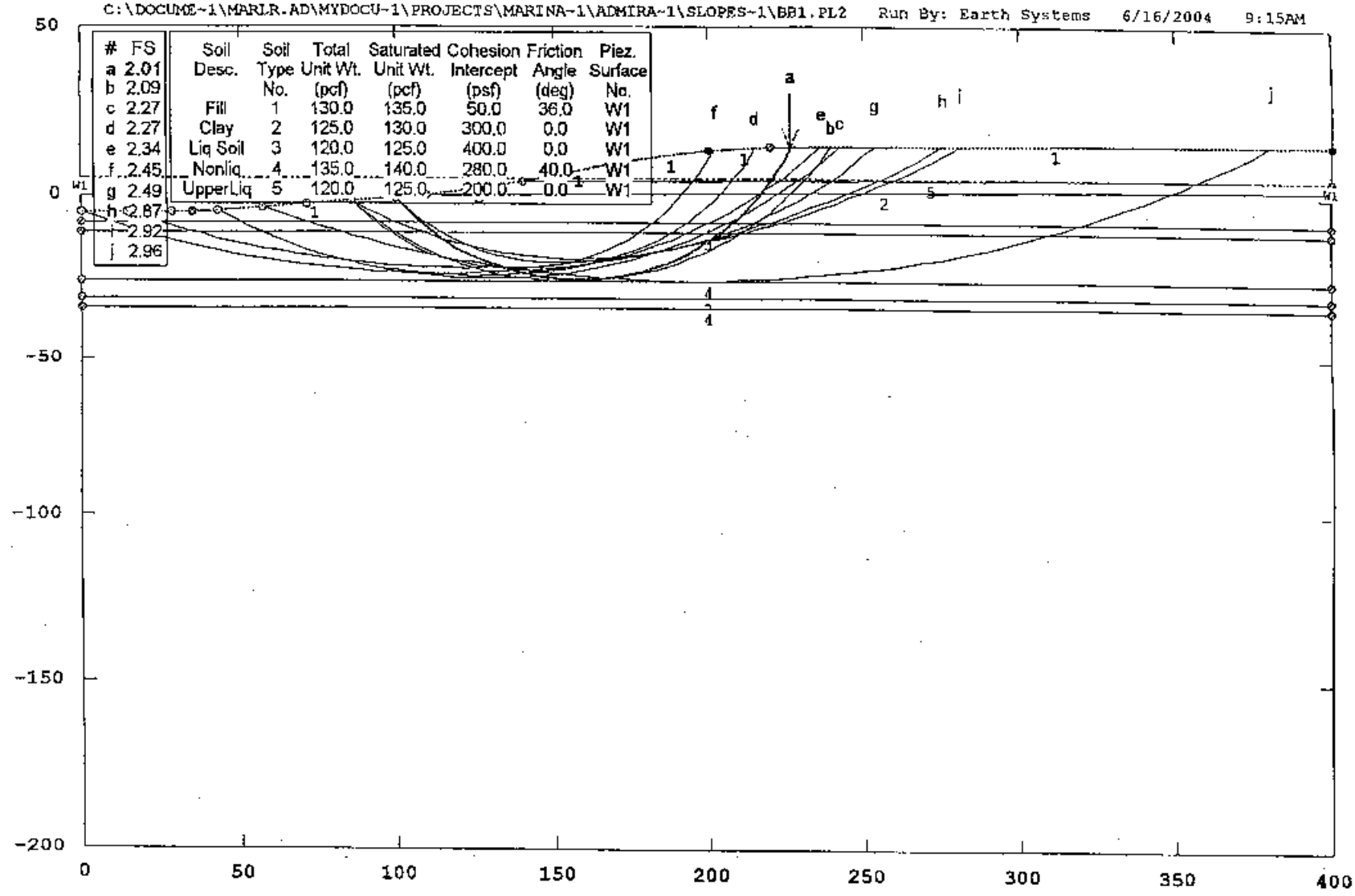
#	FS
a	2.01
b	2.09
c	2.27
d	2.27
e	2.34
f	2.45
g	2.49
h	2.87
i	2.92
j	2.96

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Fill	1	130.0	135.0	50.0	36.0	W1
Clay	2	125.0	130.0	300.0	0.0	W1
Liq Soil	3	120.0	125.0	400.0	0.0	W1
Nonliq	4	135.0	140.0	280.0	40.0	W1
UpperLiq	5	120.0	125.0	200.0	0.0	W1



STABL6H FSmin=2.01

Safety Factors Are Calculated By The Modified Bishop Method

STED

Admiralty Way PL-06242-01 Section BB Flow Failure Potential

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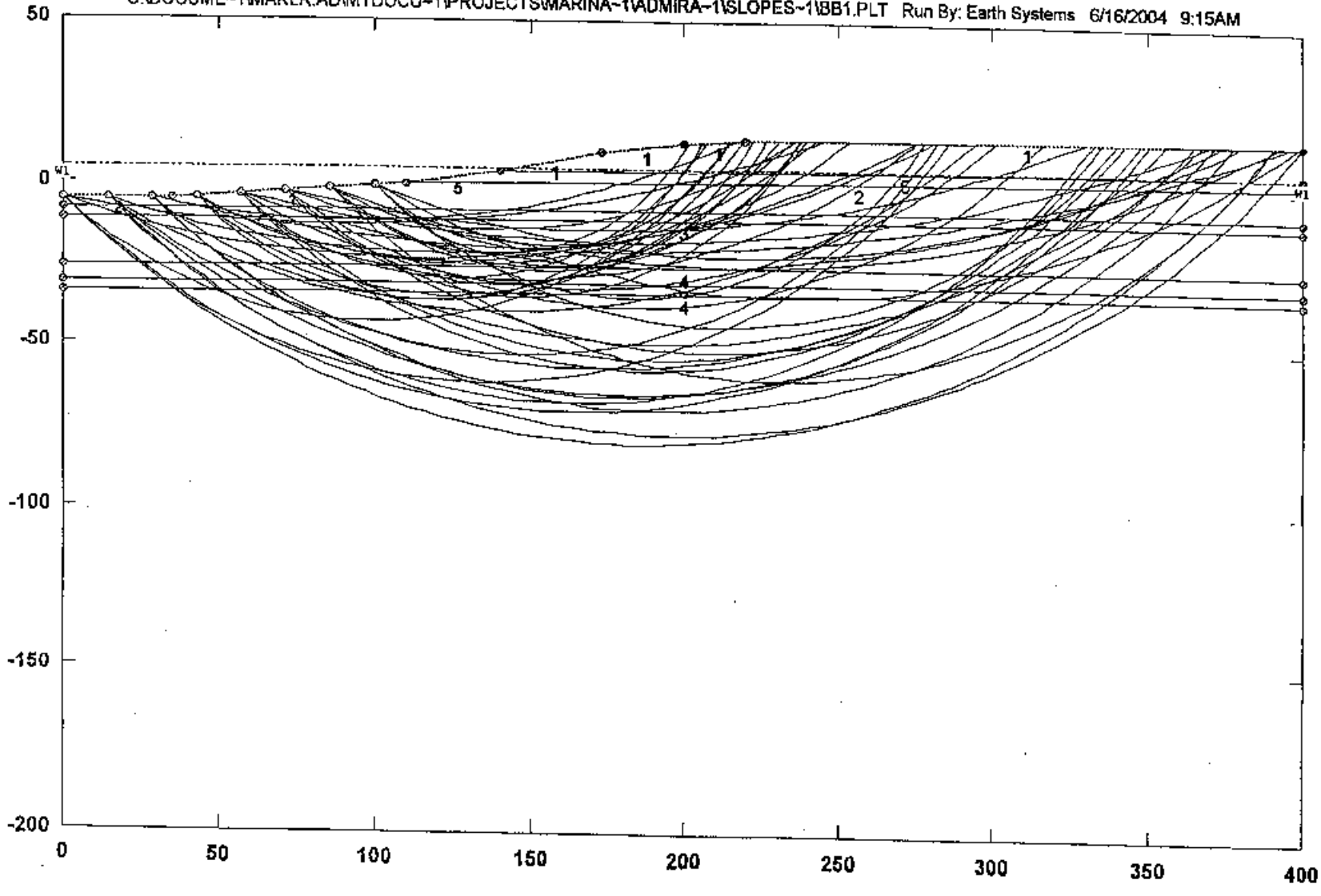

STED

Admiralty Way PL-06242-01 Section BB Specific Failure Surface - Flow Failure

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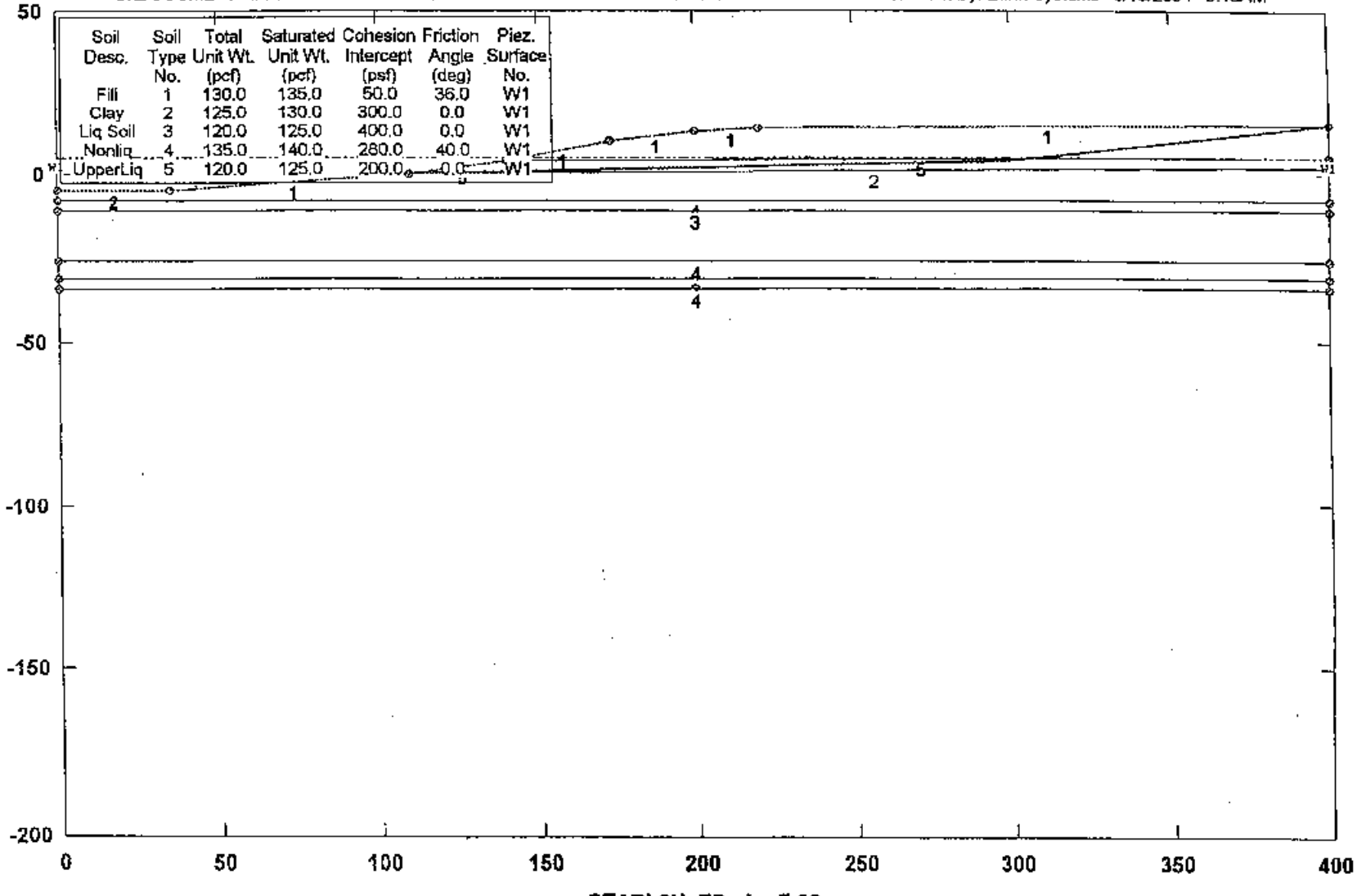

STABL6H FSmin=7.86

Factor Of Safety is Calculated By The Modified Bishop Method

STED

Admiralty Way PL-06242-01 Section AA Dynamic

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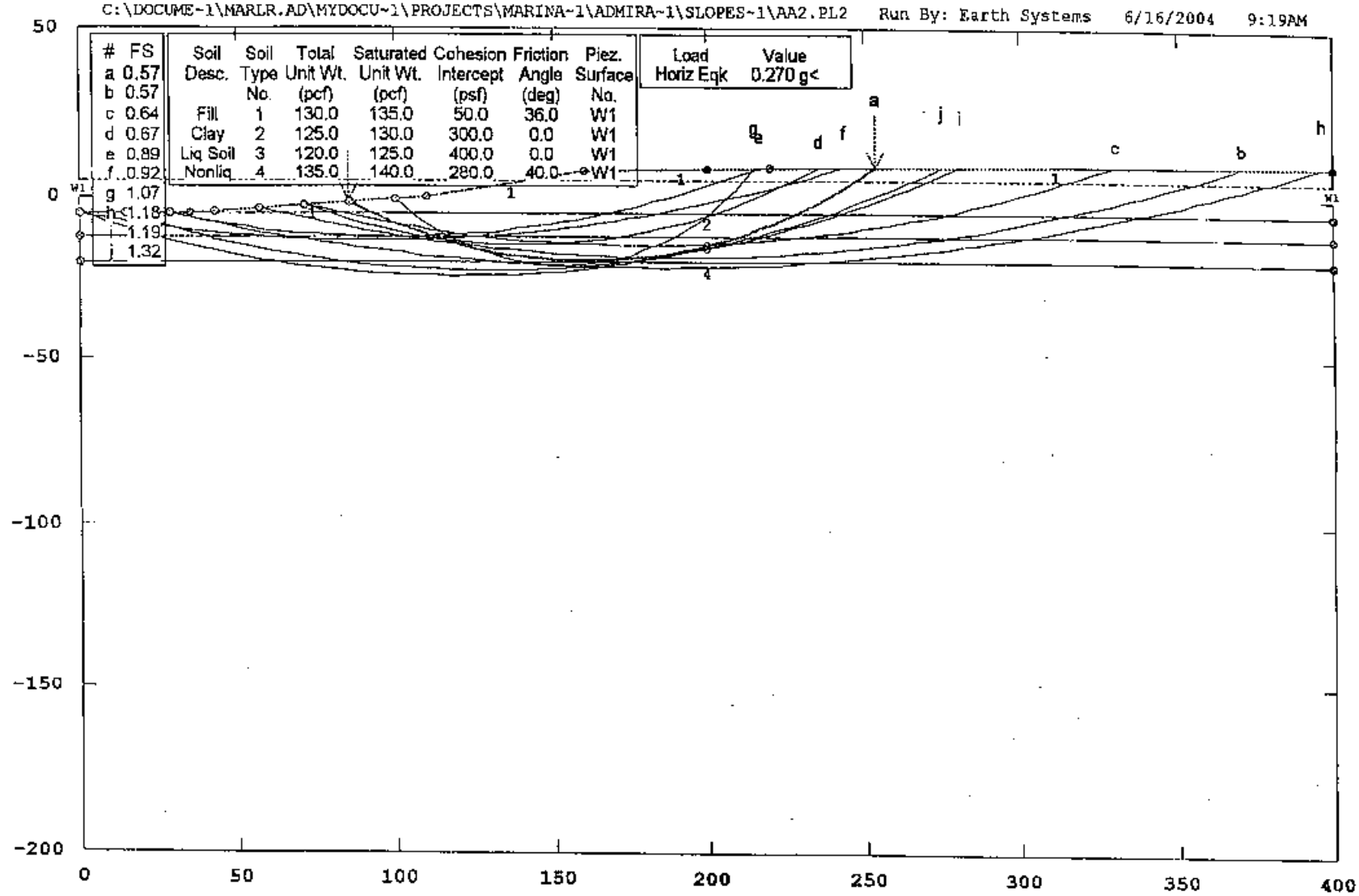

#	FS
a	0.57
b	0.57
c	0.64
d	0.67
e	0.89
f	0.92
g	1.07
h	1.18
i	1.19
j	1.32

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Fill	1	130.0	135.0	50.0	36.0	W1
Clay	2	125.0	130.0	300.0	0.0	W1
Liq Soil	3	120.0	125.0	400.0	0.0	W1
Nonliq	4	135.0	140.0	280.0	40.0	W1

Load	Value
Horiz Eqk	0.270 g<

STABL6H FSmin=0.57

Safety Factors Are Calculated By The Modified Bishop Method

STED

Admiralty Way PL-06242-01 Section AA Dynamic

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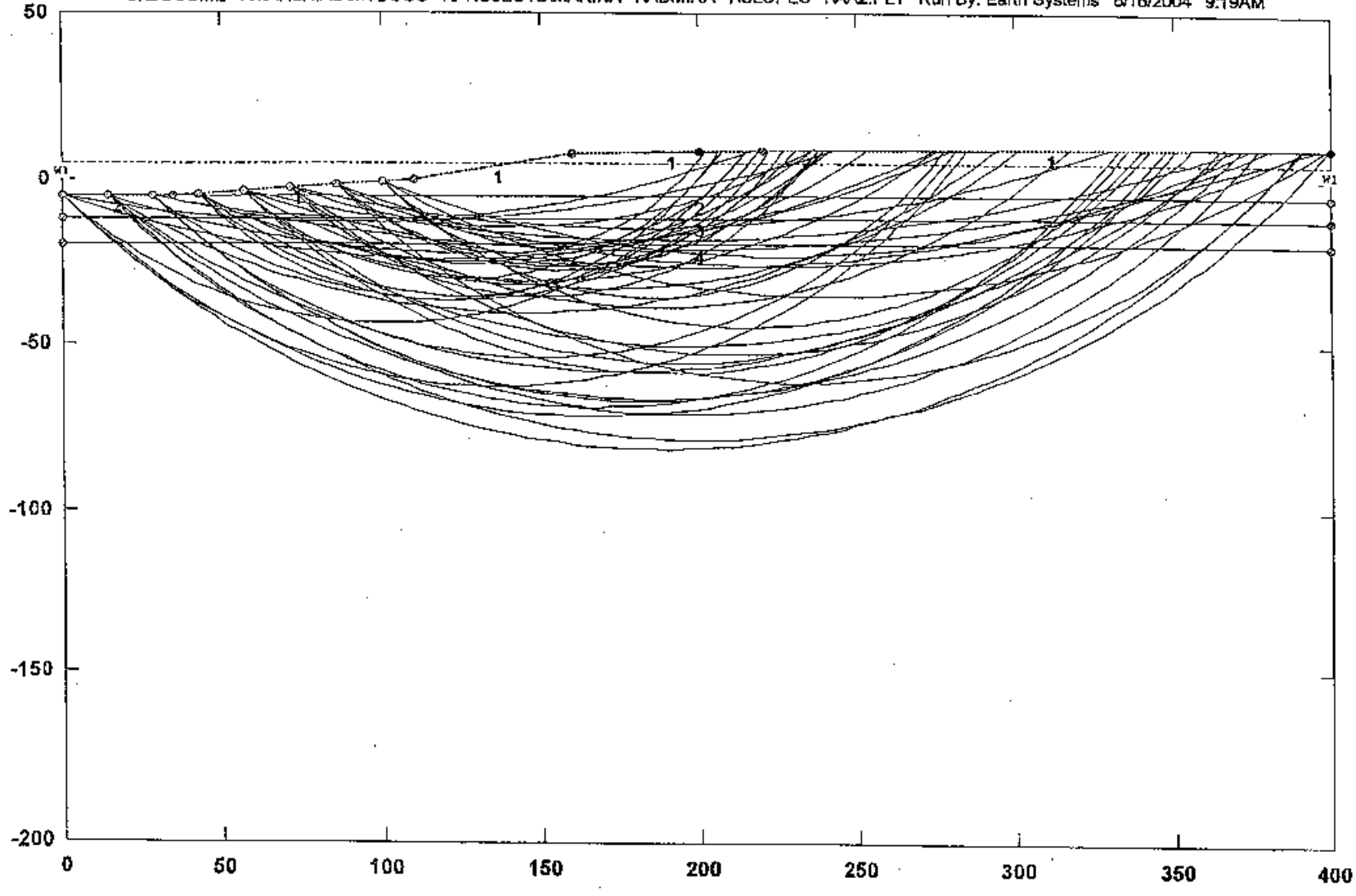

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Admiralty Way PL-06242-01 Section BB Dynamic

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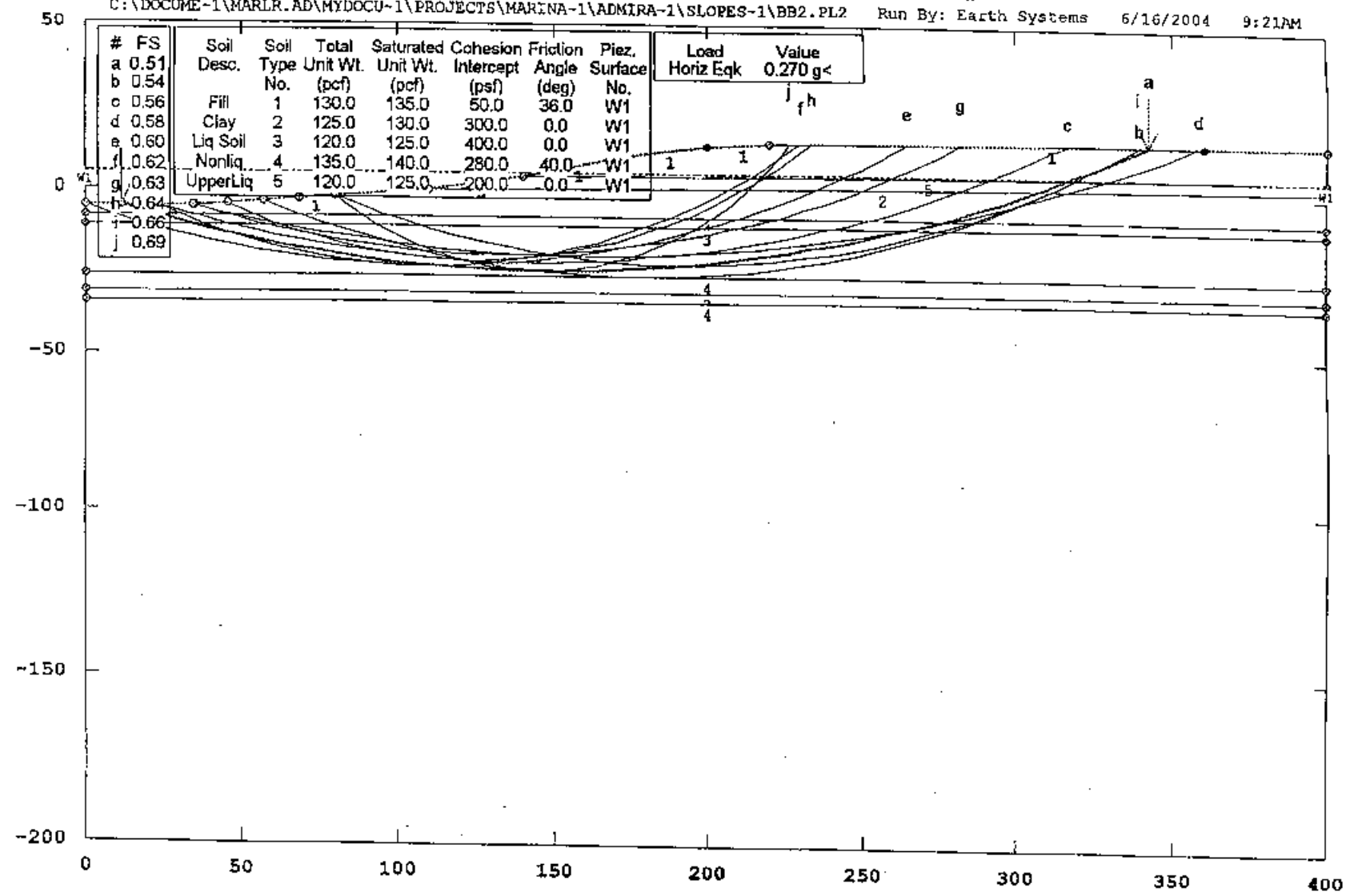
#	FS
a	0.51
b	0.54
c	0.56
d	0.58
e	0.60
f	0.62
g	0.63
h	0.64
i	0.66
j	0.69

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Fill	1	130.0	135.0	50.0	36.0	W1
Clay	2	125.0	130.0	300.0	0.0	W1
Liq Soil	3	120.0	125.0	400.0	0.0	W1
Nonliq	4	135.0	140.0	280.0	40.0	W1
UpperLiq	5	120.0	125.0	200.0	0.0	W1

Load	Value
Horiz Eqk	0.270 g<



STABL6H FSmin=0.51

Safety Factors Are Calculated By The Modified Bishop Method

STED

Admiralty Way PL-06242-01 Section BB Dynamic

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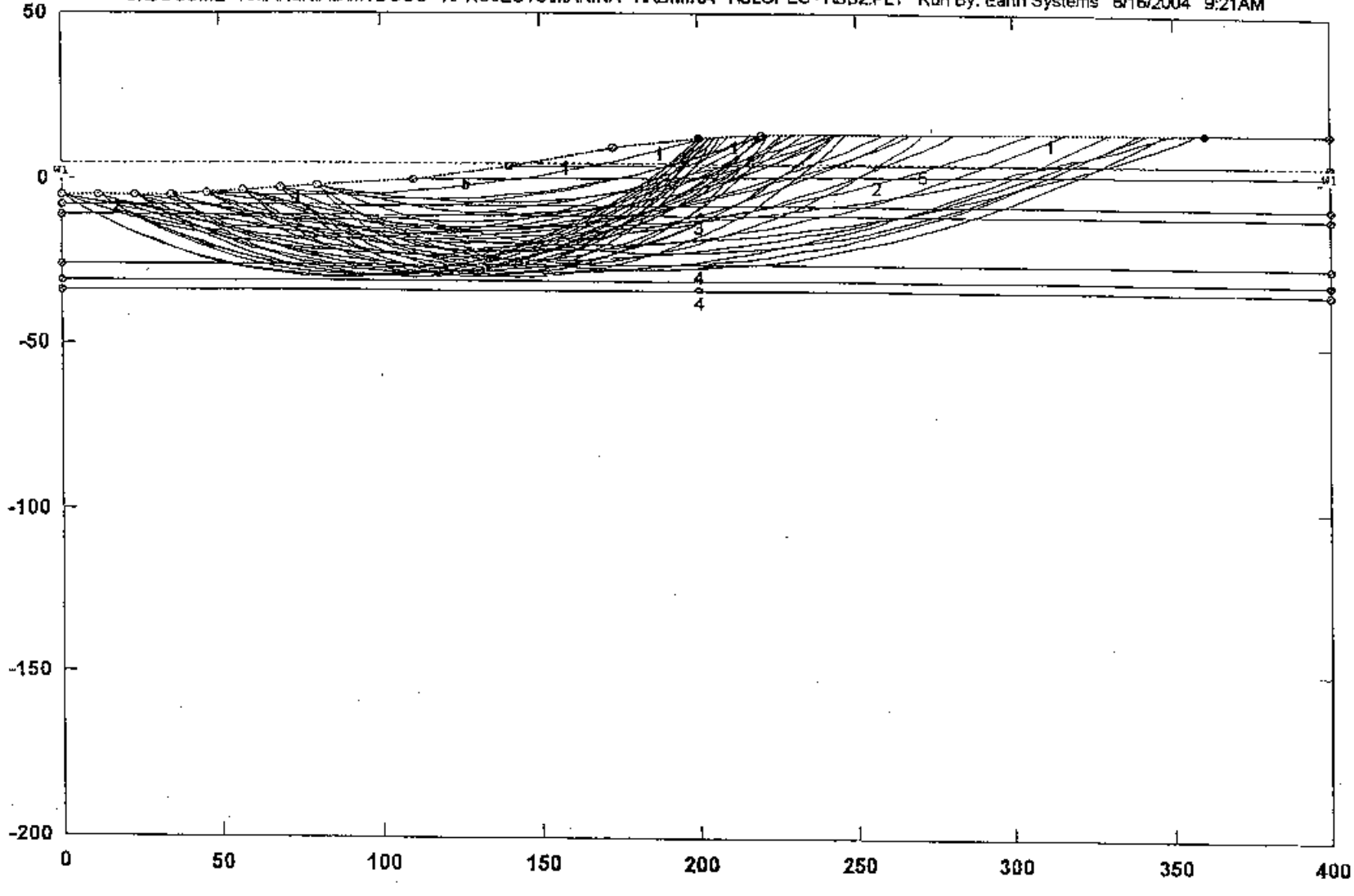

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Admiralty Way PL-06242-01 Section BB Specific Surface - Dynamic

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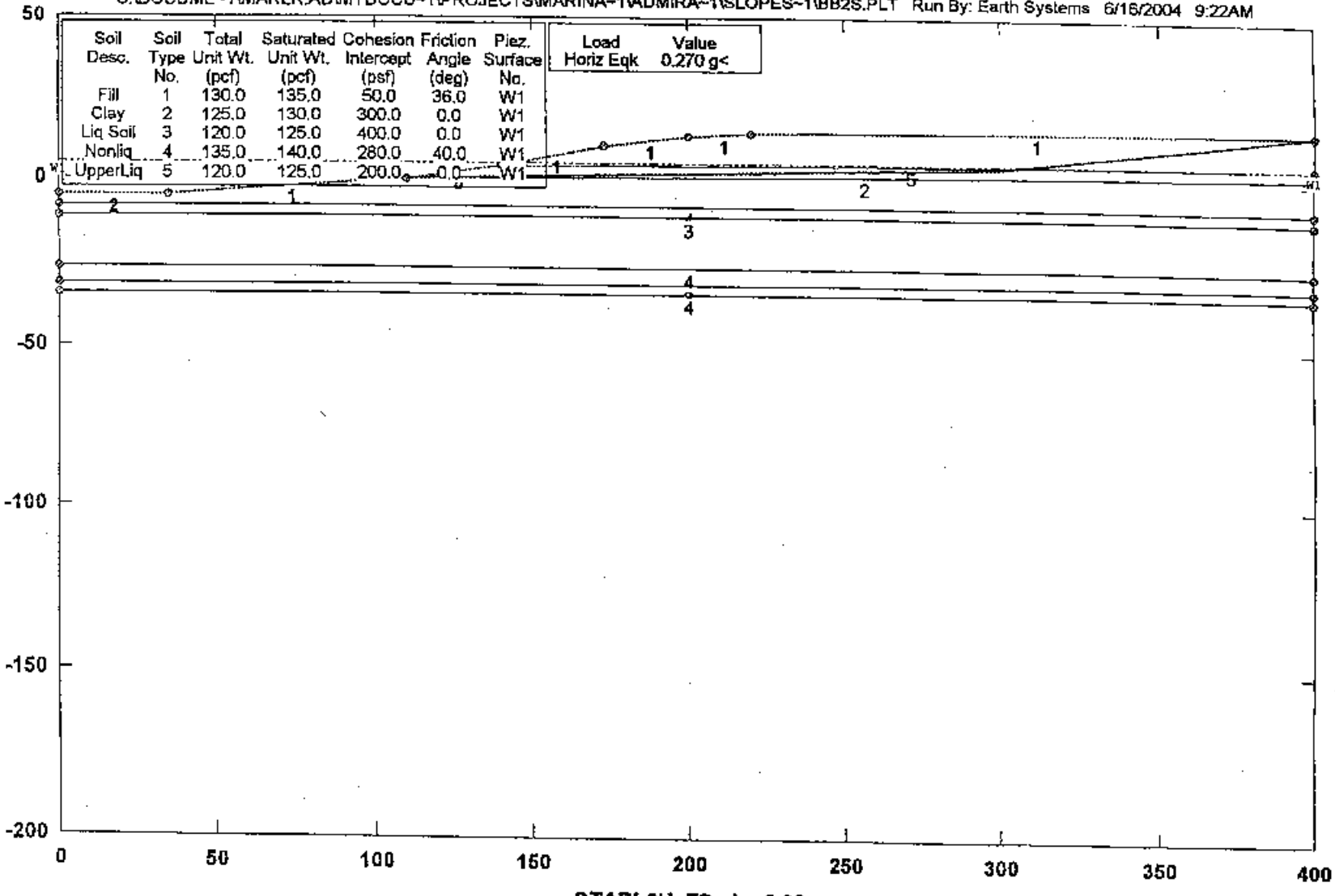
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Fill	1	130.0	135.0	50.0	36.0	W1
Clay	2	125.0	130.0	300.0	0.0	W1
Liq Soil	3	120.0	125.0	400.0	0.0	W1
Nonliq	4	135.0	140.0	280.0	40.0	W1
UpperLiq	5	120.0	125.0	200.0	0.0	W1

Load	Value
Horiz Eqk	0.270 g<



STABL6H FSmin=0.98

Factor Of Safety Is Calculated By The Modified Bishop Method

STED

Admiralty Way PL-06242-01 Section BB Dynamic, YieldAccel

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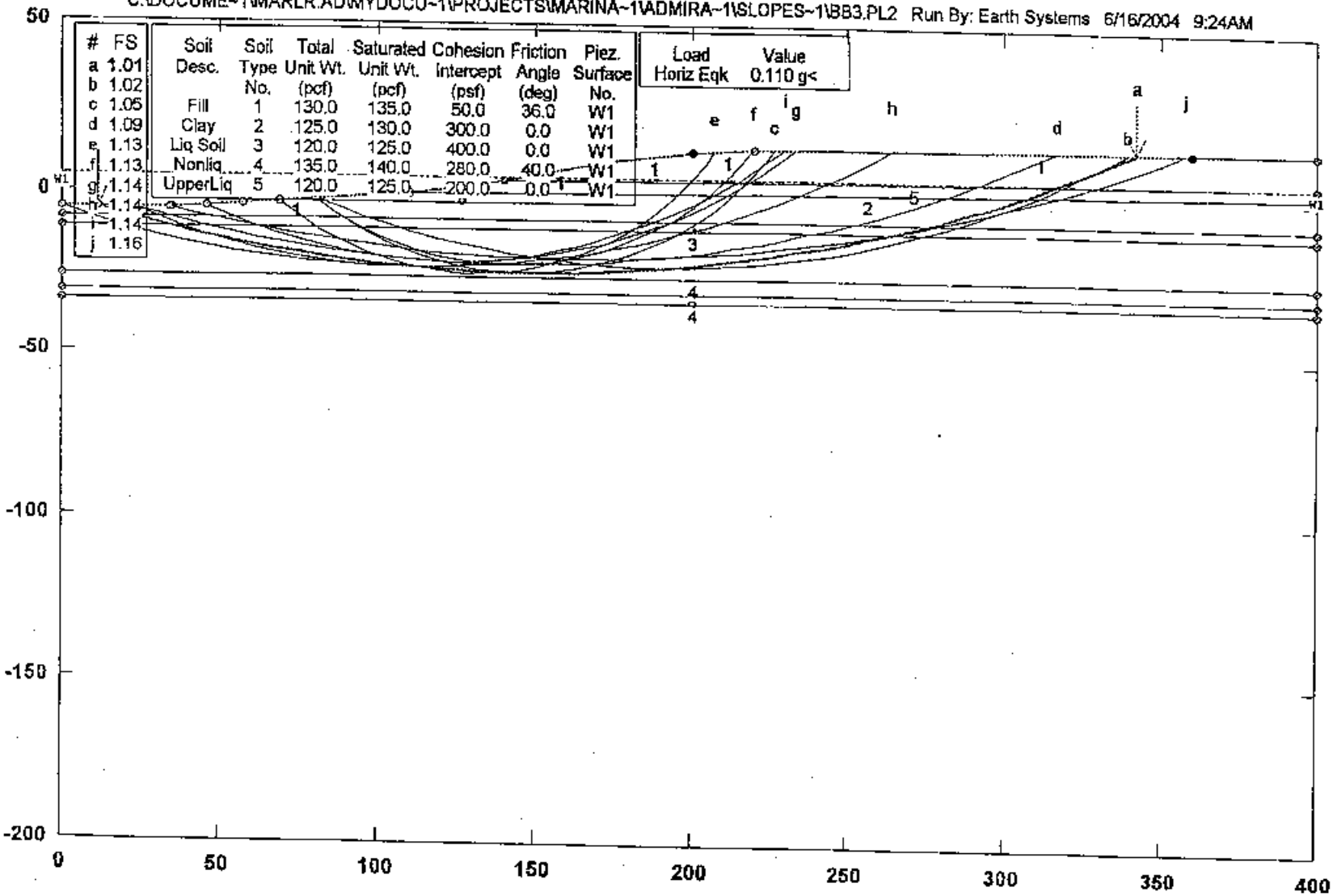
#	FS
a	1.01
b	1.02
c	1.05
d	1.09
e	1.13
f	1.13
g	1.14
h	1.14
i	1.14
j	1.16

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Fill	1	130.0	135.0	50.0	36.0	W1
Clay	2	125.0	130.0	300.0	0.0	W1
Liq Soil	3	120.0	125.0	400.0	0.0	W1
Nonliq	4	135.0	140.0	280.0	40.0	W1
UpperLiq	5	120.0	125.0	200.0	0.0	W1

Load	Value
Horiz Eqk	0.110 g<



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STABL6H FSmin=1.01

Safety Factors Are Calculated By The Modified Bishop Method

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Southern California

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PRELIMINARY
GEOTECHNICAL ENGINEERING REPORT

Proposed Commercial Development
Parcel 21, Vicinity of 14025 Panay Way
Marina del Rey, California
LA-01052-01

Prepared For

PRESTIGE HOMES, INC.

August 21, 2006

Prepared By

Earth Systems Southern California
14550 Haynes Street, #202
Van Nuys, California 91411

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FAX (818) 901-8084

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Southern California

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Fax (818) 901-8084

August 21, 2006

LA-01052-01

Prestige Homes
5150 Overland Avenue, Suite A
Culver City, California 90230

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Attention: Mr. Kirk Buteyn

Subject: **Preliminary Geotechnical Engineering Report**
Proposed Commercial Development
Parcel 21, Vicinity of 14025 Panay Way
Marina del Rey, California

Presented herewith is the Preliminary Geotechnical Engineering Report prepared, as authorized, for the site of a proposed commercial development in the Marina del Rey community of Los Angeles County, California. The conclusions and recommendations contained in this report are based upon Earth Systems Southern California (ESSC's) understanding of the proposed development and on analyses of the data obtained from the field and laboratory testing programs.

The recommendations provided in this report generally pertain to criteria for foundation design. ESSC strives to provide analyses and recommendations in accordance with the applicable standards of care for the geotechnical engineering profession at the time the study is conducted. The submittal of this report marks the completion of the scope of geotechnical engineering services described in ESSC's proposal dated April 12, 2006 and authorized on April 17, 2006. Other services which may be required, such as grading observation and construction testing, are additional services that will be billed according to the Fee Schedule in effect at the time such services are provided. Budgets for these services, which are dependent upon design and construction schedules, can be provided when requested. ESSC appreciates this opportunity to provide professional geotechnical engineering services for this project. If you need clarification of the information contained in this report, or if ESSC can be of additional service, please contact the undersigned.

Respectfully submitted,

Earth Systems
Southern California

David J. Murray
Project Manger

Distribution: 6 – Addressee

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August 21, 2006 LA-01052-01

PRELIMINARY GEOTECHNICAL ENGINEERING REPORT
PROPOSED COMMERCIAL DEVELOPMENT
PARCEL 21, VICINITY OF 14025 PANAY WAY
MARINA DEL REY, CALIFORNIA

INTRODUCTION

This Preliminary Geotechnical Engineering Report has been prepared for the site of a proposed commercial development. The purpose of this study was to evaluate the geotechnical engineering characteristics of the on-site subsurface soil relative to the anticipated site development.

This report includes:

1. Descriptions of the field exploration and laboratory tests performed.

2. Evaluation of liquefaction potential of soils and the potential for lateral spreading at the site.

3. Conclusions and recommendations relating to construction of the proposed commercial development based upon analyses of data obtained from the exploration and testing programs, and on knowledge of the general and site specific characteristics of the subsurface soils.

Two other projects at adjacent properties (13900 and 13953 Panay Way) with nearly identical site conditions have been completed under Los Angeles County review within the last few years. The following references provide information regarding the geotechnical aspects of the design and construction of those structures with relate directly to the subject site. These references are presented for consideration by the owner and the review agency, and are considered pertinent for the design team and the County review of this document.

1. Earth Systems Southern California (ESSC), 2002, *Preliminary Geotechnical Engineering Report*, Proposed Multi-Unit Residential Apartment Building, 13953 Panay Way, Marina Del Rey, California, Project No. PL-05482-01 dated July 12, 2002.

2. **County of Los Angeles – Soil Engineering Review Sheet for the Final Report by Earth Systems (Pile Foundations) recommended for Approval dated 1/15/04.**

3. Earth Systems Southern California (ESSC), 2000, *Addenda No. 1 through 5: Preliminary Geotechnical Engineering Report* Proposed Senior Apartments, 13900 Panay Way, Marina Del Rey, California, Project No. PL-05232-01 dated May 18, 2000 - December 21, 2000.

4. **County of Los Angeles – Soil Engineering Review Sheet for the Final Report by Earth Systems recommended for Approval dated 9/15/02.**

SITE DESCRIPTION

The proposed building site is within the marina area of the Marina del Rey community in Los Angeles County, California. The approximate one and a half acre proposed project site is on the north side of the Panay Way "peninsula" at 13953 Panay Way. The site is approximately one-half mile west of the Pacific Coast Highway (Highway 1) and approximately 3/4 mile northeast of the Marina del Rey harbor entrance (Plates I and II). The site is currently occupied by an asphalt-paved parking lot and one small one-story retail structure. The existing marina edge/quay wall (sea wall) forms the northern boundary of the site, while Panay Way forms the southern boundary (Plate III). Existing residential developments make up the western and eastern boundaries of the site, respectively. Topographically, the site is situated at ground elevations of approximately +7 to +10 feet above mean sea level (msl). The property slopes downward towards the north at a grade of approximately 2% to a relatively flat area adjacent to the quay wall (Plates IV and V). The above-cited descriptions are intended to be illustrative and are specifically not intended for use as a legal description of the subject property.

PROJECT DESCRIPTION

Based on preliminary plans by the project architect (GMP Architects), Earth Systems Southern California (ESSC) understands that the proposed project will consist of two new structures separated by a plaza. One structure will have a footprint approximately 390 feet by 120 feet and will include a yacht club, fitness club, retail space and parking. The east end of the main structure will consist of a five level parking garage including one partial subterranean level, while the west end of the structure will be four stories and will include the club and retail space as well as some parking. The second structure (footprint approximately 160 by 120 feet) will consist of a four or five level parking garage including one partial subterranean level.

ESSC has not received building or foundation plans for the proposed structures as of this writing. However, based upon the type of construction and the nature of the site soils, ESSC understands that the structures will be supported by precast, prestressed concrete driven piles. Estimated axial (vertical) structural loads are not expected to exceed 180 kips per pile for normal (static) conditions and 300 kips per pile for transient (seismic) loads. Transient lateral loads on the piles may be as much as 30 kips per pile.

The project will also include associated parking, walkways, and landscaping. ESSC has assumed that what little site grading may be needed can be accomplished by conventional cut and fill methods. Permanent slopes at the site will not exceed five feet in height. These assumptions were used as the basis for the exploration, testing programs, and for the initial recommendations contained in this feasibility report. If the anticipated foundation loads or other site conditions vary significantly from the values stated herein, the recommendations should be reconfirmed prior to completing project plans.

PURPOSE AND SCOPE OF SERVICES

The purpose of ESSC's services was to evaluate the project site soil conditions, and to provide preliminary geotechnical engineering conclusions and recommendations relative to the project site and the proposed development. ESSC's scope of services included the following:

A. A general reconnaissance of the site and review of previously completed geotechnical reports from nearby sites.

B. Shallow subsurface exploration of the project site by drilling five hollow-stem auger test borings, and advancing four cone penetration test (CPT) soundings.

C. Geotechnical laboratory testing of selected soil samples obtained from the exploration program conducted for this project.

D. Geotechnical engineering analyses of the data obtained from the exploration and testing programs.

E. A summary of findings and recommendations in this written report.

Contained in this report are:

A. Discussions on local and site specific soil conditions.

B. Results of laboratory tests and field data.

C. Evaluation of susceptibility of site soils to earthquake induced liquefaction and lateral spreading.

D. Recommendations relating to the proposed site development, including allowable foundation pile load-supporting capacity, recommendations for pile foundation design, lateral earth pressures, and soil corrosion characteristics.

SITE HISTORY

Most of the land within Marina del Rey, including the subject site, was created during construction of the marina circa 1963. The Panay Way peninsula consists of dredge material placed hydraulically or as dump fill between the north and south quay walls at that time (USACOE, 1963). Geotechnical investigations were conducted at sites adjacent to the subject site in 1968 (hollow stem auger borings TH-1* through TH-3* to depths of up to 19 feet) and in 1996 (hollow-stem auger borings TH-1 through TH-5 to depths of up to 70 feet). A geotechnical investigation of Parcel 20 (adjacent to the subject site) was conducted in 2000 (ESSC, 2002) that included two borings and three cone penetration test (CPT) soundings. That building was subsequently constructed on a foundation system consisting of 24-inch square reinforced concrete piles driven to depths of 40 to 45 feet below subgrade elevation (ESSC, 2003) In 2005, a geotechnical study was conducted of the area around

Basin D of the marina including Panay Way for a proposed water quality improvement project (Converse, 2005). That investigation included installation of two groundwater monitoring wells (MW1 and MW2) to depths of 25 feet on the subject site (Parcel 21). The boring logs and well-construction details for those two wells are included in Appendix A. For reference, the logs of previously completed borings and CPT soundings from the adjacent sites (Panay Way Parcel 20 and Parcel 19) are included in Appendix C. An environmental investigation of soils at Panay Way Parcels 19, 20, and 21 (Enviropro, 2006) was conducted in February 2006 that consisted of five shallow "geoprobe" borings.

The Los Angeles County Department of Public (LACDPW) works completed a major upgrade of the existing quay wall in the late 1990's including 24-inch diameter piers installed at 10-foot spacing and anchored to the quay wall panels. According to design reports for the upgrade project, soil liquefaction and certain dynamic soil pressures were accounted for (GEI, 1996 and Kesner, 1999). However, according to subsequent communication with the LACDPW, the LACDPW determined that the quay wall, including upgrades, was not capable of withstanding anticipated loads due to laterally spreading soils. Therefore, all analyses of building foundations within the Panay Way peninsula may not rely on containment of the existing soils within the existing quay wall system.

FIELD EXPLORATION

The field exploration for this study consisted of drilling and sampling five exploratory hollow-stem auger test borings to depths of approximately 5 to 80 feet below the existing ground surface, and advancing four cone penetration test (CPT) soundings to depths of approximately 78 to 80 feet. The CPT soundings were conducted on May 15, 2006 while the borings were drilled on May 31 through June 2, 2006. Because of the very loose and saturated nature of the subsurface soil, mud rotary drilling methods were used in order to keep the borings open during drilling. The approximate locations of the exploratory test borings and CPT soundings, as indicated on the attached Site Sketch (Plate III), were determined by sighting and tape measuring from existing surrounding improvements. The locations of the borings and CPT soundings should be considered accurate only to the degree implied by the measurement method used.

Bulk (disturbed) samples of the subsurface soil were obtained from tailings generated during drilling. These samples were secured for classification and testing purposes and represent mixtures of soils within the noted depths.

Additional soil samples ("ring samples") were secured from within the test borings using a three-inch outside diameter (2.5-inch inside diameter) ring sampler (ASTM D 3550) with a shoe similar to the drive cylinder sampler (ASTM D 2937). A 140-pound hammer falling approximately 30 inches (ASTM D 1586) drove the sampler. The hammer was operated by a power reversing hydraulic winch. The hammer operated at a rate of approximately 30 blows per minute. The number of blows required to drive the sampler 18 inches was recorded in six-inch increments and recorded on the boring logs. Recovered ring samples were sealed in plastic containers and transported to the ESSC laboratory for further classification and testing.

Further sampling and collection of disturbed soil samples was accomplished using the Standard Penetration Test (SPT) sampler in accordance with ASTM D 1586. The SPT sampler is a split barrel sampler with a 1-3/8 inch inside diameter. No liner was used in the SPT sampler. This sampler was also driven by a 140-pound hammer falling approximately 30 inches. The number of blows required to drive the sampler 18 inches was recorded in six-inch increments and recorded on the boring logs. Soil samples recovered by this method were sealed in sealed plastic bags. Recovered soil samples were transported to the ESSC laboratory for further classification and testing.

The Logs of Test Borings for this report, included in Appendix A, represent ESSC's interpretation of the field logs prepared for each test boring by ESSC's staff, along with their interpretation of soil conditions between samples and results of laboratory tests. While the noted stratification lines represent approximate boundaries between soil types, the actual transitions may be gradual.

The CPT exploration was conducted by hydraulically advancing an instrumented Hogentogler $10cm^2$ conical probe into the ground at a rate of 2 cm per second using a 23-ton truck as a reaction mass. An electronic data acquisition system recorded a near-continuous log of the resistance of the soil against the cone tip (Q_c) and soil friction against the cone sleeve (f_s) as the probe was advanced. Resistance readings were recorded for every 2.5 cm (1 inch) of depth. Empirical relationships (Robertson and Campanella, 1985) were applied to the data to give a near-continuous profile of soil stratigraphy. Interpretation of CPT data provides correlations for SPT blow count, internal friction angle, ultimate stress (S_u) of clays, and soil type. Logs of the CPT soundings are included in Appendix B.

LABORATORY TESTING

After visual and tactile classification in the field, the soil samples were brought to ESSC's laboratory. The soil classifications were checked in accordance with the Unified Soil Classification System and a testing program was established as follows:

A. Soil samples were examined and field logs were reviewed to select samples for laboratory testing.

B. Moisture content and dry unit weight for soil ring samples were evaluated (ASTM D 2937 and ASTM D 2216).

C. Soil classification tests consisted of Particle Size Analysis: Mechanical Method and Hydrometer Method (ASTM D 422).

D. The relative strength characteristics of selected ring samples of the near-surface soils were estimated from the results of direct shear tests (ASTM D 3080). The specimens were placed in contact with water for at least 24 hours before testing and then sheared under normal loads ranging from approximately 1 to 4 kips per square foot (ksf). Samples were sheared to sufficient strains so that both peak and ultimate values were evaluated.

E. Soil chemistry tests consisted of pH, resistivity, conductivity, and a variety of cations and anions including soluble sulfate. Soil chemistry tests were performed by M.J. Schiff and Associates on a soil sample provided by ESSC.

F. Additional tests consisted of Maximum Density-Optimum Moisture (ASTM D 1557) and Expansion Index (ASTM D 4829).

Refer to Appendix D for the laboratory test results. Presentation of the test results provides only that information considered pertinent. References to ASTM and other test standards refer to the standard currently in effect.

GEOLOGIC SETTING

The project site is located near the boundary of two of California's geomorphic provinces. It lies at the northwestern limits of the Peninsular Ranges geomorphic province that is characterized by northwest-southeast trending mountain ranges and intervening sediment-filled valleys. Included in this province is the Los Angeles Basin. The project site is located at the northwesterly edge of the western block of the Los Angeles Basin, which is characterized by the deep alluvial deposits of the coastal plain.

The site also lies at the southern margin of the Transverse Ranges geomorphic province that is composed of parallel, east-west trending mountain ranges and intervening sediment-filled valleys. The Santa Monica Mountains extend from the Los Angeles River approximately 45-miles westward to the Oxnard Plain. The mountains comprise a complex, westward-plunging anticline that exposes older rocks in the eastern core of the range.

The geologic structures of the Transverse Ranges and Peninsular Ranges are distinctively different. Geologic structure is dominated by the effects of north-south compressive deformation that results in thrust faulting and folding characteristic of the Transverse Ranges and the strike-slip faulting and bedrock folding characteristic of the Newport-Inglewood fault in the Peninsular Ranges province. These active geologic features are attributable to convergence between the "Big Bend" of the San Andreas fault and northwestern motion of the Pacific Plate and have caused thrust fault related earthquakes such as the 1994 Northridge, the 1971 San Fernando, and the 1987 Whittier Narrows earthquakes.

The area of the subject site comprises lagunal deposits at the mouth of the Balona Creek estuary. The Ballona Creek estuary is underfit in that it is much too large to have developed around the modern Ballona Creek drainage. At the time of the estuary's formation it was the mouth of the Los Angeles River which was later diverted into its modern stream course that outlets at San Pedro.

An older (late Pleistocene age) dissected alluvial surface (the Santa Monica plain) lies along the southern flank of the Santa Monica Mountains. This plain extends as far south as the Santa Monica Airport (approximately 2-km north of the subject site. The Westchester plain above the bluff at Playa del Rey forms a similar-age geomorphic surface approximately 2-km south of the subject site. These plains remain as an elevated, isolated, geomorphically inactive surface that is neither generating nor receiving sediments. The Ballona Creek floodplain occupied the intervening lowland

area between Westchester and Santa Monica plains. The area of the subject site has been incised below the older, elevated alluvial plains that surround it. The Quaternary sedimentary units are "stratigraphically reversed" with the older units at a higher elevation. Sediments that underlie the Santa Monica plain were first mapped by Hoots (1930). This work and the later work of Yerkes (1987) assigned the underlying sediments to Late Pleistocene marine terrace. The sediments underlying the subject site are recent (Holocene) deposits.

The active Newport- Ingewood fault zone is one of the most significant geologic features of the area and is located approximately 10-km east of the site. The northwest-trending Compton-Los Alamitos Trend of folds is now thought to overlie a northeast dipping series of blind thrust faults several miles to the south of the site. This series of faults and folds is likely associated with the more widely recognized Newport-Inglewood zone of deformation that extends from Newport Beach through the Baldwin Hills. The Cheviot Hills are the northernmost recognizable feature in the Newport-Inglewood zone of deformation. The active Newport-Inglewood fault zone is one of the most significant geologic features of the area and is located under the southern margin of the western Santa Monica Mountains.

Other active or potentially active faults in the immediate vicinity of the site include the Santa Monica fault (approximately 8-km) north of the site which together with the Hollywood fault (approximately 4.7-km to the north) and the Malibu Coast fault (approximately 11-km) make up the southern frontal fault system of the Santa Monica mountains. This fault system is the southern boundary of the Transverse Ranges Geomorphic Province. Other nearby faults are part of the northern Peninsular Ranges Geomorphic Province. They include the Newport-Inglewood fault approximately 10-km east and the Palos Verdes fault (approximately 7-km south). The site does not fall within an earthquake fault rupture hazard ("Alquist-Priolo") zone (Hart and Bryant, 1999). The subject property falls within a liquefaction hazard zone but does not fall within a slope hazard zone as currently identified by CDMG on the Seismic Hazard Zones Map, Venice Quadrangle, 1998 (CDMG, Seismic Hazard Zone Report 034, Open File Report 98-27).

SOIL CONDITIONS

Artificial fill soils were encountered in each of the borings and CPT soundings. The depth of fill was observed to be approximately 12 to 14 feet. These fill soils were found to consist predominantly of moderately compact to poorly compact silty sand, clayey sand, and clay (SM, SC, and CL) soil types based upon the Unified Soil Classification System). It is ESSC's understanding that these artificial fill soils were placed as hydraulic fill or "dump fill" during construction of the marina circa 1963. Based upon results of the Expansion Index (EI) Tests (ASTM D 4829) conducted for previous investigations at Parcel 20, the majority of the upper on-site fill soils are considered to have a "low" (EI = 21 - 50) expansion potential.

Native alluvial soils below the fill soils were found to consist predominantly of loose to medium dense silty sand and soft to very stiff silts (SM and ML soil types) down to a depth of approximately 32 feet below existing grade. Below 32 feet, the alluvial soils consist predominantly of medium dense to very dense silty sands, poorly-graded and well-graded sands, and poorly-graded and well-graded gravels (SM, SP, SW, SP-SM, GP, GW, and GC soil types). The logs of the test borings and

CPT soundings in Appendices A through C contain more detailed descriptions of the soils encountered.

The soil "density," as represented by penetration blow counts from borings at the subject site (Parcel 21, B1 through B5) is summarized on Plates VI and VII. Plate VI presents the data obtained from Standard Penetration Tests (SPT) and California Modified Samplers with blow counts corrected for depth, hammer energy, borehole diameter, rod length, sampler liner, and sampler type in accordance with State of California Guidelines (SCEC, 1999). These corrected data are described as $(N_1)_{60}$ values. Plate VII presents the same data with the additional correction for fines content (coarse sand correction). These corrected data are described as $(N_1)_{60cs}$ values. The following correction factors were applied to both the SPT and California modified blow counts to arrive at "equivalent" $(N_1)_{60}$ values:

Item		Correction Factor Used
Energy Correction	C_E	1.1 – hammer operated by power-reversing winch
Drive rod Length	C_R	Varies with length of rod. Values used per SCEC.
Borehole Diameter	C_B	1.1 Borehole Diameter – 8" diam hole with auger pull up
Sampler Liner	C_S	1.2 – unlined SPT sampler
Sampler Type		1.0 – SPT sampler, 0.63 – Cal Modified Sampler

The data suggest density generally increasing with depth to a depth of approximately 50 feet followed by a moderation of density to a depth of at least 80 feet.

GROUNDWATER

Free groundwater was encountered at the site in the test borings at depths of approximately 12 to 16 feet below existing site grade. The two groundwater monitoring wells (MW1 and MW2) installed at the site indicated groundwater depths of 15 to 16 feet when drilled in April 2005 and approximately 7 to 9 feet after well development and sampling. According to the Seismic Hazards Report for the Venice Quadrangle (CDMG, 1998), the historic shallowest groundwater in the site vicinity is approximately 5 feet below grade. Groundwater within the marina has been demonstrated to fluctuate significantly, primarily in response to tides. Based on the highest tide recorded in this part of the Southern California Coast, the shallowest anticipated groundwater would be approximately 5 feet below existing ground surface.

GEOLOGIC HAZARDS

Geologic hazards that may affect the proposed buildings include seismic shaking and other earthquake-related hazards. The following is a discussion of the various potential geologic hazards.

Fault Rupture

The site is not located within a earthquake fault rupture hazard ("Alquist-Priolo") zone as currently delineated by the California Geological Survey (Hart and Bryant, 1999). In addition, no known active faults have been identified on the site. Therefore, the potential for active fault rupture is

considered to be low. While fault rupture would most likely occur along previously established fault traces, future fault rupture could occur at other locations.

Seismic Shaking

Although the site is not located within a known "earthquake fault rupture hazard zone," it is located in an active seismic region where large numbers of earthquakes are recorded each year. Historically, major earthquakes (i.e. those with magnitude greater than 7.5) felt in the vicinity of the subject site have originated from faults outside the area. These include the December 21, 1812 "Santa Barbara Region" earthquake that was presumably centered in the Santa Barbara Channel, the 1857 Fort Tejon earthquake, the 1872 Owens Valley earthquake, and the 1952 Kern County earthquake.

The nearest known "active" or "potentially active" faults in the vicinity of the subject site include the Palos Verdes Fault (approximately 7 kilometers [km] southwest of the site), the Santa Monica fault (approximately 8 km northwest of the site), and the Newport-Inglewood fault (approximately 10 km east of the site). Graphical and tabular representations of the relation of the project site to nearby faults are included in Appendix E.

The subject site, like all other sites in the general area, can be affected by moderate to major earthquakes centered on faults in southern California. The Seismic Hazards Report for the Venice Quadrangle presented by the state (CDMG, 1998) indicates a predominant earthquake magnitude (Mw) of 7.1 for the site vicinity. The report indicates that the site is located in an area where peak ground accelerations (for alluvium conditions) are anticipated to range up to about 0.46g for a 10% probability of excedence in 50 years (see Appendix E). For the same probability of excedance, the spectral acceleration for a 0.2 second period is expected to range up to about 1.1g, and the spectral acceleration for a 1.0 second period is expected to range up to about 0.5g.

To further evaluate potential future seismic shaking, an assessment of potential ground motions at the site was conducted through a Probabilistic Seismic Hazard Analysis (PSHA) using the United States Geological Survey (USGS) Interactive Strong Motion Deaggregation internet web site (USGS, 2002). The USGS PSHA results for soft rock ($S_{B/C}$) were adjusted by a site factor varying from 1.0 for peak ground acceleration (PGA) to 1.5 for spectral accelerations of 1.0 second. The Design-Basis Earthquake (DBE) is typically used for residential and commercial structures and has a 10% probability of excedance in 50 years. A PGA of approximately 0.41g was estimated by the USGS method. Response spectra for the site were also developed from the USGS data (see Appendix E).

Based on the various analyses discussed above, it is recommended that the design earthquake for this site be considered to be a 7.1 magnitude event, with a peak ground acceleration no higher than 0.5g. Acceleration values provided are estimates only. Actual acceleration values may be more or less than those provided.

Seismic Design Parameters

Based on the significant thickness of loose liquefiable soil beneath the site, the Soil Profile Type (2002 Los Angeles County Building Code section 1636.2) could be classified as S_F: soil requiring site specific evaluation. The Stiff Soil Profile (S_D) factor is the most appropriate soil profile for design of the proposed pile foundations that will be supported by the relatively dense sandy soils encountered below the liquefiable soil; however, a site specific design ground acceleration has been developed as discussed above. This value should be used for structural design in lieu of seismic

coefficient (C_a) and near source factor (N_a) values drawn from the code tables. The applicable 2002 LACBC seismic parameters are itemized below:

Summary of Seismic Design Parameters

Seismic Zone	4
Seismic Source Type Newport-Inglewood, Palos Verdes, and Compton Faults	B
Soil Profile Classification (2002 LACBC Table 16-J)	S_D / S_F
Seismic Zone Factor – Z (2002 LABC Table 16-I)	0.40
Estimated Design-Based Horizontal Acceleration (DBE)* *10% probability of being exceeded in 50 years	0.5 g

Secondary Seismic Hazards

Secondary seismic hazards related to ground shaking include liquefaction, ground deformation, areal subsidence, lateral spreading, tsunamis, and seiches.

Liquefaction: Liquefaction is defined as a loss of strength of saturated cohesionless soil generally due to seismic shaking. Soil types most susceptible to liquefaction are loose, saturated silty to clean fine sands. The project site is located within a "liquefaction hazard zone" as defined by the CDMG on the Venice Quadrangle Seismic Hazard Zones map dated March 1999.

The liquefaction potential at each soil boring and CPT location was evaluated using a spreadsheet format based on the procedures outlined by NCEER (1997). The results of these analyses are included in Appendix F. Assumptions used in the liquefaction analyses included:

a) The design earthquake occurs during a time of shallowest anticipated groundwater (approximately 5 feet below existing ground),
b) Blow counts from the ring sampler (California Modified sampler) were corrected to "equivalent" SPT blow counts using a conversion factor of 0.63 as recommended by the Southern California Earthquake Center (SCEC, 1999),
c) Soils with corrected blow counts $(N_1)_{60}$ greater than 30 were not considered liquefiable, nor were soils containing 15% or more clay fines.

The liquefaction potential for each CPT sounding soil profile was evaluated by the procedures set forth in Robertson & Wride (1997) and Tokimatsu & Seed (1987). These procedures are programmed in spreadsheet form, and the results of these CPT-based liquefaction analyses for magnitude 7.1 and ground accelerations of 0.5g are also included in Appendix E.

The results indicate significant potential for liquefaction within the upper site soils between approximately 5 feet and 32 feet below existing grade. The CPT data suggest the potential for liquefaction of a few thin (1 – 3 feet thick) layers of soil in various locations and depths between 32 and 52 feet below existing ground surface. However, some research suggests that the potential for liquefaction is reduced at the greater overburden stresses experienced at such depths.

Seismic Induced Settlements and Ground Damage: Given that site soils below the groundwater table may liquefy during a significant seismic event, some resulting settlement and ground disturbance can be expected. Vertical ground settlements may result as loose liquefied soils and loose unsaturated soils densify during seismic motions. Vertical ground settlement due to liquefaction was evaluated according to the procedures outlined by Robertson & Wride (1997), Tokimatsu & Seed (1987), Wu (2003) and Pradel (1998). According to these procedures, liquefying soils beneath the site can be expected to experience volumetric strains of up to 4%. Estimates of the total seismically induced settlements range from 1.2 inches in the area of CPT3 to 7.7 inches in the area of B4. Thus, without any ground improvement, earthquake-induced differential ground settlement across the site could be as great as the difference between these values, 6.5 inches. Results are presented in Appendix F.

When soil layers at depth experience liquefaction, the resulting loss of support to overlying soil layers can cause surface disruptions such as fissures, vertical off-sets and sand boils. The potential for this type of ground damage was evaluated using the procedure outlined by Ishihara (1985). According to this evaluation, this site would be likely to experience some ground damage during a significant seismic event, such as one producing ground accelerations of 0.5g or greater at the subject site.

Lateral Spreading: The temporary loss of soil shear strength caused by liquefaction can cause the liquefied soil and blocks of mostly intact, surficial soil to displace down-slope or toward a free face during an earthquake. As discussed above, the site is potentially subject to soil liquefaction and is adjacent to the existing marina sea wall (quay wall) which constitutes a "free face" approximately 15 feet high. Site soils (artificial fill) to a depth of approximately 17 feet are quite loose, with corrected blow counts $(N_1)_{60}$ ranging from 5 to more than 30 blows per foot. Below approximately 17 feet, average $(N_1)_{60}$ blow counts exceed 15 blows per foot. Based on the criteria presented by (Youd et al, 1999), soils with corrected N values in excess of 15 blows per foot are not generally subject to lateral spreading. Therefore, lateral spreading is considered applicable to the upper 17 feet of soil at this site. Using the multiple linear regression (MLR) equations presented by Youd for "free field" analyses, the magnitude of lateral soil displacement was estimated to be between 2 feet to 11 feet at the site subject to an earthquake magnitude of 7.1, distance to fault of 7 km, 4-meter thickness of soil with blow counts less than 15 and average fines content of 25% (see Appendix G). Since the "free face" is on the north side of the site and the site slopes generally from south to north, the soil spreading movement is expected to occur in a south-to-north direction.

As an alternate method (MCEER, 2001) for evaluating the potential for and magnitude of lateral spreading at the site, ESSC conducted a preliminary "sliding block" analysis. A computer slope stability analysis program (STABL6H) was used along with estimated post-liquefaction shear strengths to evaluate the stability of the site in the event of a liquefaction-producing earthquake. Post-liquefaction shear strengths ("residual strengths") for the liquefied layers were estimated using the chart provided by Seed and Harder (1990). The average less one-standard-deviation value for $(N_1)_{60}$ averaged across the depth of lateral spreading (5 to 17 feet) is approximately 11 blows per foot. Based on the chart from Seed and Harder, a residual strength of 400 psf was estimated for the upper liquefied (laterally spreading) layer. The average $(N_1)_{60}$ blow count (20 to 30 blows per foot) for the lower liquefied layer (17 to 32 feet) falls outside the source data range on the chart, however, for blow counts in excess of 16, values for residual strength may be extrapolated linearly from the lower bound curve (Seed et al, 2003). Based on a corrected blow count $(N_1)_{60}$ of 20, the residual strength of the lower liquefied layer may be taken as 900 psf.

The slope stability program was used to evaluate a potential "flow failure" condition (i,e, residual strengths but no ground acceleration). Safety factors of 2.37 and higher were computed, suggesting that "flow failure" would not be expected at this site. A safety factor of 0.97 was computed for the site subject to the expected ground acceleration (0.5g). A seismic coefficient of 0.27 was estimated for that evaluation using procedures presented by Bray et al (1998) and SCEC (2002). Since this safety factor is less than 1.0, ground displacement or lateral spreading would be expected under that ground acceleration. The yield acceleration was then estimated at 0.25g by "back-calculating" to a safety factor of 1.0. Using the anticipated maximum rock acceleration and soil yield acceleration, the lateral ground displacement was estimated using procedures presented by Bray and Rathje (1998). The displacement calculated according to that method was approximately 3.3 inches. A horizontal ground displacement of 3.3 inches is significantly lower than the displacements predicted by Youd's method, but may still be enough to induce lateral spreading earth pressures against deep foundations and/or sheet pile walls. The results of these analyses are presented in Appendix G.

A second alternate method (Zhang, Robertson and Brachman, 2004) was also used to evaluate the potential for and magnitude of lateral spreading. A "lateral displacement index" (LDI) or "displacement potential index" (DPI) is computed for each layer based on either SPT blow counts or CPT tip resistance. This method was applied to the data from the four CPT soundings at the site and lateral spreading of 4 inches to 26 inches was computed (see Appendix G).

The issue of lateral spreading is a complex problem involving soil properties, the properties of the existing quay wall, and the type of expected earthquake motion. Studies have shown that the degree of lateral spreading is not uniform but rather is greatest at the free face and decreases to zero away from the free face (in this case, along the south part of the site near Panay Way). More complex evaluations using mathematical modeling (such as finite-element analyses) could be used and could provide more realistic results. For the purposes of this report, the simplified statistical and "psuedo-static" approaches described above are considered acceptable.

Slope Stability, Flooding, Seiches, and Tsunamis

The site area is relatively flat. Therefore, potential hazards from slope instability, landslides, or debris flows are considered negligible. Because of its location in a marina, flooding hazards at the site would be directly related to tides. Ground surface at the site is located above the highest recorded tide for the vicinity (approximately +5 feet msl) and thus is not considered at significant risk of flooding from normal rainfall or tidal activity. Hazards from seiches (surging water within the marina) and tsunamis (seismically induced ocean waves) could conceivably pose hazards at the site. Marina del Rey is identified as falling within a projected 500-year tsunami run-up area based on mathematical model studies (LACRP, 1990) although no data are provided for lesser recurrence intervals. Marina del Rey is not identified as a tsunami hazard area based primarily on historical tsunami data (CDMG, 1972).

DISCUSSION AND CONCLUSIONS

Liquefaction and Liquefaction-Induced Settlement

As discussed above, liquefaction of the upper site soils (to a depth of approximately 32 feet) will result in a loss of strength, load supporting capacity, and is estimated to result in vertical settlement of up to 7 inches. This problem will be mitigated by use of building foundation piles bearing in the denser, non-liquefying, soils below 32 feet with pile caps and structural slab. Recommendations for driven pile foundations are provided herein. The recommendations were developed considering the effects of liquefaction including loss of shear strength and down-drag due to liquefaction-induced ground subsidence.

Lateral Spreading

If the existing quay wall fails as discussed under Site History, above, the upper liquefied soils (to a depth of approximately 17 feet) and the overlying soil "crust" (unsaturated soil overlying liquefied soil) would be laterally unconfined and would be subject to lateral spreading. If such a scenario occurred, the soil would be expected to move or "spread" in a south-to-north direction in the path of least resistance. As discussed above, various methods of estimating the magnitude of the anticipated lateral ground displacement range from approximately 4 inches to as much as 11 feet. Clearly, the degree of ground displacement will vary for various points across the site and the current state of engineering practice is not able to provide precise estimates of the degree of lateral spreading that could take place in the event of a sizable nearby earthquake. Nevertheless, the analyses indicate that some lateral spreading would be expected to occur to a degree likely to induce some earth pressures against the proposed subsurface structures.

Mitigation Alternatives for Lateral Spreading

The lateral spreading problem may be mitigated by designing the building foundation piles and pile-cap system to be strong enough to resist the lateral earth pressures imparted by laterally spreading soils. ESSC understands that this "strong pile" alternative is currently the project owner's preferred approach since was used successfully at the adjacent site (Parcel 20, 13953 Panay Way). Other alternatives for mitigation of liquefaction and lateral spreading hazards could also be considered if the project developer so chooses. One alternative could include containment of the liquefied soil by means of a sheet pile cutoff wall along with shorter smaller piles for vertical support of the structure; this "coffer dam" approach was used successfully at the Senior Apartments project directly across the street (13900 Panay Way) southeast of the subject site. Ground improvement techniques such as virbro-densification, deep soil mixing, or stone columns could be considered if adequate space is available laterally around each proposed structure. ESSC can provide geotechnical recommendations for such alternatives if requested.

Inertial Lateral Soil Loads

At some point during the earthquake shaking, transient lateral earth pressures will be applied to foundations including piles, retaining walls and other earth structures by the inertial movement of the soil. Since the adjacent marina and quay wall forms a "free face," approximately 15 to 17 feet in height, inertial soil forces may be developed in that zone. For the purposes of this report, lateral inertial soil pressures are presumed to be developed against the lower five feet of the structure (subterranean portion including slab and pile cap) as well as the upper 12 feet of the foundation piles.

Although the issue of inertial earth loads is a complex problem involving both soil and structure properties, the type of expected earthquake motion, and the soil-structure interaction, seismic-induced lateral earth pressures are typically evaluated using a simplified "pseudo-static" approach. The pseudo-static approach applies a continuous force horizontally against the wall or pile. During a seismic event, the soil will actually experience various directional components of acceleration and velocity, both towards and away from the structure. More complex evaluations using mathematical modeling (such as finite-element analyses) could be used and could provide more realistic results. However, for the purposes of design and this report, the pseudo-static (simplified) approach is considered acceptable.

The anticipated maximum horizontal ground acceleration (MHA) of 0.5g (10% chance of excedance in 50 years) is estimated for the subject site as discussed herein. Based on the procedures recommended by SCEC (2002) for pseudo-static slope stability analyses, the seismic coefficient (k_h) may be taken to be equal to f_{eq} x MHA. For a magnitude 7, fault distance of less than 10 kilometers, MHA of 0.5, and displacement (u) of 5 cm, the factor f_{eq} is approximately 0.5. Thus, the estimated horizontal seismic coefficient (k_h) would be 0.5 x 0.5 = 0.25 – 0.27 (see Lateral Spreading under Geologic Hazards above). For the purposes of this project, a horizontal seismic coefficient (k_h) of 0.3 was conservatively utilized to estimate the seismic increment of lateral earth pressures.

Using the Mononobe-Okabe method, the inertial lateral earth load is estimated to be approximately 900 pounds per linear foot (plf) of building wall length (0 to 5 feet below exterior grade), and approximately 4.6 kips per pile (assuming 24-inch square pile) applied between 5 and 17 feet below existing grade (192 psf, 383 pounds per linear foot of pile). Additionally, hydrodynamic pressures of approximately 2.6 kips per 24-inch pile were estimated for the zone between 5 and 17 feet deep (218psf, 437 pounds per linear foot of pile). According to Prakash (1982) and Wood (1973), dynamic earth pressures act in a roughly parabolic distribution from the base of a retaining wall to the retained height of the soil. Therefore for the purposes of design, ESSC recommends that the dynamic increment of earth pressure be applied as a uniformly distributed pressure.

Foundation Design

The proposed structures should be supported by piles firmly embedded in the dense sands deeper than 32 feet below existing site grade. These building foundation piles may consist of driven precast-concrete piles and should be connected to the building superstructure at the top with a structural pile cap. Steel piles could be feasible for the project, however, it is ESSC's understanding that concrete piles are the preferred system. The proposed lowest level of the subterranean parking facility for the building should be designed and constructed as a structural slab. The subterranean portion of the structure will need to be designed and constructed as "water-tight" and/or with continuously active dewatering systems. Plate VIII is a schematic of the proposed subterranean basement, pile cap and piles in relation to the soil profile.

Site Grading

As discussed in the Project Description section, ESSC understands that the proposed structure will have a partial subterranean level parking facility. Significant amounts of debris including large chunks of concrete were encountered during drilling and during construction of the structure on Parcel 20. Extensive debris removal should be anticipated. The subterranean parking level is expected to be bottomed near the high groundwater level. Dewatering may be required to perform site construction operations. Excavation bottoms at or below the groundwater level may not be firm

and there may be a need to stabilize the excavation bottoms to provide a trafficable surface for pile driving and to construct the proposed pile caps and structural decks. Imported gravel was used to stabilize the excavation bottom during construction at the adjacent property (Parcel 20). Refer to Section A of the Recommendations of this report for more detailed discussions and recommendations regarding site preparation and grading.

Temporary excavations up to 5 feet in depth are anticipated to be necessary for construction of the proposed subterranean parking level slab and pile cap system. Excavations should be shored or "laid back" to appropriate temporary slope angles. Refer to Sections A and B of the Recommendations section of this report for more detailed discussions and recommendations regarding site preparation and excavations.

Safety Factors

For normal service conditions not including transient loading conditions (primarily seismic loads), normal standards for safety factors should apply. A minimum safety factor of 2.5 was applied for the allowable axial bearing capacity of pile foundations herein. For transient loads, however, a minimum safety factor of 1.1 to 1.2 may be applied in design (CDMG, 1997).

Section 111 Statement

The subject project site is situated within a mapped seismic hazard zone (CDMG, 1999) and as such will be subject to seismic forces that will cause ground movement, liquefaction settlement, and lateral spreading of the site soil. Based on the findings summarized in this report, and provided the recommendations in this report are incorporated into the building construction, it is ESSC's opinion that the proposed building foundations will not be subject to geologic hazards from landslides, slippage, or settlement beyond the estimated settlement discussed herein. It is also ESSC's opinion that the proposed building foundations will not adversely affect the geologic stability of the site or adjacent properties provided the recommendations of this report are followed. Test findings and statements of professional opinion do not constitute a guarantee or warranty, expressed or implied.

DESIGN ANALYSES

The proposed pile foundation system was evaluated for three separate loading conditions. These conditions are as follows, in chronological sequence as the conditions would be expected to occur during and following a significant seismic event:

- Loading Condition #0 – Beginning of earthquake shock. Static axial loads and building seismic base shear applied to the foundation pile heads.

- Loading Condition #1 – Peak acceleration during earthquake motion. Static and dynamic axial loads applied to the pile heads. Building seismic base shear and dynamic (inertial) earth forces applied to the subterranean portions of the building and pile cap system as well as to portions of the sides of the foundation piles.

- Loading Condition #2 – Subsequent to the majority of the earthquake shaking. Upper 17 feet of soil undergoes lateral spreading in a northward direction. Static axial loads and building seismic base shear applied to the foundation pile heads. Lateral spreading earth forces imparted to the

subterranean portions of the building and pile cap system as well as to portions of the sides of the foundation piles.

Recommendations for the building foundation piles subject to liquefaction and lateral spreading, are provided in Recommendations Section E, below. It is ESSC's understanding that the piles will be 24-inches square in cross section. For comparison purposes, some recommendations are included herein for 16-inch and 20-inch concrete piles as well.

Axial Pile Analyses

The axial pile capacities were examined considering two cases: a) static (non-seismic) conditions with frictional resistance on piles, and b) down-drag due to settlement of liquefying soils with tip resistance of piles. The design curves (Plates IX and X) are based on the "worst case" of the two conditions. The axial pile capacities were computed by a varicty of methods including Meyerhoff (1976).

Lateral Pile Analyses

The lateral pile capacities were evaluated using the LPILEP5 computer program by Ensoft, Inc. The design curves shown on Plate XI summarize the results of the lateral pile analyses.

Load Condition #0 – Building Base Shear: For this condition, the piles are embedded entirely in existing unliquefied soil and the lateral base shear of the building is applied to each of the piles at the pile heads. For purposes of comparison between load conditions in this report, the building base shear is assumed to be 25 kips per pile.

Load Condition #1 - Building Base Shear and Soil Inertial Forces: The magnitude of the inertial soil forces was computed using the Mononabe-Okabe method as described above. For analysis, a uniform soil inertial load was applied to the upper 12 feet of the piles and an additional inertial soil load (approximately 8 kips per pile assuming 20-foot pile spacing) to represent the inertial soil pressure against the basement walls. Hydrodynamic forces (approximately 6 kips per pile) were applied as uniform lateral loads against the upper 12 feet of the piles.

Load Condition #2 - Building Base Shear and Lateral Spreading Forces: The lateral forces applied by spreading soils against the face of the piles depend on the nature of the soil. The upper unliquefied soil ("soil crust") is generally assumed to apply a "Rankine or Coulomb type" passive pressure to the site of the pile (Dobry, 2001). (For comparison analyses, the crust load per pile is approximately 12 kips per pile assuming 20-foot pile spacing). For the liquefied spreading soils, several approaches have been proposed to evaluate lateral pressure from laterally spreading soils. The Japanese Road Association building code uses a trapezoidal pressure distribution based on a pressure of 30% of the total overburden pressure at any given stress (JRA, 1996, Yokoyama et al, 1997). This approach is based on back-calculations from case histories. A pressure modifier (m_p) depending on degree of excess pore-water pressure may be applied to the p-y curve for any given depth to give liquefied soil pressures at that depth (Dobry, 1995). This approach is based largely on the results of centrifuge model tests. A third method involves shifting the p-y curves by an amount based on the relative movement between the laterally spreading soil and the bending pile (Wang, 1998, and Ashford, 2005). Alternatively, a fourth method liquefied soils may be assumed to behave

essentially as cohesive soils with undrained strengths taken as the residual strengths obtained from the research presented by Seed and Harder (1990).

The latter two methods (shifted p-y curves and uniform pressure based on residual strengths) have been used for the analyses herein. The lateral pile analyses were conducted using the LPILEPlus 5.0 computer program (Ensoft, 2004) which uses a finite-difference based numerical method. For the shifted p-y curve method (Load Condition #2a), the relative movement between the bending pile and the spreading soil was taken as six inches based on the lateral spreading analyses discussed above. For the uniform pressure (residual strength "cohesive soil") method (Load Condition #2b), a uniform pressure of 1.35 ksf (225 lb/inch) was applied to the upper 12 feet of the piles. Based on these analyses (using the "crust" load of 12 kips/pile), Loading Condition #2 (laterally spreading soil) appears to be the most critical condition for design of the foundation piles. See Appendix H for results of the lateral pile analyses.

Pile Groups

Axial Loads: It is assumed that the 24-inch square piles for the building foundations may be placed in groups as close as four feet on center. According to commonly accepted engineering criteria (Poulos and Davis, 1980, Winterkorn and Fang, 1975, NAVFAC, 1982), for piles deriving their primary bearing capacity from sands, axial group efficiency factors are typically in excess of 1.0. Therefore, a group "efficiency factor" of 1.0 can be used for axial load analysis of the proposed 24-inch driven piles at this site.

Lateral Loads: The effects of grouping action on the lateral pile capacities were evaluated using the guidelines provided by Mokwa (1999). According to the research summarized by Mokwa (1999), group efficiency factors (G_e) of 70% to 75% should be applied to proposed in-line 2-pile and 3-pile groups when loaded laterally in the direction of the pile group alignment. The group efficiency factor is the ratio between the actual lateral load carrying capacity of the pile group to the sum of the lateral capacities of the individual piles. The efficiency factor increases to approximately 85% when the groups are loaded laterally perpendicular to the orientation of the pile group. In addition to the group efficiency factor, the distribution of the lateral load among the piles should also be considered. The outer two piles in a three pile group may carry significantly more of the lateral load than the inner pile.

RECOMMENDATIONS

Based upon field exploration, laboratory testing, interpretation of the data, and past experience, the following recommendations should be incorporated into site preparation, design, and construction of the proposed office building and emergency operations center.

A. Site Preparation

1. All vegetation, pavements, abandoned underground utilities, and other debris should be removed from the proposed foundation and grading areas. Underground utilities (water, sewer, storm drain, electric, gas, cable, etc.) are anticipated within or adjacent to the proposed

construction area. These utilities should be identified and relocated as required prior to performing excavations for any site grading or foundation excavations. All strippings and debris should be removed from the site in order to preclude their incorporation in site fill or backfill. Depressions resulting from such removals should have debris and loose soils removed and filled with suitable soils placed as recommended below.

2. Much of the soil within the building footprints is very loose and soft, and the foundation excavations are expected to penetrate to a depth near or below the groundwater table elevation. Therefore, to provide a firm working surface for pile driving and construction of the pile caps and structural deck, ESSC recommends that a layer of gravel, at least one-foot thick, be placed at the base of the excavation for each building footprint. Since each building will be supported by piles and a structural deck, compaction of soil beneath the buildings will not be necessary.

3. Soils beneath any proposed traffic-bearing flexible pavement and non-traffic-bearing flatwork (sidewalks, walkways, patios, etc.) outside the building footprints, should be excavated a minimum of 24 inches below the existing grade or finished subgrade, whichever is lower. These remedial excavations should extend a minimum lateral distance of at least two feet beyond the pavement edges. The bottom of the remedial excavation should then be scarified (ripped) 6 inches. The scarified and excavated soils should be moisture conditioned to near optimum moisture content and be uniformly compacted to at least 90% of maximum dry density using mechanical compaction equipment. **Compaction should be verified by testing.** The purpose of this recommendation is to provide minimum subgrade support to attain minimum life for the proposed pavements and flatwork. It should be understood that, the entire site is underlain by at least 17 feet of poorly compacted uncertified fill and the proposed pavements and flatwork may experience settlement and other distress sooner and to a greater degree than pavements and flatwork supported by a full depth of structural fill.

4. Any import soils should be equal to, or better than, the on-site soils in strength, expansion, compressibility, and soil chemistry characteristics. In general, import material should be free of organic matter and deleterious substances, have no more than 20% passing a #200 sieve, and an Expansion Index less than 20,. Import soils can be evaluated prior to their use, but will not be prequalified by the geotechnical consultant. Approval of import soils will be given only after the material is on the project, either in-place, or stockpiled in adequate quantity to complete the project.

5. Backfill around or adjacent to confined areas (i.e. interior utility trench excavations, etc.) may be performed with a lean sand/cement slurry (minimum two sacks of cement per cubic yard) or "flowable fill" material (a mixture of sand/cement/fly ash). The fluidity and lift placement thickness of any such material should be controlled in order to prevent "floating" of any "submerged" structure.

6. Roof drainage systems for the proposed structures should be designed so that runoff water is diverted away from any structure.

7. Final site grades should be designed and constructed so that all water is diverted away from all structures and not allowed to pond on or near pavement. Drainage devices should be constructed to divert drainage from the project site.

8. It is recommended that ESSC be retained to provide geotechnical engineering services during the excavation and foundation phases of development. This continuity of services will allow for the geotechnical review of the design concepts and specifications relative to the recommendations of this report and will more readily allow for design changes in the event that subsurface conditions differ from those currently anticipated.

B. Excavations

Standard construction techniques may not be sufficient for site excavations due to the relatively loose, uncompacted and variable nature of the existing fill soils and because of the potential for relatively shallow groundwater conditions. Excavations that are to be made at or below the groundwater table may require specialized shoring and/or dewatering.

1. All excavations should be made in accordance with applicable regulations (including CAL/OSHA). Project safety is the responsibility of the contractor and the owner. ESSC will not be responsible for project safety.

2. It should be understood that there is a significant amount of debris in the fill including large chunks of concrete. Excavation of this material can be difficult.

3. As previously discussed, groundwater may be anticipated to be as shallow as 5 feet below existing site grades; actual groundwater levels will fluctuate on a daily basis with changes in the tides. Vertical cuts for open (unshored) excavations in saturated soils will not stand. Open excavations above the groundwater table may be cut vertically to a maximum depth of no more than four feet. Excavations extending between four and ten feet deep should be shored or sloped back from the base of the excavation to at least a one and one-half horizontal to 1 vertical (1.5H:1V) slope or flatter. If excavations dry out, sloughing will occur. No excavation should be made within a 1:1 line projected outward from the toe of any existing footing or structure.

4. During the time unshored excavations are open, no heavy grading equipment or other surcharge loads (i.e. excavation spoils) should be allowed within a horizontal distance from the top of any slope equal to the depth of the excavation (both distances measured from the top of the excavation slope).

5. Adequate measures should be taken to protect any structural foundations, pavements, or utilities adjacent to any excavations.

C. Temporary Shoring

1. The proposed partial subterranean parking level excavation will be approximately 5 to 7 feet deep and may be adjacent to at least one property line. Temporary shoring may be necessary to support the excavation during construction. The shoring may consist of temporary sheet

pile or steel panels, a soldier pile and lagging type system, or similar temporary shoring system. The shoring may be cantilevered or anchored with tie-backs or internal bracing. For the purposes of this report, the temporary shoring is assumed to be cantilevered. If tie-backs or internal bracing become necessary, additional recommendations for those types of shoring can be provided if requested.

2. Cantilevered, shoring should be designed to resist active lateral earth pressures of 40Z pounds per square foot (psf) per foot of depth, where Z = Depth (in feet) measured below the top of the retained ground surface behind the shoring. This value is based on level ground behind the shoring.

3. The lateral earth pressure to be resisted by retaining should be increased to allow for surcharge loads. The surcharge considered should include the loads from any other structures or vehicle traffic within a distance at least equal to the height of the shoring. This includes the surcharge from the weight of the existing south property-line wall if this wall is to be preserved in place. Surcharge effects for cantilevered shoring may be computed assuming active earth pressure conditions using a pressure coefficient of 0.4.

4. Lateral resistance for temporary shoring sheet piles or soldier piles founded in native site soils may be assumed to be provided by passive pressure below the bottom of the excavation. As discussed above, the excavation depth is expected to be approximately 7 feet below the existing ground surface. The passive pressure for temporary sheet piles or soldier piles may be taken as 250D pounds per square foot (psf) per foot of depth for unsaturated soils, where D = Depth (in feet) measured below the bottom of the excavation. For saturated soils below the water table, passive pressure of 135 psf per foot of soil may be used. This resisting pressure is an ultimate value. An appropriate factor of safety should be used for design calculations (minimum of 1.5 recommended). The effective width of soldier piles for passive pressure calculations may be taken as up to three times the actual pile width.

5. If soldier piles are used, exposed soils between soldier piles should be supported by lagging and backfilled or supported through the use of reinforced gunite designed to prevent soil movement. All timber lagging to be left in the ground should be pressure treated in accordance with Standard Specifications for Public Works Construction, Section 204-2.

D. Utility Trenches

Standard construction techniques should be sufficient for site utility trench excavations. The surface of utility trench backfill frequently settles even when backfill is placed under optimum conditions. Structural units or pavement placed over such backfill should be designed to accommodate such movements. Jetting of utility trench backfill is not recommended.

1. Backfill of utilities within rights-of-way should be placed in strict conformance with the requirements of the governing agency. However, as a minimum it is recommended that utility trench backfill should be moisture conditioned to near optimum moisture content and be uniformly compacted to at least 90% of maximum dry density using mechanical

compaction equipment. To aid in the compaction operation, utility trench backfill should be placed in lifts not exceeding six inches compacted thickness.

2. The provisions of this report relative to minimum compaction standards should govern utility trench backfill within the project boundary. In general, service lines extending inside the site should be backfilled with native soils that have been moisture conditioned and uniformly compacted to at least 90% of maximum dry density using mechanical compaction equipment. To aid in the compaction operation, utility trench backfill should be placed in lifts not exceeding six inches in compacted thickness.

3. Backfill operations should be reviewed and tested by the geotechnical engineer's representative to verify conformance with these recommendations.

E. Foundation Piles

1. Building foundation piles should consist of precast, prestressed reinforced concrete driven piles. The piles may be round or square in cross-section. Recommendations are provided herein primarily for 24-inch square piles. Recommendations for piles of other sizes or shapes can be provided if requested.

2. Building piles should be embedded a minimum of 13-feet into dense sand (minimum tip depth of approximately 45 ft below existing grade). The actual total pile length and embedment may vary depending upon the requirements of the structural engineer and the results of the pile driving analysis (ie. evaluation of pile driving blow counts).

3. In general, the pile driving criteria provided by the Engineering News Record (ENR) formula (Public Works, 2006) should be satisfied for the last one foot of pile driving. If the required driving resistance is not achieved at the design depth, the pile may be allowed to "set" overnight and then driven an additional foot. If the required driving resistance is still not achieved, additional piles may be installed in accordance with the recommendations of the geotechnical and structural engineers.

4. The axial load carrying capacities of the foundation piles will depend on the final pile size and embedment depth selected. Pile capacity curves for compression loads and uplift loads are provided on Plates IX and X, respectively.

5. The lateral load carrying capacities of the foundation piles will depend on the final pile size and embedment depth selected. Pile lateral capacity curves for 16-inch, 20-inch and 24-inch square driven precast, prestressed concrete piles are provided on Plate XI. The lateral load values are based on loading condition #2d. The lateral load values are the total lateral load applied at the pile head including any lateral spreading soil pressures applied to the building perimeter. The lateral deflection values presented do not include any safety factor.

6. The design mix for the concrete to be used in the pile construction should be established and approved by the structural engineer prior to the time of construction. Concrete compression tests should be performed during pile casting in accordance with applicable codes or

requirements of the structural engineer. Inspection by qualified personnel should be provided during the pile casing and/or reinforcement placing and tensioning.

7. It is important that the project structural engineer be experienced in pile design and be familiar with seismic issues and structural issues related to pile driving. A meeting between the project structural engineer and ESSC is recommended to support understanding of the various geotechnical, structural and seismic issues.

8. An indicator pile program should be conducted for the proposed building prior to the remainder of the building foundation piles. The indicator pile program should include a minimum of six (6) piles within each of the two building footprints. The indicator piles should have the same cross-section and consist of the same construction as the piles selected for the building foundation and may be used as final building foundation piles ("production piles"). The indicator piles should be located at points distributed approximately uniformly across the building footprints, except that at least one set of indicator piles should be driven as a group of three to evaluate pile group installation. The indicator piles should be 45 to 50 feet in length (as delivered to the site) and should be driven to a minimum embedment of 15 feet into the dense sand (at least 15 feet below the 32-foot depth from existing grade). The indicator piles should be driven using the same hammer that will be used for production pile installation.

9. At least the first indicator pile should be driven with no pre-boring. Pre-boring up to ¾ of pile cross sectional area will be permitted for subsequent piles if necessary to achieve minimum embedment depth. The axial pile capacity for the last foot of driving must be calculated based on blow counts to at least the required axial design load for the pile.

10. The geotechnical engineers, or their representatives, should be present during the installation of all pile foundations. This is to observe pile driving conditions and help identify variations in soil conditions that may require additional evaluation of the foundation criteria in this report.

11. Piles in groups or rows should be driven alternately before driving an adjacent pile.

12. Driven piles should not be more than two percent (2%) from the plumb position.

F. Retaining Walls

1. The walls of the subterranean portion of the proposed building should be supported by the structural deck and building piles. Any retaining walls proposed for the project that are not structurally supported by the piles would be supported by existing uncertified fill soils at the site and thus may experience some degree of settlement and other distress.

2. Lateral earth pressures for subterranean walls at the subject site include normal "static" pressures and earth pressures resulting from earthquakes and laterally spreading soils. The following "static" lateral earth pressures may be used in the design of the proposed subterranean building walls and any other retaining walls that may be proposed at the site

(earth pressures resulting from laterally spreading soils are discussed elsewhere in this report):

	Equivalent Fluid Earth Pressures (pcf)* Well Drained Backfill (above water table)
Level backfill soil	40
2H:1V slope backfill	55
At-rest*** (restrained) wall, Level backfill soil	64

*Equivalent fluid pressure (psf) per foot of soil height.

**Hydrostatic pressures should be added to the buoyant earth pressures for soils below the water table.

***For purposes of design, a wall is considered restrained if it is prevented from movement greater than 0.002H (H = height of wall in feet) at the top of the wall. **The walls of the subterranean portions of the proposed structure may be considered restrained walls.**

NOTE: The pressures recommended above were based on the assumption that the on-site soils will be used for wall backfill and will be compacted to approximately 90% of maximum dry density. The use of select granular fill may reduce the recommended driving earth pressure. The resisting pressure provided is an ultimate value. An appropriate factor of safety should be used for design calculations (minimum of 1.5 recommended).

3. For walls founded in soil rather than supported by the pile foundation system, resistance to lateral loading may be provided by passive pressure of soil in front of the wall and by friction acting along the foundation base.

4. For retaining walls founded in soil, passive pressures of 270 psf per foot of soil in front of the wall may be used for unsaturated soils. For saturated soils below the water table, passive pressure of 135 psf per foot of soil may be used. The upper one-foot of soil should be neglected for passive pressure calculations unless confined by pavement or slab.

5. A coefficient of friction of 0.3 may be used in designing concrete retaining wall foundations in site soils recompacted to approximately 90% of maximum dry density as determined by ASTM D 1557 test procedures, and may be used with dead loads. This value includes a safety factor of 1.5. This value used for design may be increased by 1/3 when transient loads (such as wind and seismic forces) are considered.

6. The lateral earth pressure to be resisted by retaining should be increased to allow for surcharge loads. The surcharge considered should include the loads from any structures or vehicle traffic within a distance approximately equal to the height of the retaining wall.

7. Backfill immediately behind any retaining structure should be a free-draining granular material. Comments on the characteristics of import soils will be given by the geotechnical consultant after the material is on the project, either in place, or stockpiled in adequate quantities to complete the project.

8. Backfill behind retaining walls should be with soils that have been properly moisture conditioned to approximately optimum moisture content and uniformly compacted to at least 90% of maximum dry density as determined by ASTM D 1557 test procedures using mechanical compaction equipment. To aid in the compaction operation, retaining wall backfill should be placed in lifts not exceeding six inches compacted thickness.

9. Compaction within the area of a 1H:1V slope from the bottom of wall excavations should be performed by hand operated compaction equipment. This is intended to reduce potential "locked-in" lateral pressures caused by compaction with heavy grading equipment.

10. Back-drains, or an equivalent system of backfill drainage should be incorporated into the retaining wall design (see Plate XII for backdrain details). Proper back-drainage will minimize the potential for hydrostatic pressures behind retaining walls. In addition to back-drains, waterproofing of retaining walls is recommended to minimize moisture migration through the walls and to help reduce the potential for effloresecent formation.

11. The final grade should be such that all water is diverted away from the retaining wall's foundation or backfill.

G. Soil Chemical Testing

1. Selected samples of near-surface soils were tested for pH, resistivity and conductivity, as well as a variety of cations and anions including soluble sulfates. Sulfate contents appear to be in the "moderate" range per LACBC table 19A-4. However, soil chemistry results from the adjacent property showed sulfate in the "severe" range as well as somewhat elevated chloride and conductivity levels.

2. The test results provided in Appendix D should be distributed to the design team for their interpretations pertaining to the corrosivity or reactivity of various construction materials (such as concrete and piping) with the soils. Tests should be conducted of the surface soils in the final graded pad to verify these interpretations, especially if the soils are mixed and additional fill is added during site preparation.

CLIENT OPTIONAL SERVICES

This report was based on the assumption that an adequate program of client consultation, construction monitoring, and testing will be performed during the final design and construction phases to check conformance with the recommendations of this report. Maintaining ESSC as the geotechnical engineering consultant from beginning to end of this project will help provide continuity of services. The recommended services include, but are not necessarily limited to, the following:

a. Consultation as required during the final design stages of the project.

b. Review of grading and/or building plans.

c. Observation and testing during site preparation, grading, placement of engineered fill, and backfill of utility trenches.

d. Consultation as required during construction.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

The conclusions and recommendations submitted in this report relative to the proposed development are based, in part, upon the data obtained from site observations during the field exploration operations, and past experience. The nature and extent of variations between the borings and CPT soundings may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

In the event of any change in the assumed nature or design of the proposed project as planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing. This report is issued with the understanding that it is the responsibility of Prestige Homes, Inc., or of its representatives, to insure that the information and recommendations contained in this report are called to the attention of the architects and engineers for the project and incorporated into the plan. It is also the responsibility of Prestige Homes, Inc., or of its representatives, to insure that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

As the geotechnical engineers for this project, ESSC strives to provide its services in accordance with generally accepted geotechnical engineering practices in this community at this time. No warranty or guarantee is expressed or implied. This report was prepared for the exclusive use of Prestige Homes, Inc. and its authorized agents.

It is recommended that ESSC be provided the opportunity for a general review of final design and specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design specifications. If ESSC is not accorded the privilege of making this recommended review, it can assume no responsibility for misinterpretation of the recommendations.

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

The statements contained in this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or to the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards occur, whether they result from legislation or the broadening of knowledge. Accordingly, the conclusions of this report may be invalidated, wholly or partially, by changes outside of ESSC's control, and should therefore be reviewed after one year.

CLOSURE

Earth Systems Southern California trusts this report is sufficient at this time and meets your current needs. Earth Systems Southern California appreciates this opportunity to provide professional geotechnical engineering services for this project. If you have any questions regarding the information contained in this report, or if you require additional geotechnical engineering services, please contact the undersigned.

Respectfully submitted,

Earth Systems
Southern California

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END OF TEXT

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PLATES
APPENDICES

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PLATES

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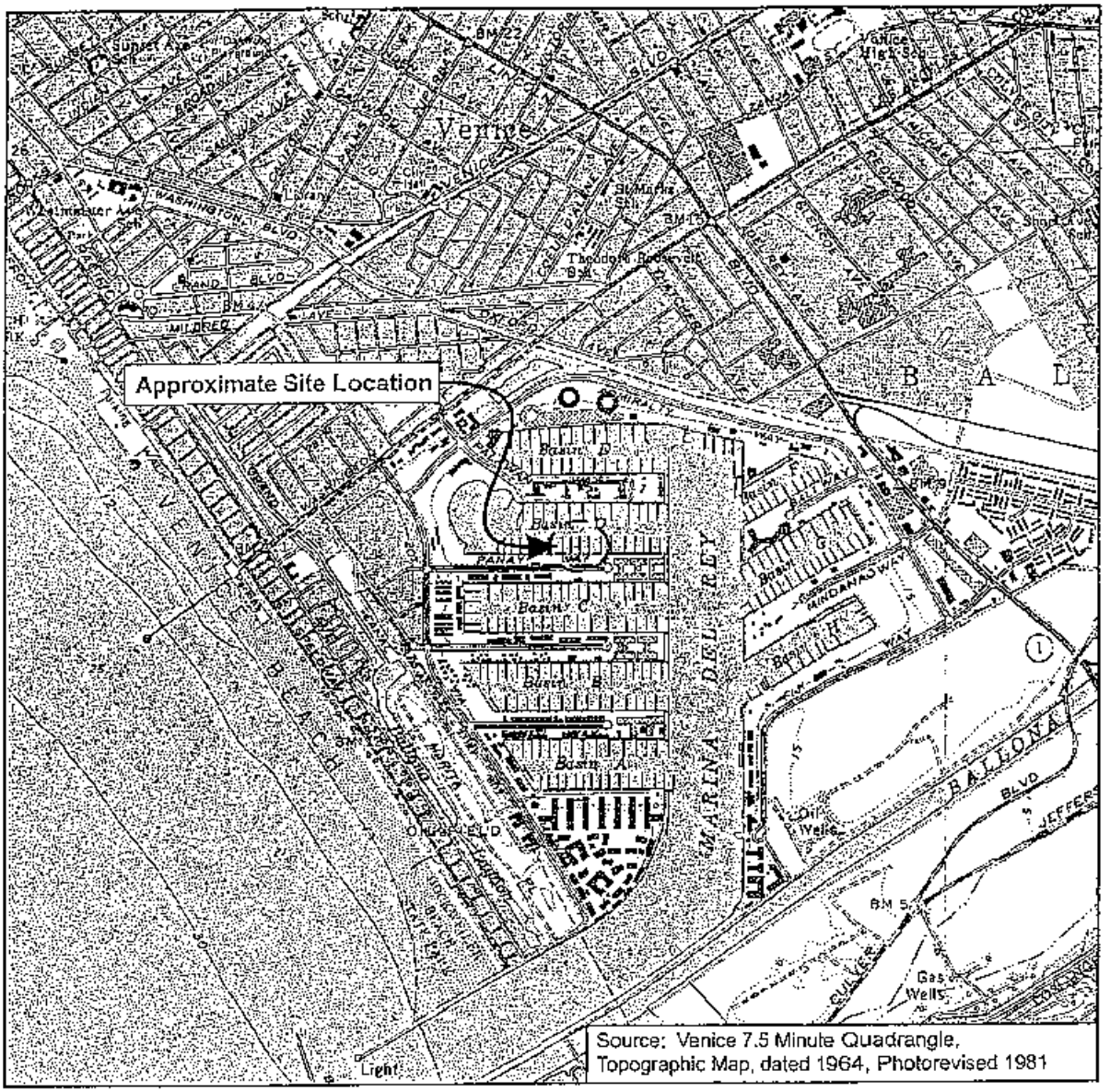
PLATE IX Axial Pile Capacities – Compression Loads
PLATE X Axial Pile Capacities – Uplift Loads
PLATE XI Lateral Pile Capacities
PLATE XII Retaining Wall Drain Details



Source: Venice 7.5 Minute Quadrangle, Topographic Map, dated 1964, Photorevised 1981

N

0 ft. 1,000 ft. 2,000 ft.

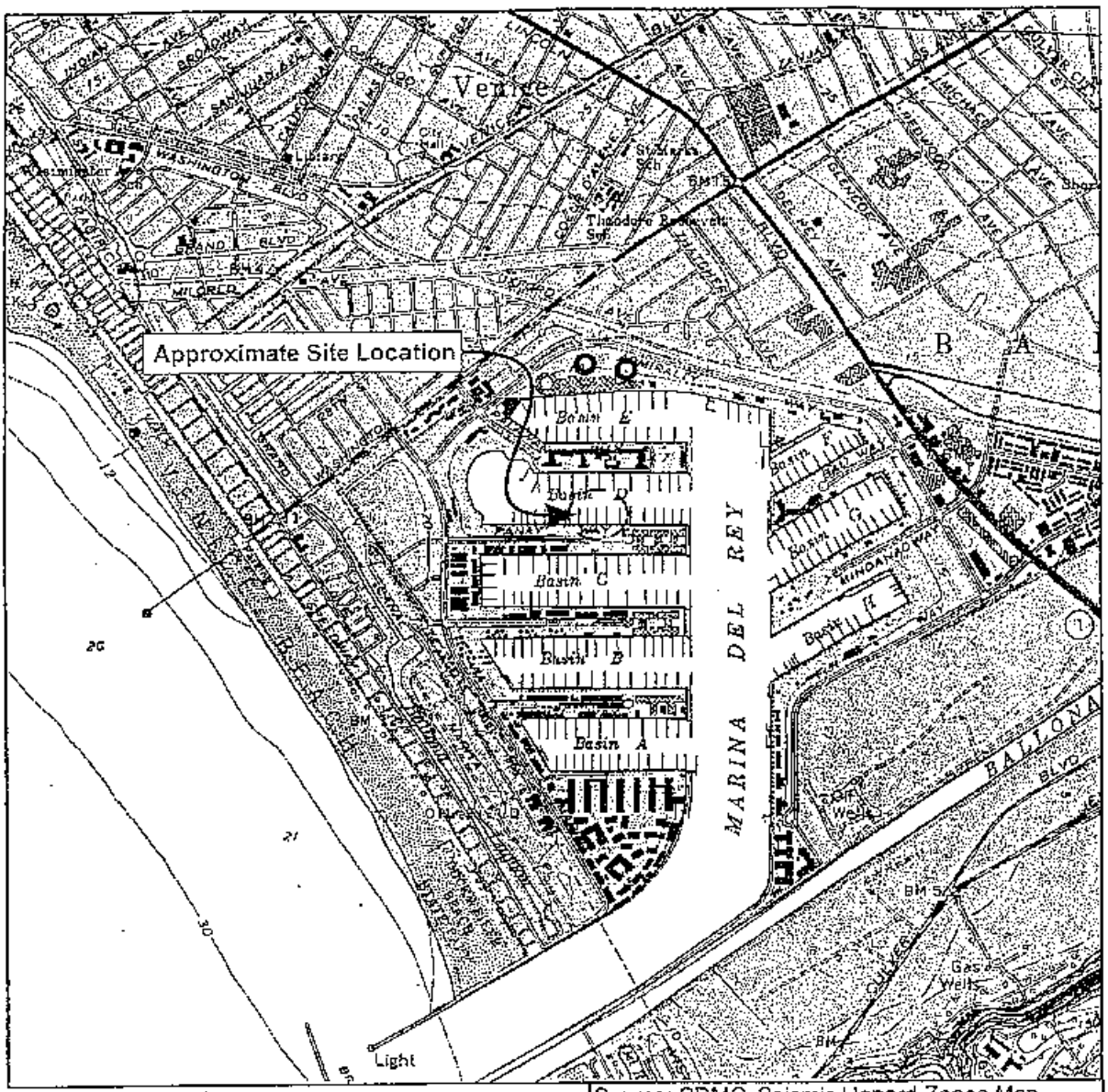
Plate I

SITE LOCATION MAP

PROPOSED COMMERCIAL DEVELOPMENT
PARCEL 21, PANAY WAY
MARINA DEL REY, CALIFORNIA

Earth Systems
Southern California

8/21/2006	LA-01052-01



Source: CDMG, Seismic Hazard Zones Map, Venice Quadrangle, dated March 25, 1999.

MAP EXPLANATION

Zones of Required Investigation

N

0 ft. ~1,000 ft. ~2,000 ft.

Liquefaction
Areas where historic occurrences of liquefaction or local geological, geotechnical and groundwater conditions include a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake Induced Landslides
Areas where previous occurrences of landslide movement, or local topographic, geologic, geotechnical and subsurface water conditions indicate a potential for permanent ground displacement such that mitigation as defined in Public Resources Code Section (2693(c) would be required.

Plate II

SEISMIC HAZARD MAP

PROPOSED COMMERCIAL DEVELOPMENT
PANAY WAY PARCEL 21
MARINA DEL REY, CALIFORNIA

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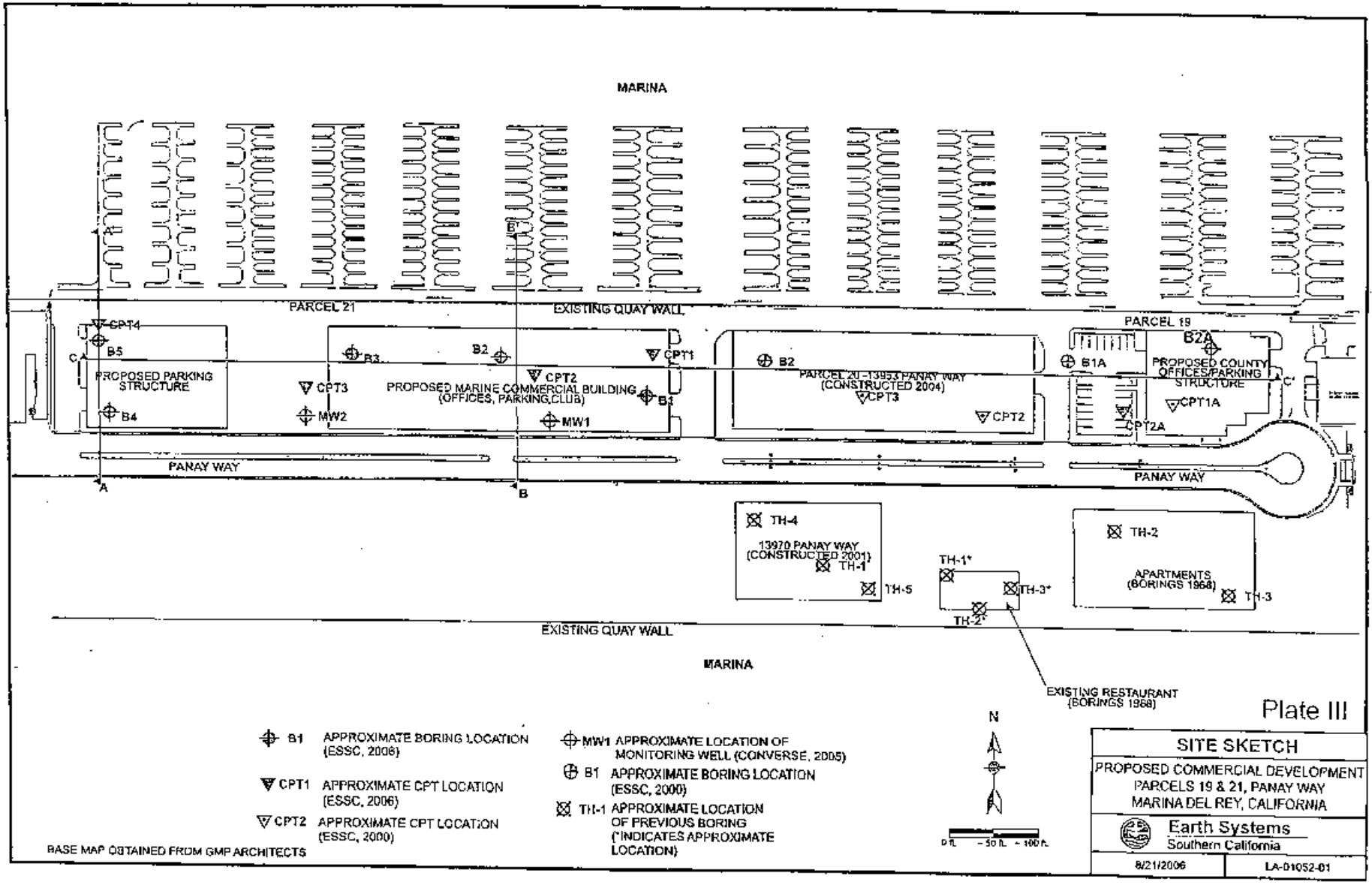

Plate III

SITE SKETCH

PROPOSED COMMERCIAL DEVELOPMENT
PARCELS 19 & 21, PANAY WAY
MARINA DEL REY, CALIFORNIA

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Southern California

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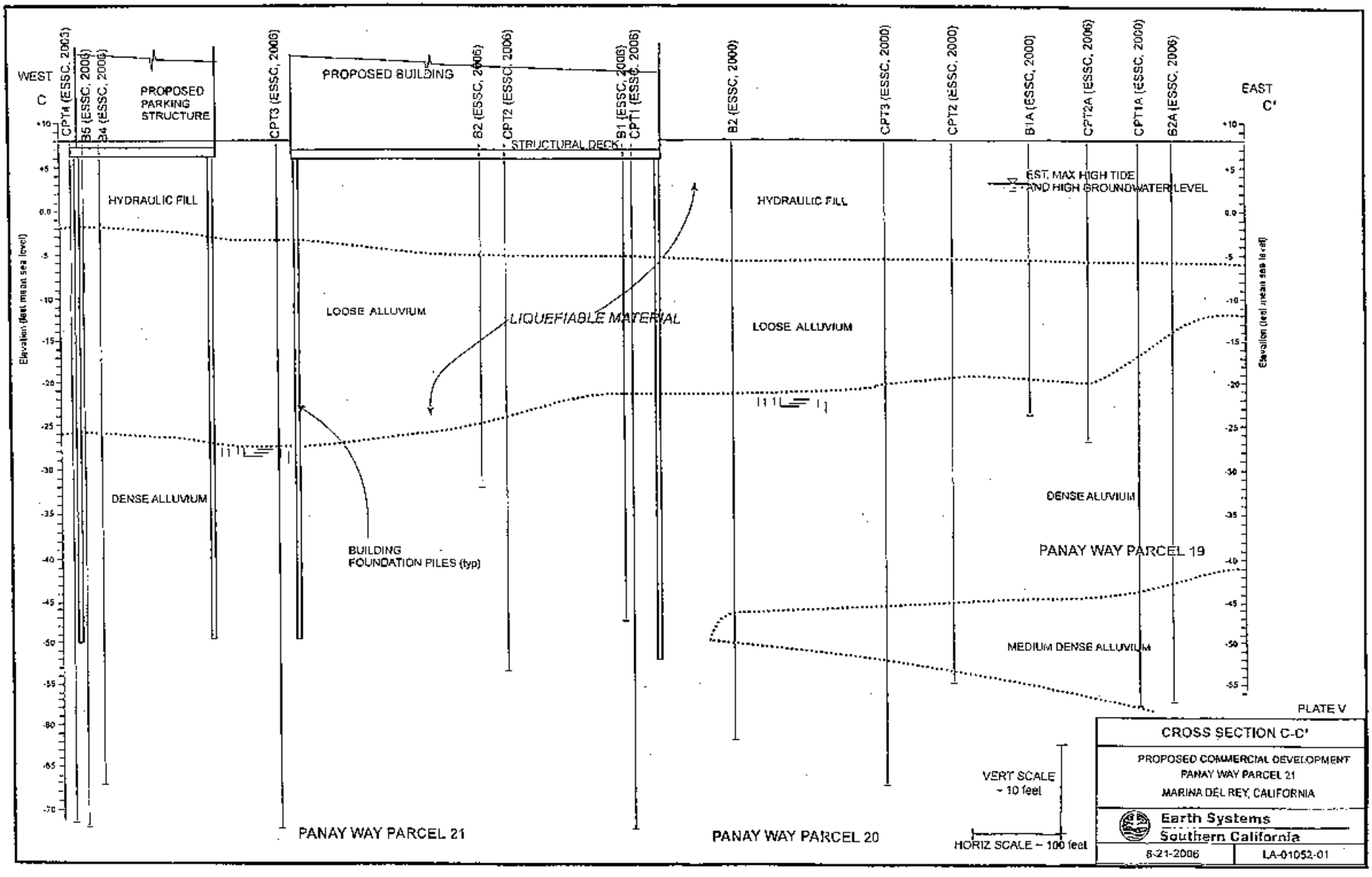

PLATE V

CROSS SECTION C-C'

PROPOSED COMMERCIAL DEVELOPMENT
PANAY WAY PARCEL 21
MARINA DEL REY, CALIFORNIA

Earth Systems Southern California

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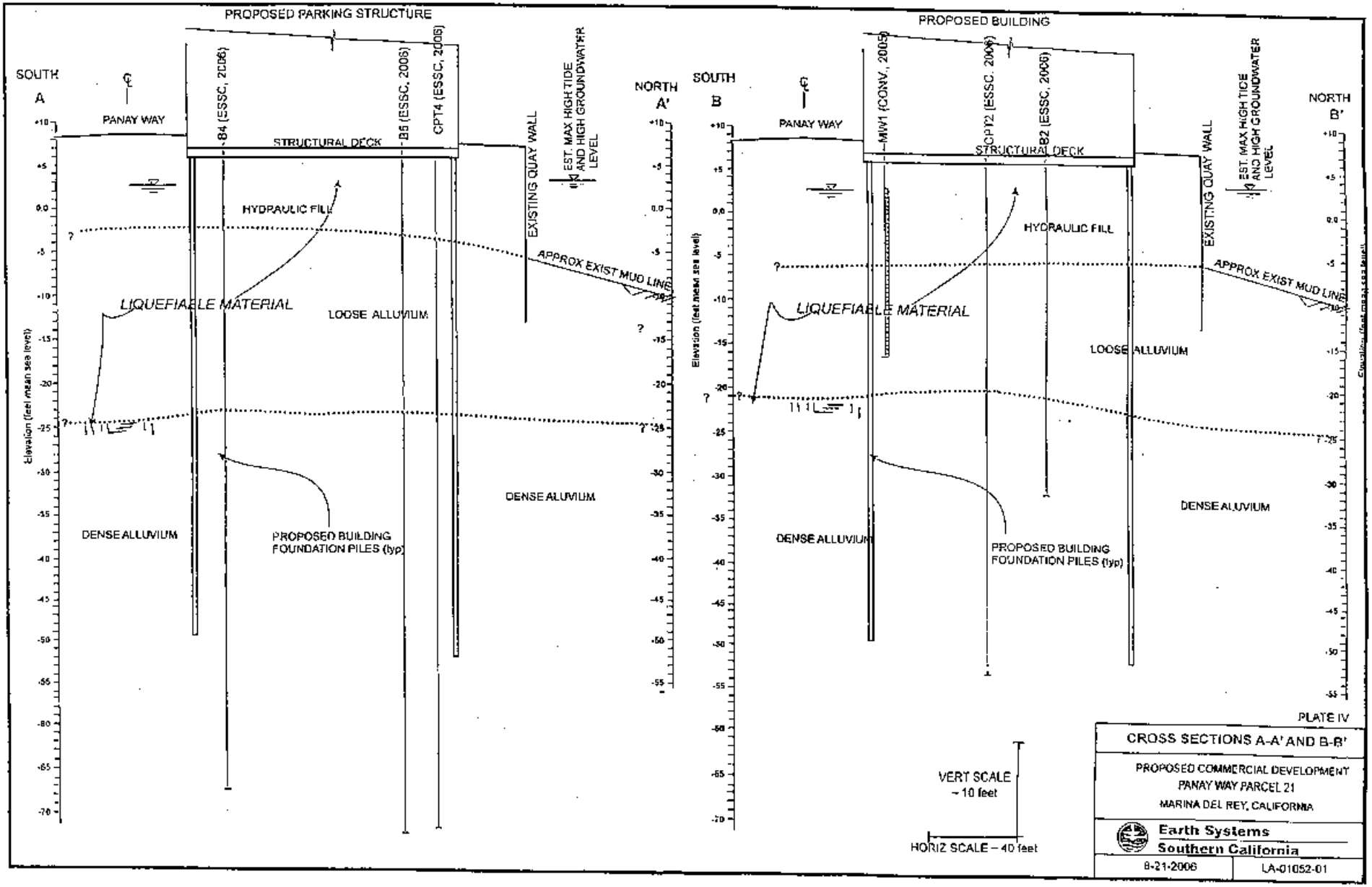

PLATE IV

CROSS SECTIONS A-A' AND B-B'

PROPOSED COMMERCIAL DEVELOPMENT
PANAY WAY PARCEL 21
MARINA DEL REY, CALIFORNIA

Earth Systems Southern California

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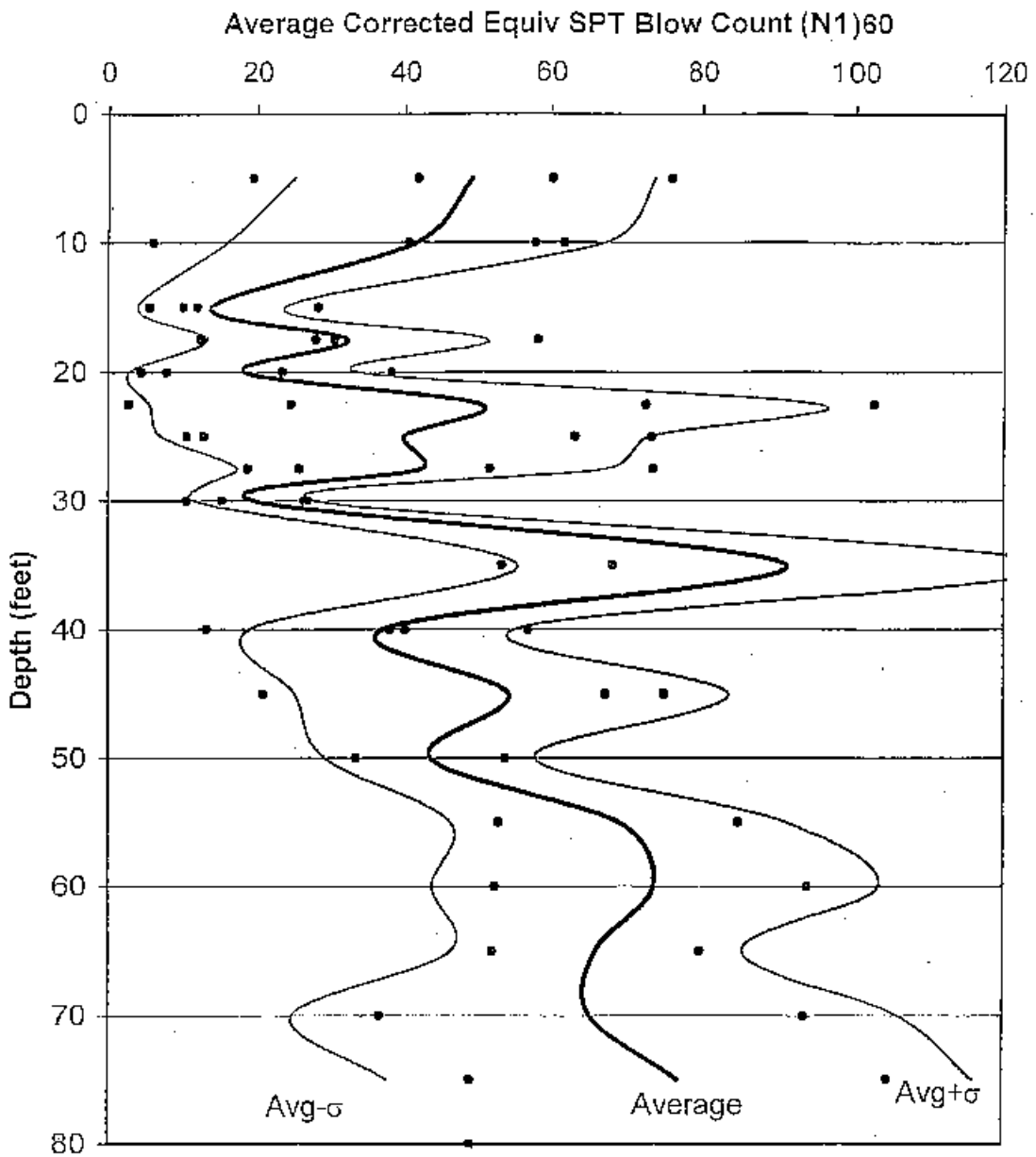


PLATE VI

SUMMARY OF CORRECTED
BLOW COUNTS (N1)60
Panay Way Parcel 21
Marina del Rey, California

Earth Systems
Southern California

8-21-2006	LA-01052-01

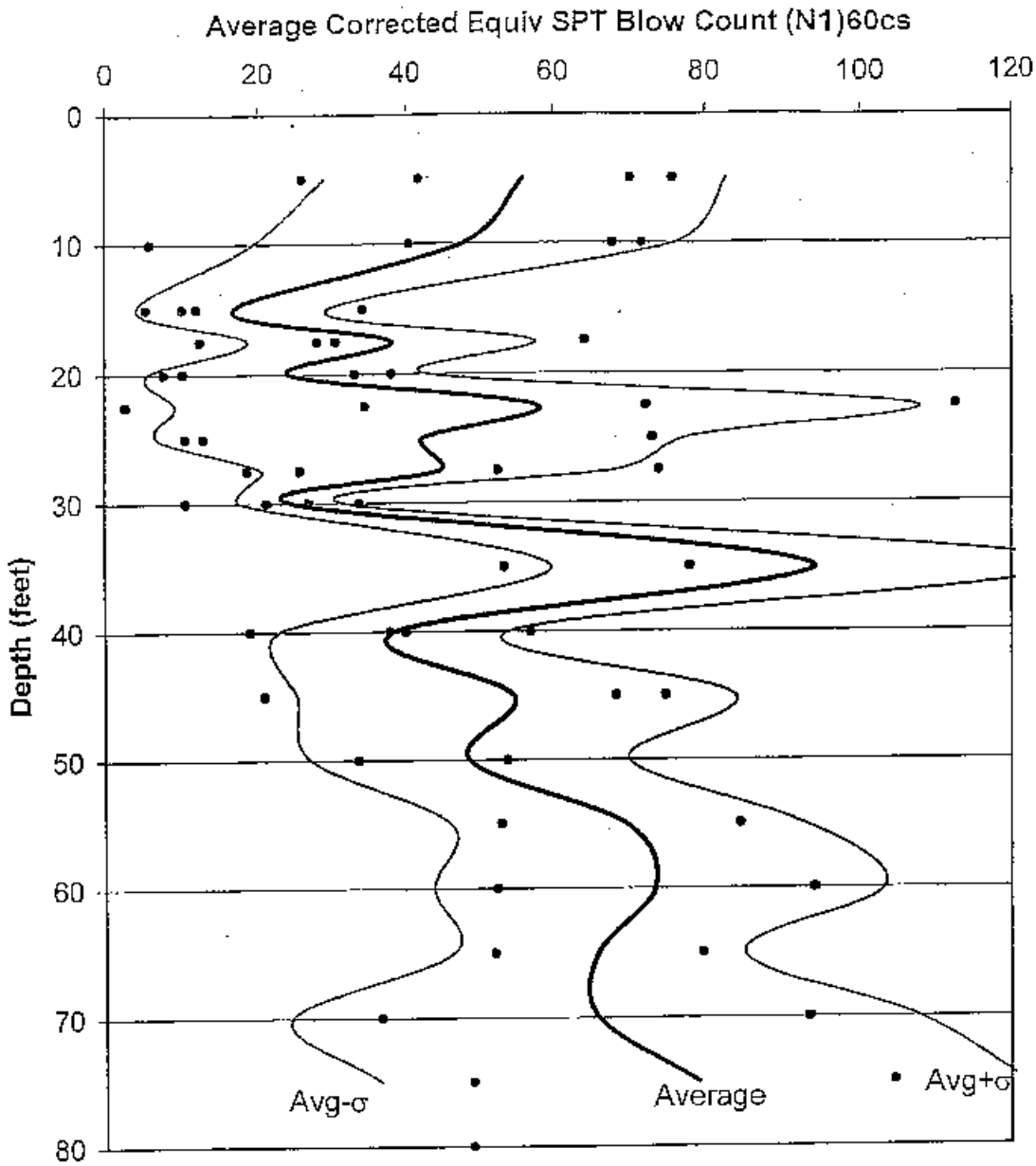


PLATE VII

SUMMARY OF CORRECTED COARSE SAND BLOW COUNTS (N1)60cs
Panay Way Parcel 21
Marina del Rey, California

Earth Systems
Southern California

8-21-2006	LA-01052-01

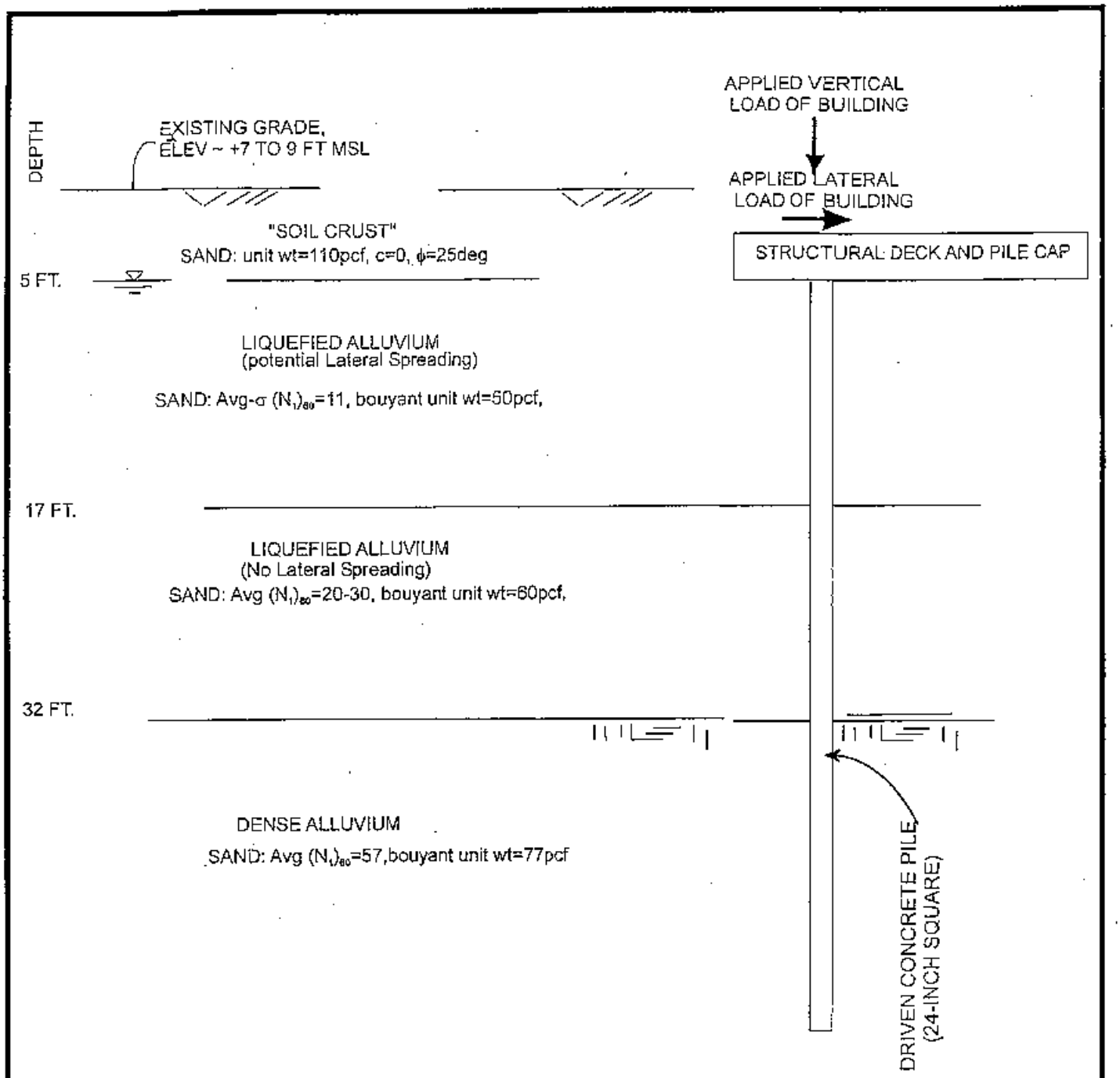


PLATE VIII

PILE/ SOIL PROFILE SCHEMATIC

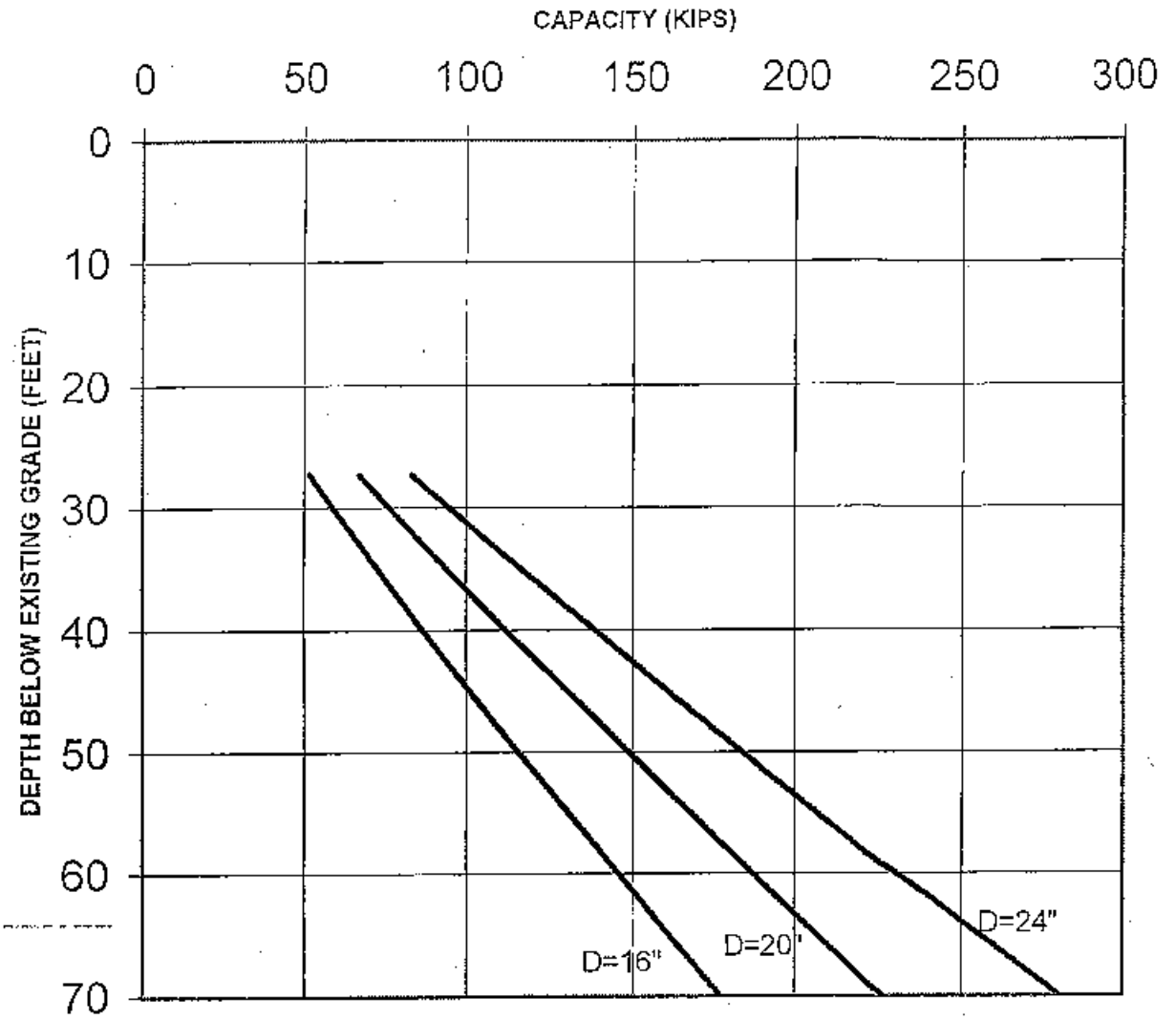
PROPOSED COMMERCIAL DEVELOPMENT
PANAY WAY PARCEL 21
MARINA DEL REY, CALIFORNIA

Earth Systems
Southern California

8-21-2006	LA-01052-01

NOT TO SCALE

VERTICAL PILE CAPACITY - UPLIFT LOADS



NOTES:

1. Embedment determined from top of existing ground surface.
   The geotechnical consultant should be present during construction to verify soil conditions.
2. Capacities indicated are for single vertical, cast-in-place piers. Weight of pier is included.
   Group effects should be evaluated if piles are placed closer than 3 pile diameters.
3. The indicated capacities are for sustained (dead plus live) vertical loads, and include
   Safety Factor of 3.0 for side friction. Pile capacity under earthquake loads must be considered separately.
4. Intermediate pile sizes may be interpolated from above values.

PLATE X

PROPOSED RESIDENTIAL DEVELOPMENT PANAY WAY PARCEL 21 MARINA DEL REY, CALIFORNA	
Earth Systems **Southern California**	
8-21-2006	LA-01052-01

LATERAL PILE CAPACITY

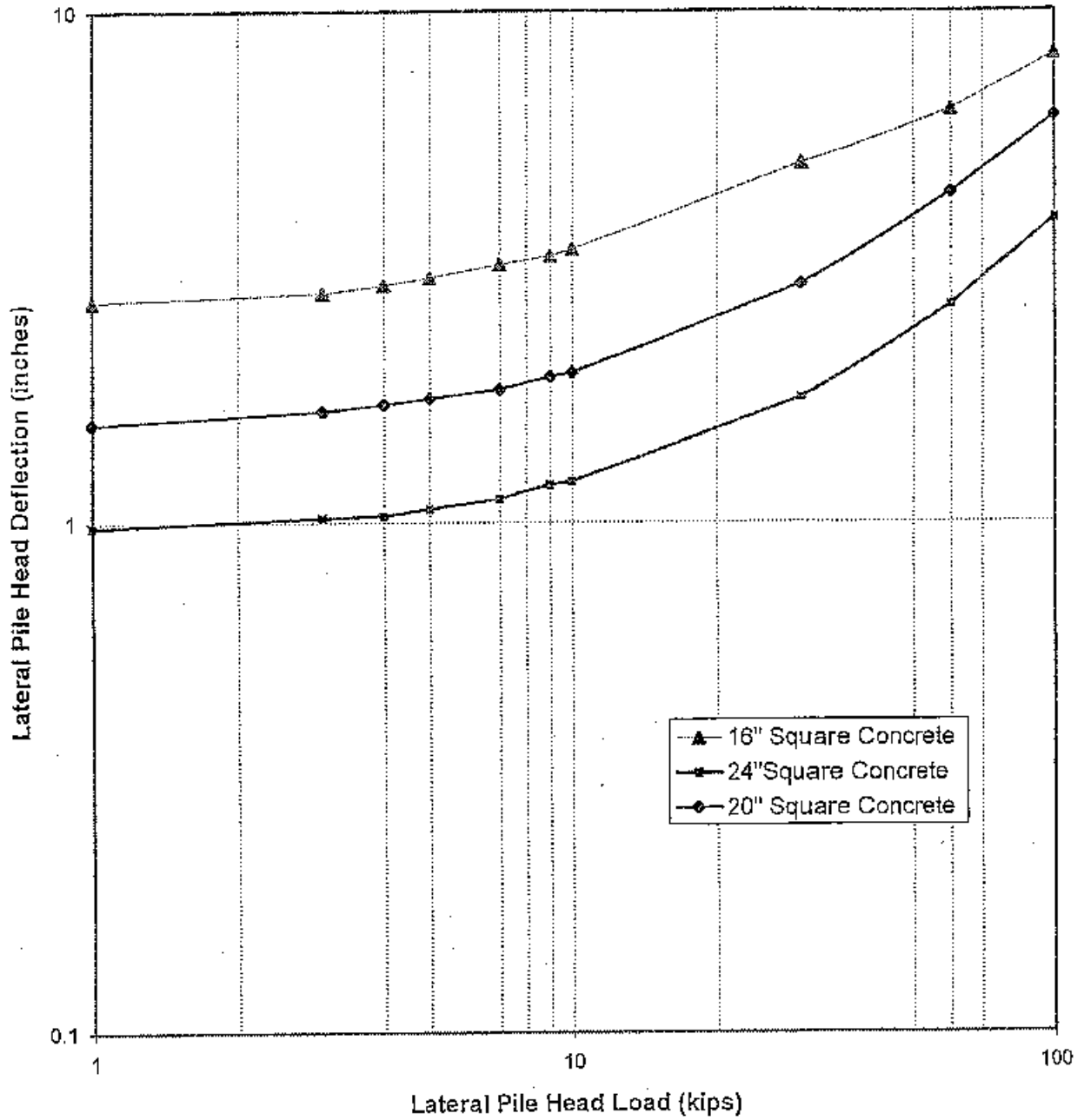


PLATE XI

NOTES:

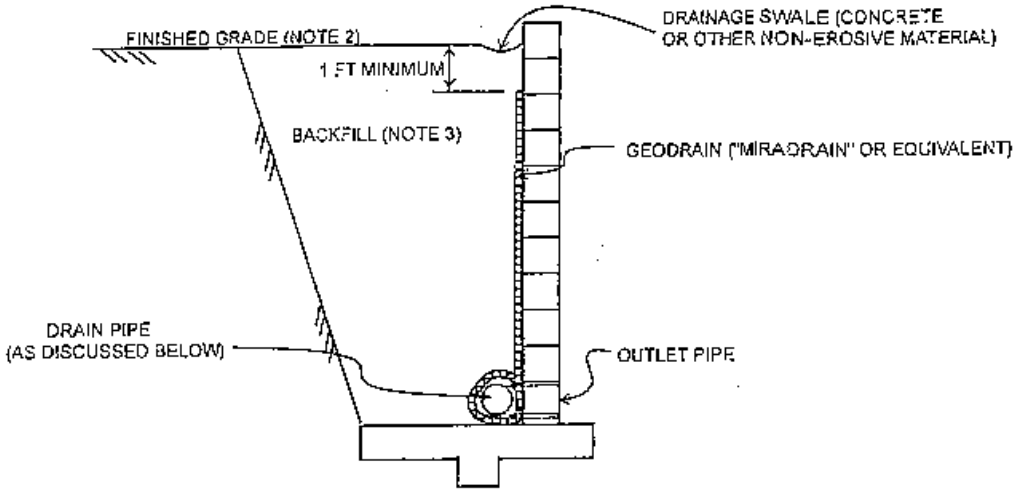
1. Capcities based on piles embedded to depth of 45 feet below existing grade.
2. Assumes Load Condition #2a - lateral spreading soil pressures applied from 5 to 17 feet.
3. Assumes fixed head conditions.

PROPOSED COMMERCIAL DEVELOPMENT
PANAY WAY PARCEL 21
MARINA DEL REY, CALIFORNA

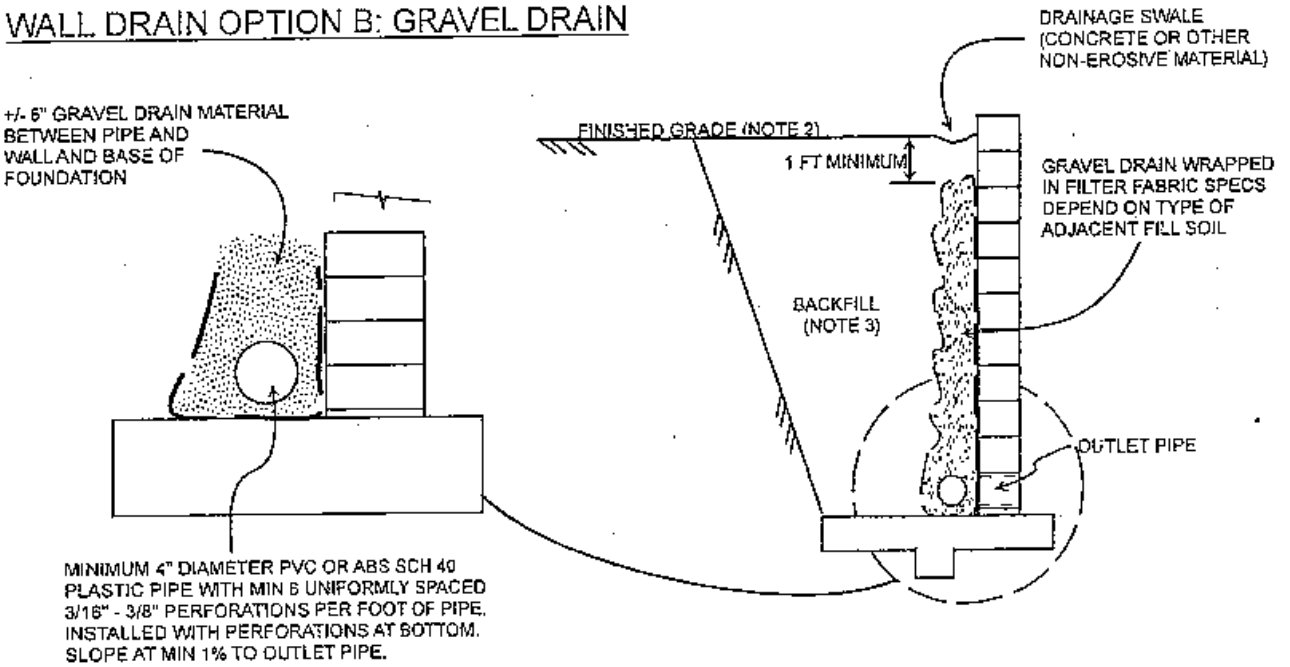
Earth Systems
Southern California

8-21-2006	LA-01052-01

WALL DRAIN OPTION A: SYNTHETIC GEODRAIN



WALL DRAIN OPTION B: GRAVEL DRAIN



NOTE 1)
GRAVEL DRAIN MATERIAL SHALL CONSIST OF CLEAN PEA GRAVEL OR 3/8" GRAVEL WRAPPED IN APPROPRIATE FILTER FABRIC* OR CALIFORNIA CLASS II PERMEABLE MATERIAL

NOTE 2)
USE DRAINAGE SWALE OR GRADE TO DRAIN AWAY FROM WALL.

NOTE 3)
ENGINEERED BACKFILL COMPACTED AS RECOMMENDED IN GEOTECHNICAL REPORT. SPECIAL PROVISIONS WILL APPLY TO MODERATELY OR HIGHLY EXPANSIVE BACKFILL.

NOTE 4)
WEEP HOLES IN BASE BLOCK COURSE ARE RECOMMENDED. CARE SHOULD BE TAKEN THAT WEEPHOLES ARE NOT COVERED BY EXTERIOR GRADE OR PAVING.

NOT TO SCALE

Plate XII

BACKDRAIN DETAILS - EXTERIOR WALLS

PROPOSED COMMERCIAL DEVELOPMENT
PANAY WAY PARCEL 21
MARINA DEL REY, CALIFORNIA

Earth Systems
Southern California

8/21/2006	LA-01052-01

APPENDIX A

Unified Soil Classification System
Soil Consistency Terms
Boring Log Symbols
Logs of Test Borings – Subject Site (Parcel 21, 2006)
Logs of Borings for Monitoring Wells by Converse (2005)
Well Construction Details (MW-1 and MW-2)

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNTOF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGAINC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENT

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

UNIFIED SOIL CLASSIFICATION SYSTEM

PROPOSED COMMERCIAL DEVELOPMENT
PANAY WAY PARCEL 21
MARINA DEL REY, CALIFORNIA

Earth Systems
Southern California

8/21/2006	LA-01052-01

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS

(Major Portion Retained on Number 200 Sieve)

Includes clean gravels and sands described as fine, medium or coarse, depending on distribution of grain sizes, and silty or clayey gravels and sands, condition is rated according to laboratory tests or estimated from resistance to sampler penetration.

Penetration Resistance* California Split Spoon (CSS) Blows/Ft		Penetration Resistance* Standard Pentrometer (SPT) Blows/Ft
0-5	Very Loose	0-4
5-15	Loose	5-10
15-40	Medium Dense	11-30
40-70	Dense	31-50
>70		>50

Fine Grained Soils

(Major Portion Passing the Number 200 Sieve)

Includes inorganic and organic silts and clays, gravelly, sandy or silty clays, and clayey silts. Consistency is rated according to laboratory tests or estimated from resistance to sampler penetration.

Penetration Resistance* California Split Spoon (CSS) Blows/Ft		Penetration Resistance* Standard Pentrometer (SPT) Blows/Ft
0-2	Very Soft	0-2
2-5	Soft	2-4
6-10	Medium Stiff	5-8
11-18	Stiff	9-15
19-36	Very Stiff	16-30
>36		>30

* Penetration resistance based on a 140 pound hammer falling approximately 30 inches.

SOIL CONSISTENCY TERMS

PROPOSED COMMERCIAL DEVELOPMENT
PANAY WAY PARCEL 21
MARINA DEL REY, CALIFORNIA

Earth Systems
Southern California

8-21-2006 | LA-01052-01

SYMBOLS COMMONLY USED ON BORING LOGS

Modified California Split Barrel Sampler

Modified California Split Barrel Sampler - No Recovery

Standard Penetration Test (SPT) Sampler

Standard Penetration Test (SPT) Sampler - No Recovery

Perched Water Level

Water Level First Encountered

Water Level After Drilling

Pocket Penetrometer (tsf)

Vane Shear (ksf)

1. The location of borings were approximately determined by pacing and/or siting from visible features. Elevations of borings are approximately determined by interpolating between plan contours. The location and elevation of the borings should be considered accurate only to the degree implied by the method used.

2. The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

3. Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. This data has been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, tides, temperature, and other factors at the time measurements were made.

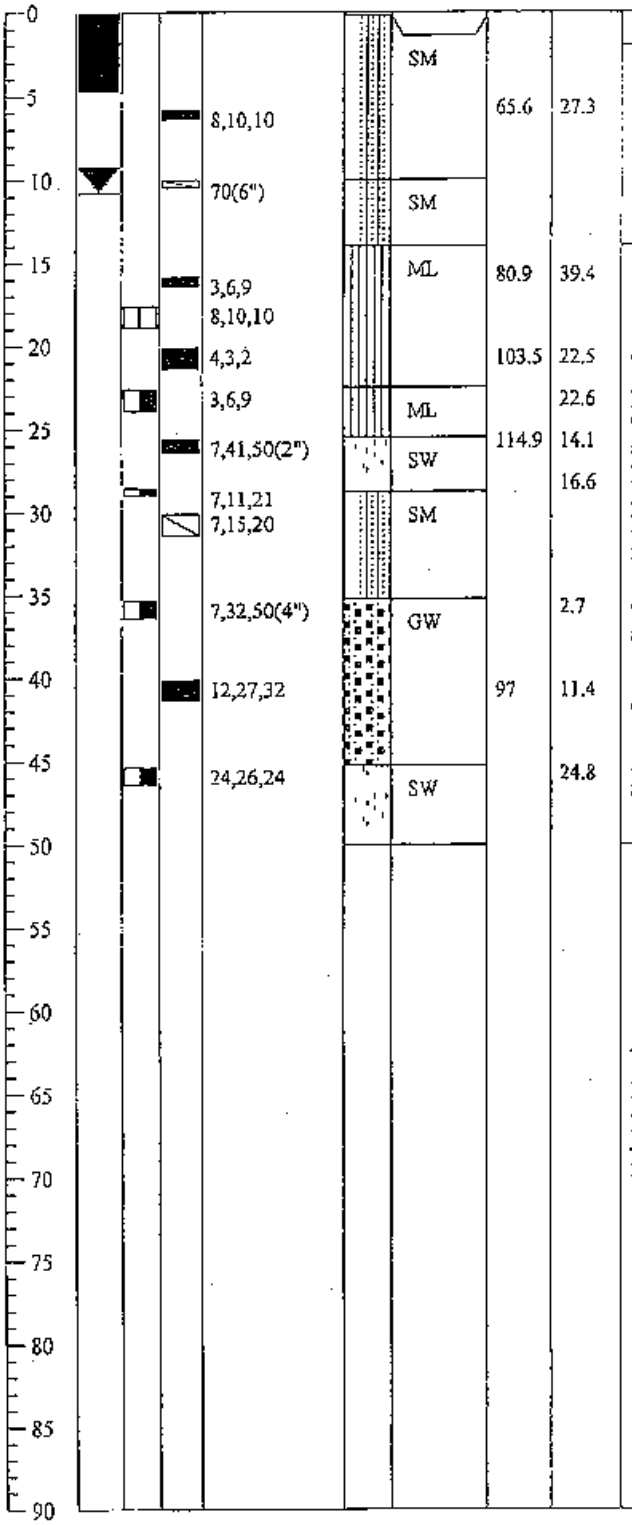
BORING LOG SYMBOLS	
PROPOSED COMMERCIAL DEVELOPMENT PANAY WAY PARCEL 21 MARINA DEL REY, CALIFORNIA	
Earth Systems Southern California	
8-21-2006	LA-01052-01

Earth Systems
Southern California
14550 Haynes St., Suite #202, Van Nuys, CA
Phone (818) 901-8075 Fax (818) 901-8084

Boring No: B1
Project Name: Panay Way Parcel 21
Project Number: LA-01052-01
Boring Location: Per Plan

Drilling Date: June 2, 2006
Drilling Method: 8" HSA Mud Rotary
Drill Type: Mobile Drill B-90
Logged By: MRM

DESCRIPTION OF UNITS

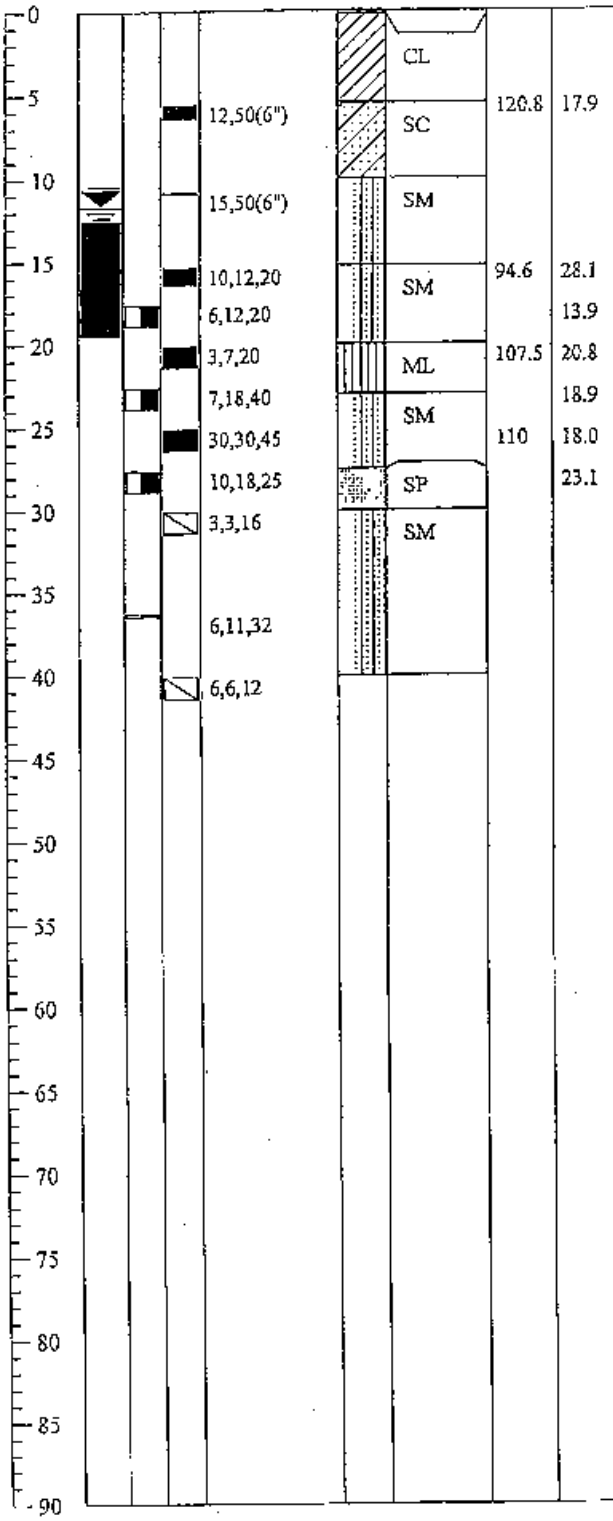


Depth (Ft.)	Sample Type (Bulk / SPT / MOD Calif.)	Penetration Resistance (Blows/6")	Symbol	USCS	Dry Density (pcf)	Moisture Content (%)	DESCRIPTION OF UNITS
0							2 inches of asphalt.
5	MOD	8,10,10		SM	65.6	27.3	ARTIFICIAL FILL (af)- Brown silty fine sand, damp, pieces of angular shaped concrete and asphalt. Dark gray sitly fine sand, moist, medium dense, trace micaceous sand.
10	MOD	70(6")		SM			Large piece of concrete, little to no recovery of asphalt and concrete fragments.
15	MOD	3,6,9		ML	80.9	39.4	ALLUVIUM (Qa)- Dark gray fine sandy silt alternating with gray fine sandy silt, very moist, very stiff, with fragments of kelp rootlets, strong sulfur odor.
	SPT	8,10,10					
20	MOD	4,3,2			103.5	22.5	Gray fine sandy silt, wet, medium stiff, abundant shell fragments approximately 1 in. diameter.
	SPT	3,6,9		ML		22.6	Dark gray fine sandy silt with clay, wet, very stiff.
25	MOD	7,41,50(2")		SW	114.9	14.1	Grayish brown fine to coarse sandy clay, wet, soft with sub-rounded gravel approximately 1/2 in. diameter.
						16.6	Dark gray gravelly sand, moist, very dense, gravel approximately 1 in. diameter.
30	MOD	7,11,21		SM			Dark gray fine to coarse sand with gravel, wet, dense, gravel approximately 1/2 in. diameter.
	MOD	7,15,20					
35	SPT	7,32,50(4")		GW		2.7	Grayish white well-graded gravel, wet, loose, clasts angular to semi-rounded approximately 1 in. diameter.
40	MOD	12,27,32			97	11.4	Caving from 41 feet.
45	SPT	24,26,24		SW		24.8	Brown fine to medium sand, very moist, very dense. One inch layer of oxidized orange sand atop a thin lense of clay.
50							
55							
60							
65							Total depth 50 feet. Free groundwater encountered at 11 feet. Backfilled with soil cuttings. Note: The stratification lines shown represent the approximate boundaries between soil and/or types and may be gradational.
70							
75							
80							
85							
90							

Earth Systems
Southern California
14550 Haynes St., Suite #202, Van Nuys, CA
Phone (818) 901-8075 Fax (818) 901-8084

Boring No:B2
Project Name: Panay Way Parcel 21
Project Number: LA-01052-01
Boring Location: Per Plan

Drilling Date: June 1, 2006
Drilling Method: 8" HSA Mud Rotary
Drill Type: Mobile Drill B-90
Logged By: MRM



DESCRIPTION OF UNITS

2 inches of asphalt

ARTIFICIAL FILL (af)- Brown fine to coarse sandy clay, moist, concrete and brick fragments/clasts; lean clay.
Whitish clayey silty fine to coarse sand, moist, very dense, large pieces of asphalt approximately 1 1/2 in. and angular clasts of concrete.

Little to no recover. Fragmented brick, asphalt and concrete.

ALLUVIUM (Qa)- Dark gray silty fine sand, very moist, dense, with shell fragments approximately 1/2in diameter, strong sulfur odor.

Dark gray fine sandy clay, very moist, very stiff, with elongated rounded gravel rounded at ends approximately 1/2 in. diameter.

Brown silty clay, very moist, very stiff, gravel rounded at edges.

Dark gray fine to coarse sand, wet, very dense, gravel clasts sub-rounded approximately 1/2 in. diameter.

Brownish gray fine to coarse sand, wet to saturated, very dense.

Difficult drilling, caving at 30 feet.

Greenish gray medium to coarse sand, wet, very dense.
Caving approximately 6 feet of sidewall.

Total depth 40 feet.

Free groundwater encountered at 12.5 feet.

Backfilled with soil cuttings.

Note: The stratification lines shown represent the approximate boundaries between soil and/or types and may be gradational.

Earth Systems
Southern California

14550 Haynes St., Suite #202, Van Nuys, CA
Phone (818) 901-8075 Fax (818) 901-8084

Boring No: B3
Project Name: Panay Way Parcel 21
Project Number: LA-01052-01
Boring Location: Per Plan

Drilling Date: June 1, 2006
Drilling Method: Hand Auger
Drill Type: Mobile Drill B-90
Logged By: MRM

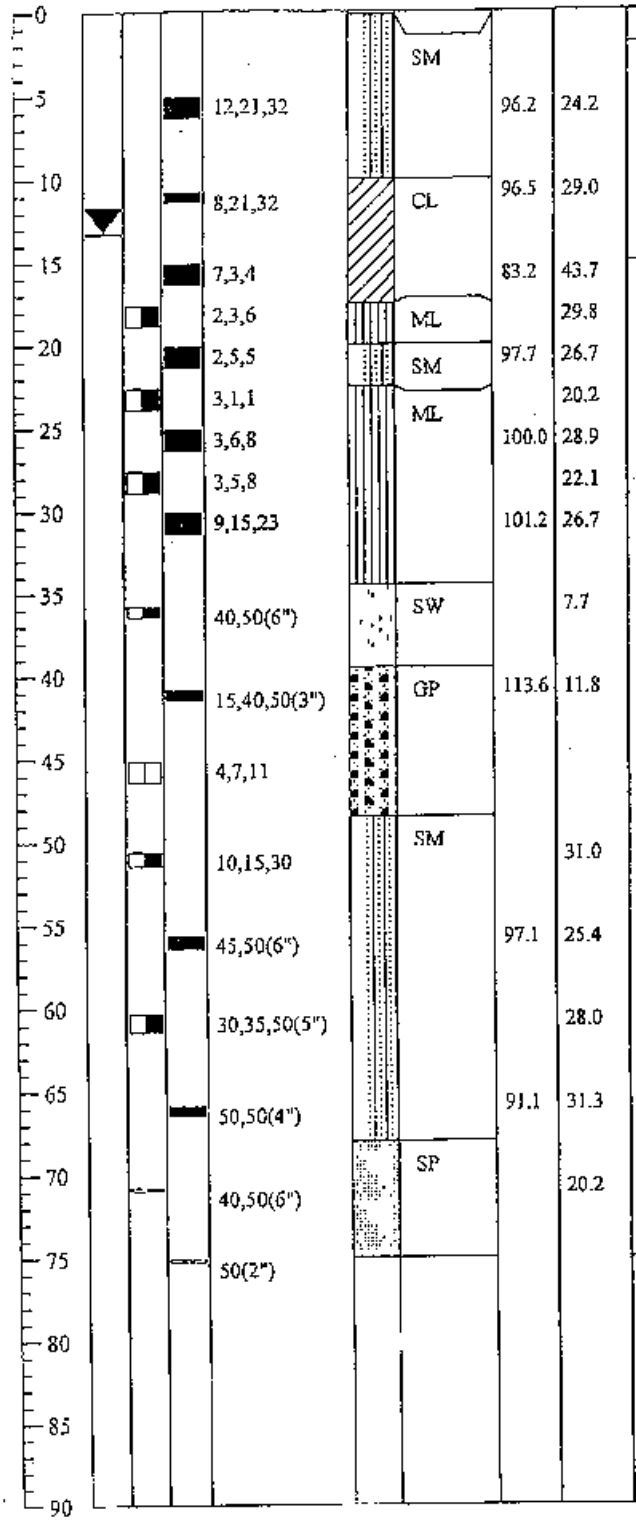
Depth (Ft.)	Sample Type: Bulk	Sample Type: SPT	Sample Type: MOD Calif.	Penetration Resistance (Blows/6")	Symbol	USCS	Dry Density (pcf)	Moisture Content (%)	DESCRIPTION OF UNITS
0									2 inches of asphalt
5						SM			ARTIFICIAL FILL (af)- Light brown silty fine to coarse sand, moist, dense, concrete and shell fragments.
10									
15									
20									
25									Total depth 5 feet.
30									No free groundwater encountered.
35									Backfilled with soil cuttings.
40									Note: The stratification lines shown represent the approximate boundaries between soil and/or types and may be gradational.
45									
50									
55									
60									
65									
70									
75									
80									
85									
90									

Earth Systems
Southern California
14550 Haynes St., Suite #202, Van Nuys, CA
Phone (818) 901-8975 Fax (818) 901-8084

Boring No: B4
Project Name: Panay Way Parcel 21
Project Number: LA-01052-01
Boring Location: Per Plan

Drilling Date: May 31, 2006
Drilling Method: 8" HSA Mud Rotary
Drill Type: Mobile Drill B-90
Logged By: MRM

DESCRIPTION OF UNITS



2 inches of asphalt.

ARTIFICIAL FILL (af)- Brown silty fine to medium sand with some clay, medium dense, damp with shell fragments.

Brownish gray clay with trace fine sand and fragments of concrete, very moist, very stiff with asphalt.

ALLUVIUM (Qa)- Dark gray silty sandy clay, medium stiff, strong sulfur odor.

Dark gray sandy silt, wet, medium stiff, with shell fragments and slight sulfur odor.

Gray fine sand, very moist, medium dense, strong sulfur odor.

Dark gray fine to medium sandy silt with clay, very moist, soft with kelp fragments.

Dark gray clay with trace fine sand, very moist, very stiff with kelp fragments and rootlets.

Brown fine to coarse sandy silt with clay, very moist, stiff, gravel clasts sub-rounded approximately 1 in. diameter, small pockets of matrix-supported gray sandy clay.

Brown fine sandy silt with trace clay, very moist, very stiff, few pockets of matrix-supported clay.

Brownish gravelly fine to coarse sand, very moist, very dense, angular to sub-rounded clasts approximately 1 in. diameter.

Grayish brown gravel with some fine to coarse sand, saturated, loose, gravel clasts to 2 in. diameter.

Difficult drilling, some beginings of caving.

Dark gray silty sand with clay, slightly moist, very stiff grading into fine sandy silt.

Pockets of matrix-supported light gray sandy clay.

Dark gray silty fine sand, moist to very moist, very dense.

Dark gray fine to medium sand, moist, very dense.

Gravelly sand with silt.

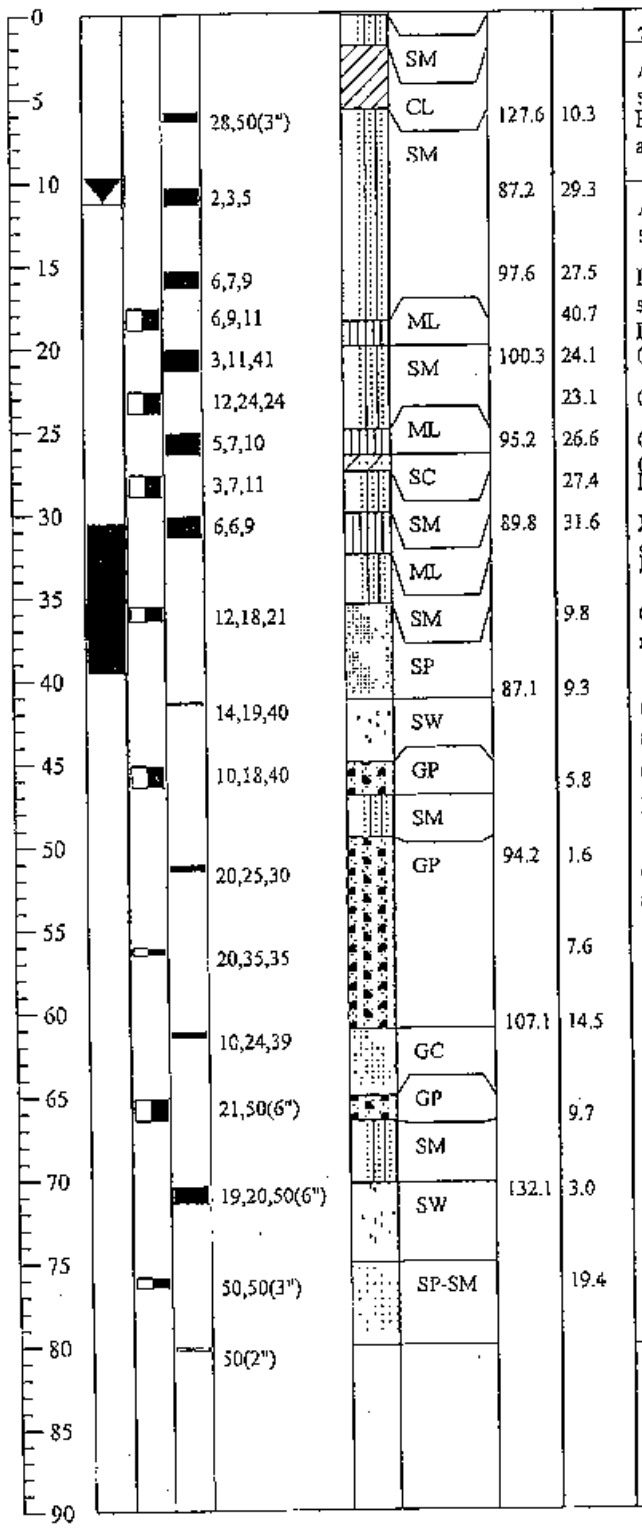
Total depth 75 feet.
Free groundwater encountered at 13.5 feet.
Backfilled with soil cuttings.
Note: The stratification lines shown represent the approximate boundaries between soil and/or types and may be gradational.

Earth Systems
Southern California
14550 Haynes St., Suite #202, Van Nuys, CA
Phone (818) 901-8075 Fax (818) 901-8084

Boring No:B5
Project Name: Panay Way Parcel 21
Project Number: LA-01052-01
Boring Location: Per Plan

Drilling Date: May 26, 2006
Drilling Method: 8" HSA Mud Rotary
Drill Type: Mobile Drill B-90
Logged By: MRM

DESCRIPTION OF UNITS



2 inches of asphalt

ARTIFICIAL FILL (af)- Dark gray clay with trace fine to medium sand, moist, soft.
Brown silty fine to coarse sand, wet, loose, concrete to fragments 1 in. diameter and shell fragments.

ALLUVIUM (Qa)- Dark gray silty fine to medium sand, wet to saturated, loose, strong sulfur odor.

Dark grey silty fine micaceous sand, wet, medium dense, large shell fragments, strong sulfur odor, slightly plastic.
Dark gray silt with trace fine sand, moist, stiff.
Gray very fine sand, very moist, very dense.

Gray fine to medium sand, wet, very dense with shell fragments.

Gray fine sandy silt with clay, very moist, stiff.
Gray clayey fine sand, very moist.
Dark greenish gray silty fine sand with trace clay, moist, medium dense.

Brownish gray fine sandy silt with clay, slightly moist, medium dense, iron staining and small nodules.
Brownish gray silty sand.

Gray medium to coarse sand with trace pockets of brown clay, wet, dense, rounded gravel to 1 in. diameter.

Grayish white medium to coarse sand, wet, loose, sub-angular to rounded clasts approximately 2 in. diameter.

Grayish white sandy gravel, wet, very dense.

Dark gray clayey silty fine sand, moist.

Grayish white sandy gravel with coarse sand, wet, loose, gravel to approximately 1 in. diameter.

Sub-angular to rounded gravel approximately 1-1/2 in. diameter.

Whitish gray gravel, wet, loose, sub-rounded to angular gravel approximately 1/2 in. diameter.

Sandy gravel, wet, loose, sub-angular to sub-rounded.
Grayish black medium to coarse sand, wet, medium dense.

Grayish white medium to coarse sand with trace clay, wet, medium dense, gravel sub-angular to rounded approximately 1 in. diameter.

Gray fine to slightly silty sand, moist, dense.

Total depth 80 feet.
Free groundwater encountered at 11.5 feet.
Backfilled with soil cuttings.
Note: The stratification lines shown represent the approximate boundaries between soil and/or types and may be gradational.

Log of Boring No.BH-2

Dates Drilled: 4/14/2005 | Logged by: CKL | Checked By: KN

Equipment: 8" HOLLOW STEM AUGER | Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 12 | Depth to Water (ft): 15

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/FOOT	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TEST
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		2" Asphalt Concrete						
		FILL: SILTY SAND (SM): fine- to medium-grained, gray brown.	■	▨	26	18	97	
5		CLAYEY SAND (SC): fine- to medium-grained, trace fine gravel, dark gray.	■	▨	31	12	112	
		CLAY WITH SAND (CL): fine-grained sand, dark gray.	■		28	60	69	wa
10			■		12	71	61	
15		CLAYEY SAND (SC): fine-grained, dark gray.	■		18	29	93	se
20		ALLUVIUM: SILTY SAND (SM): fine-grained, dark gray.	☒		(19)			
25		- trace clay	■		23	23	106	wa
		End of boring at 26.5 feet. Groundwater encountered at 15.0 feet at the time of drilling. Boring was converted to monitoring well, MW-1.						

Converse Consultants

Project Name: Los Angeles County Beaches and Harbors Water Quality Improvement Project, Marina Del Rey, California

Project No. 05-32117-01

Drawing No. A-3

Log of Boring No.BH-3

Drilled: 4/13/2005 Logged by: CKL Checked By: KN

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 12.5 Depth to Water (ft): 15.5

SUMMARY OF SUBSURFACE CONDITIONS

This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

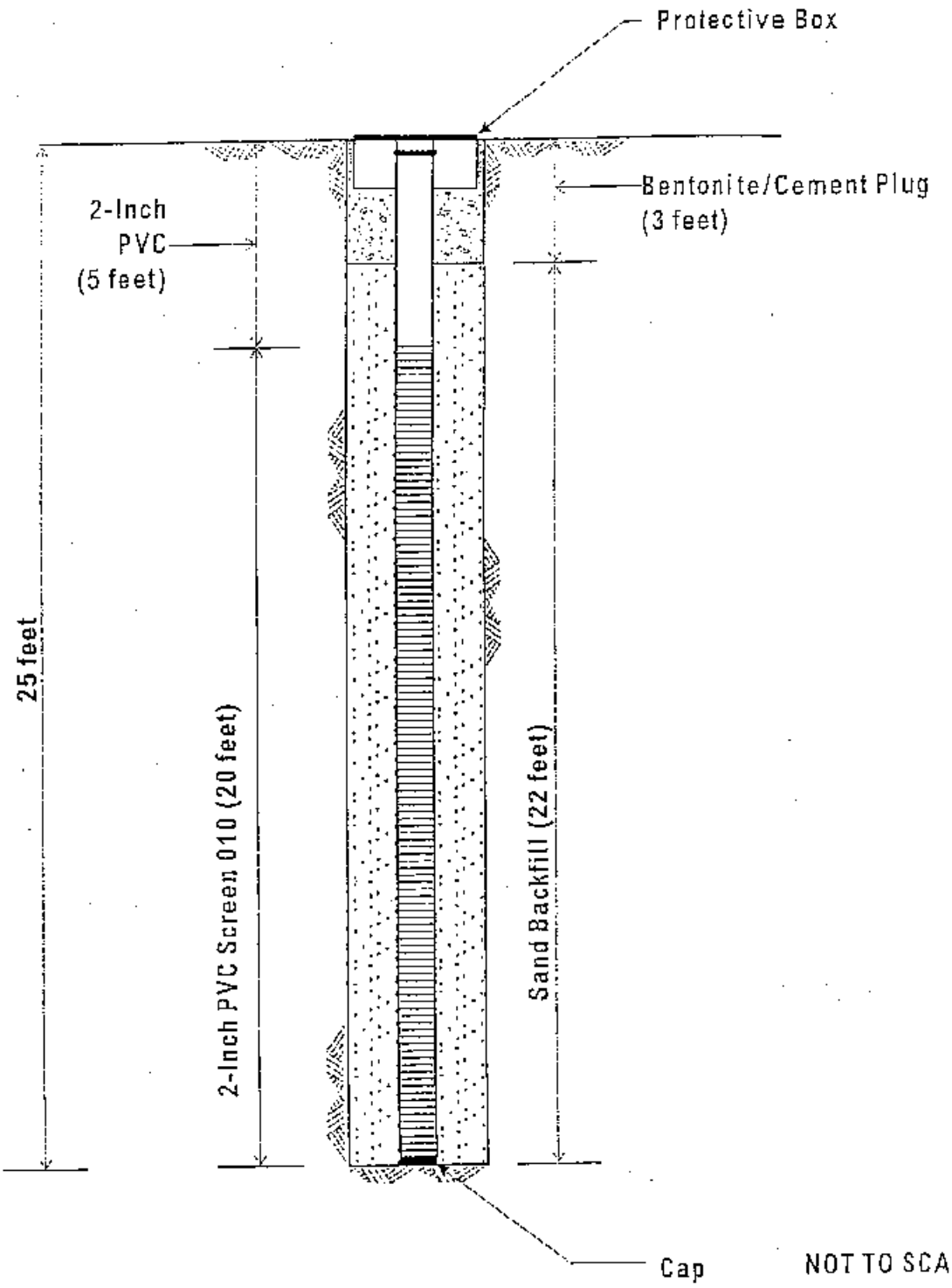
Depth (ft)	Graphic Log	SAMPLES DRIVE	SAMPLES BULK	BLOWS/FOOT	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TEST
	2" Asphalt Concrete						
	FILL: SILTY SAND (SM): fine- to medium-grained, gray brown.						ca,er
5				39	28	94	
	SILT (ML): dark gray.						
	CLAYEY SAND (SC): fine- to coarse-grained, black.			20	11	115	
10	CLAY (CL): dark gray.			10	37	80	
15	ALLUVIUM: SILTY SAND (SM): fine-grained, dark gray.			(21)			
20	SANDY SILT (ML): fine-grained sand, dark gray.			44	30	93	wa
25	CLAY (CL): dark gray.			26	25	100	
	End of boring at 28.0 feet. Groundwater encountered at 15.5 feet at the time of drilling. Boring was converted to monitoring well, MW-2.						

Converse Consultants

Project Name: Los Angeles County Beaches and Harbors Water Quality Improvement Project - Marina Del Rey, California

Project No. 05-32117-01

Drawing No. A-4



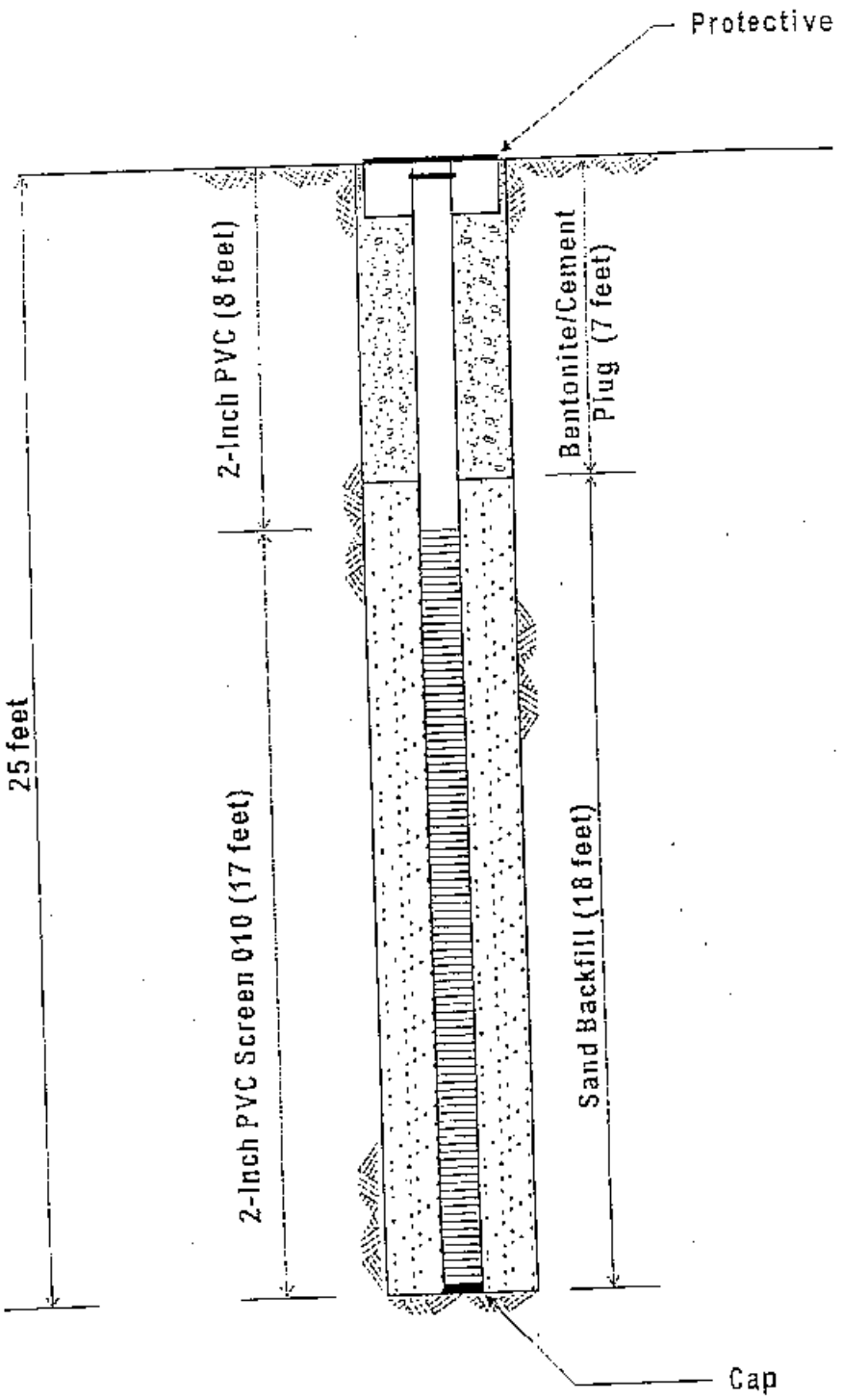
MONITORING WELL LOG NO. MW-1

LOS ANGELES COUNTY BEACHES AND HARBOR
WATER QUALITY IMPROVEMENT PROJECT
MARINA DEL REY, CALIFORNIA

Project No.
05-32117-01

Figure No.
W-1

Converse Consultants Geotechnical Engineering and Applied Sciences



MONITORING WELL LOG NO. MW-2

LOS ANGELES COUNTY BEACHES AND HARBOR
WATER QUALITY IMPROVEMENT PROJECT
MARINA DEL REY, CALIFORNIA

Project No.
05-32117-01

Figure No.
W-2

Converse Consultants Geotechnical Engineering and Applied Sciences

APPENDIX B

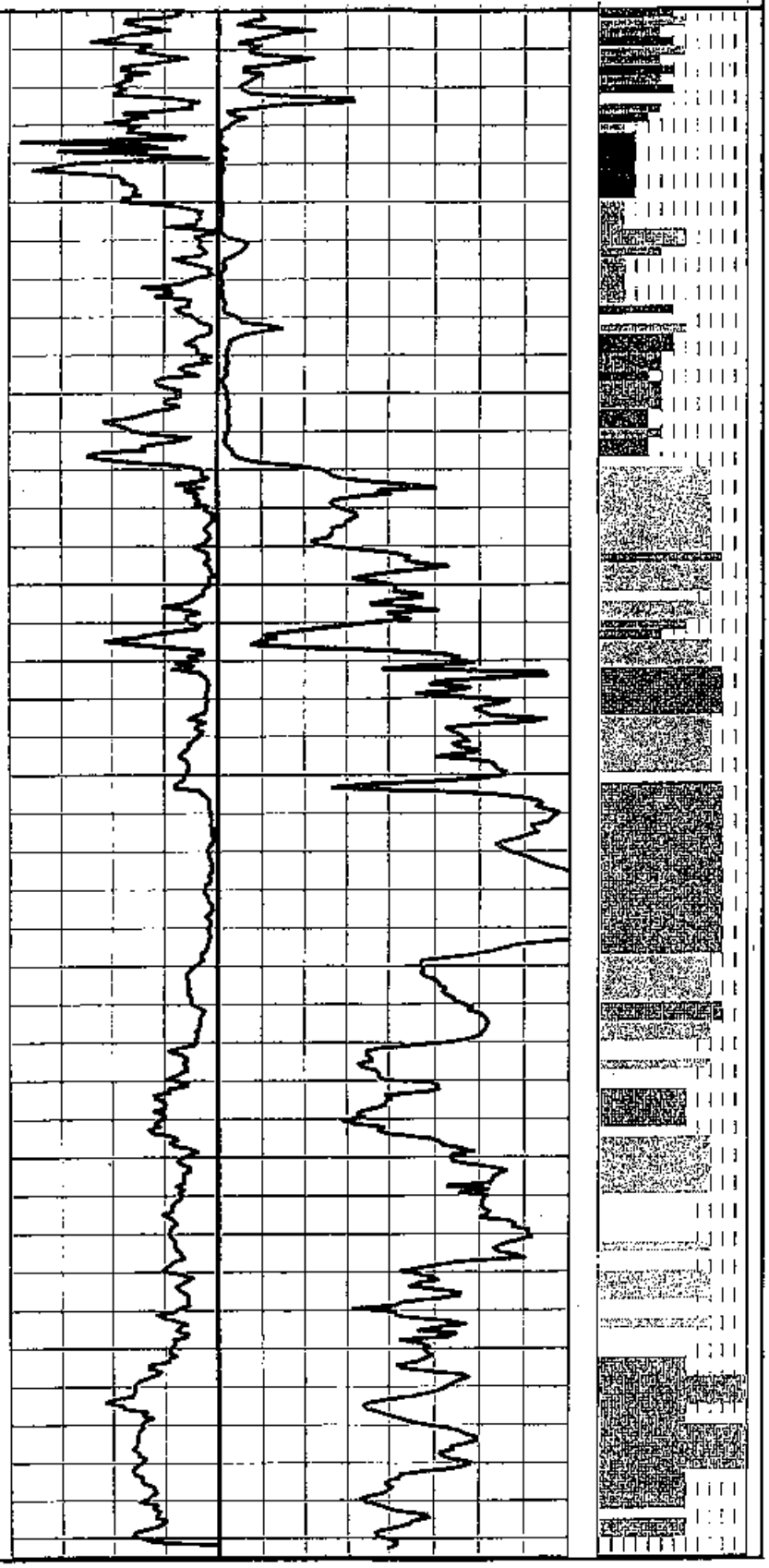
Logs of CPT Soundings – Subject Site (Parcel 21)

Earth Systems
Southern California

CPT No : CPT1
Project Name: Panay Way Parcel 21
Project No.: LA-01052-01
Location: See Site Exploration Plan

Cone Penetrometer: Holguin Fahan & Associates
Truck Mounted Electric Cone
with 23-ton reaction weight
Date: 5/15/2006

DEPTH (FEET)	Interpreted Soil Stratigraphy Robertson & Campanella ('89)	Density/Consistency
	Sandy Silt to Clayey Silt	dense
	Clayey Silt to Silty Clay	dense
	Sandy Silt to Clayey Silt	dense
	Clayey Silt to Silty Clay	dense
5	Silty Sand to Sandy Silt	dense
	Clayey Silt to Silty Clay	stiff
	Clay	soft
	Clay	firm
	Clay	soft
10	Clay	soft
	Sensitive fine grained	soft
	Sandy Silt to Clayey Silt	loose
	Sandy Silt to Clayey Silt	loose
	Sensitive fine grained	firm
15	Sensitive fine grained	soft
	Sandy Silt to Clayey Silt	loose
	Sand to Silty Sand	medium dense
	Sandy Silt to Clayey Silt	loose
	Clayey Silt to Silty Clay	firm
20	Clayey Silt to Silty Clay	firm
	Clayey Silt to Silty Clay	stiff
	Silty Clay to Clay	stiff
	Clayey Silt to Silty Clay	stiff
	Sandy Silt to Clayey Silt	dense
25	Sand	dense
	Sand	dense
	Sand	medium dense
	Sand	medium dense
	Gravelly Sand to Sand	dense
30	Sand	dense
	Sand	dense
	Sand	dense
	Sandy Silt to Clayey Silt	medium dense
	Sand	dense
35	Sand	very dense
	Gravelly Sand to Sand	dense
	Gravelly Sand to Sand	dense
	Sand	dense
	Sand	dense
40	Sand	very dense
	Sand	dense
	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	dense
	Gravelly Sand to Sand	dense
45	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	dense
50	Sand	dense
	Sand	dense
	Sand	dense
	Gravelly Sand to Sand	dense
	Sand	dense
55	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
	Silty Sand to Sandy Silt	dense
	Sand to Silty Sand	dense
60	Sand	dense
	Sand	dense
	Sand	dense
	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
65	Sand	dense
	Sand to Silty Sand	dense
	Sand	dense
	Sand to Silty Sand	dense
	Sand	dense
70	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
	Sand to Clayey Sand	medium dense
	Sand to Clayey Sand	medium dense
	Silty Sand to Sandy Silt	dense
75	Sand to Clayey Sand	dense
	Sand to Clayey Sand	medium dense
	Silty Sand to Sandy Silt	dense
	Silty Sand to Sandy Silt	dense
	Silty Sand to Sandy Silt	dense
80	Silty Sand to Sandy Silt	dense
	End of Sounding @ 80.7 feet	

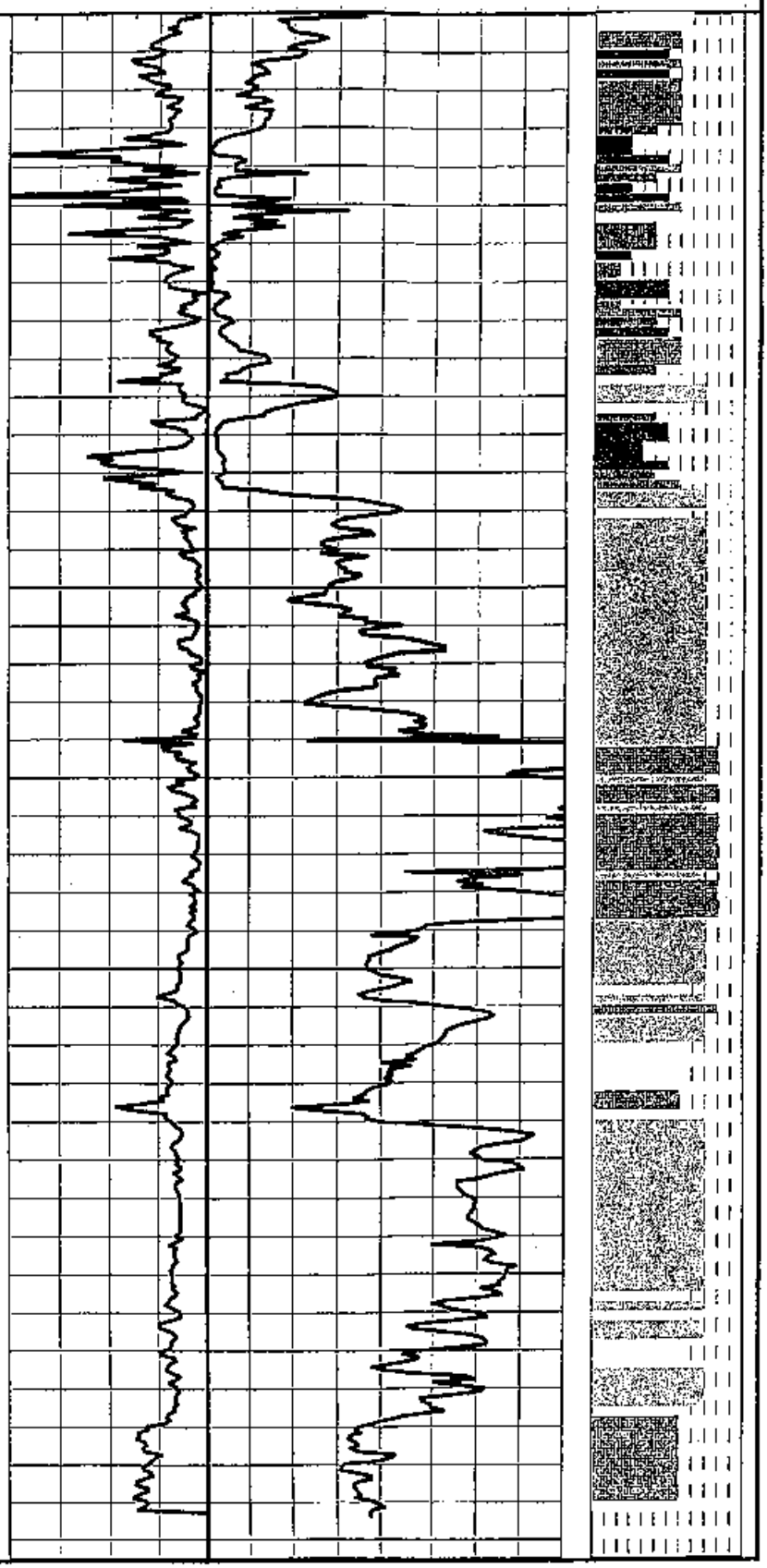


Earth Systems
Southern California

CPT No : CPT2
Project Name: Panay Way Parcel 21
Project No.: LA-01052-01
Location: See Site Exploration Plan

Cone Penetrometer: Holguin Fahan & Associates
Truck Mounted Electric Cone
with 23-ton reaction weight
Date: 5/15/2006

DEPTH (FEET)	Interpreted Soil Stratigraphy Robertson & Campanella ('89)	Density/Consistency
	Sand to Silty Sand	dense
	Silty Sand to Sandy Silt	very dense
	Sandy Silt to Clayey Silt	dense
	Sandy Silt to Clayey Silt	dense
5	Silty Sand to Sandy Silt	dense
	Silty Sand to Sandy Silt	dense
	Silty Clay to Clay	stiff
	Clayey Silt to Silty Clay	medium dense
	Sandy Silt to Clayey Silt	medium dense
10	Silty Clay to Clay	dense
	Silty Sand to Sandy Silt	dense
	Clayey Silt to Silty Clay	medium dense
	Silty Clay to Clay	firm
	Sensitive fine grained	soft
15	Sandy Silt to Clayey Silt	loose
	Sandy Silt to Clayey Silt	loose
	Sandy Silt to Clayey Silt	loose
	Silty Sand to Sandy Silt	medium dense
	Sandy Silt to Clayey Silt	medium dense
20	Sand to Silty Sand	dense
	Sand to Silty Sand	medium dense
	Sandy Silt to Clayey Silt	stiff
	Clayey Silt to Silty Clay	stiff
	Clayey Silt to Silty Clay	very stiff
25	Sandy Silt to Clayey Silt	medium dense
	Sand	dense
	Sand	dense
	Sand	medium dense
	Sand	dense
30	Sand	medium dense
	Sand	medium dense
	Sand	dense
	Sand	dense
	Sand	dense
35	Sand	dense
	Sand	medium dense
	Sand	dense
	Sand	dense
	Sand	very dense
40	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	very dense
	Sand	very dense
	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	very dense
45	Gravelly Sand to Sand	dense
	Gravelly Sand to Sand	dense
	Gravelly Sand to Sand	very dense
	Sand	dense
	Sand	dense
50	Sand	medium dense
	Sand	dense
	Sand	dense
	Sand	dense
	Sand	dense
55	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
	Silty Sand to Sandy Silt	dense
	Sand	dense
60	Sand	dense
	Sand	dense
	Sand	dense
	Sand	dense
	Sand	dense
65	Sand	dense
	Sand	dense
	Sand	dense
	Sand	dense
	Sand to Silty Sand	dense
70	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
	Sand	dense
	Sand	dense
	Sand to Silty Sand	dense
75	Silty Sand to Sandy Silt	dense
	Silty Sand to Sandy Silt	dense
	Silty Sand to Sandy Silt	dense
	Silty Sand to Sandy Silt	dense
80	End of Sounding @ 78.9 feet	

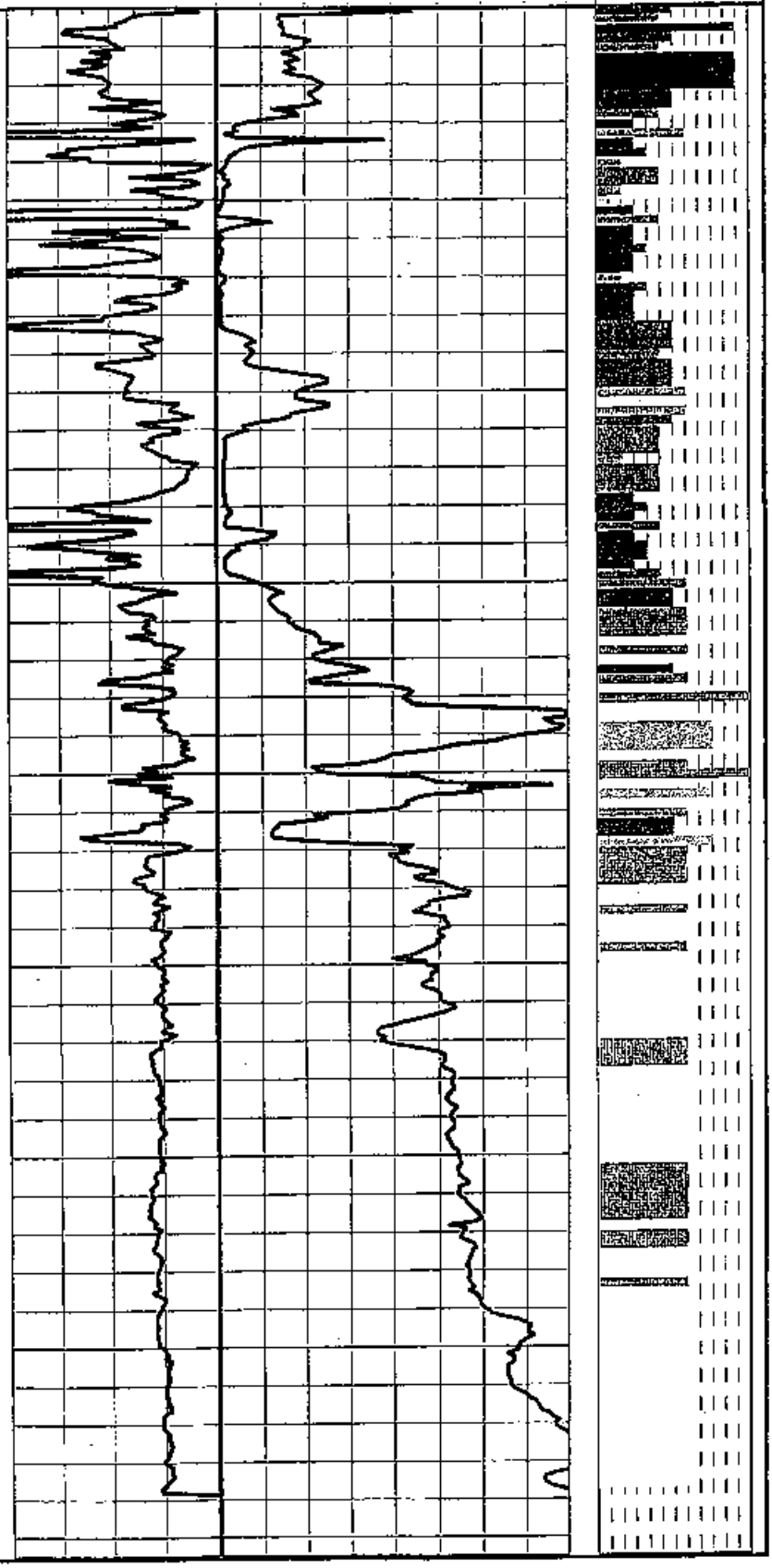


Earth Systems
Southern California

CPT No : CPT3
Project Name: Panay Way Parcel 21
Project No.: LA-01052-01
Location: See Site Exploration Plan

Cone Penetrometer: Holguin Fahan & Associates Truck Mounted Electric Cone with 23-ton reaction weight
Date: 5/15/2006

DEPTH (FEET)	Interpreted Soil Stratigraphy Robertson & Campanella ('89)	Density/Consistency
	Clayey Silt to Silty Clay	very dense
	Clayey Silt to Silty Clay	very dense
	Clayey Silt to Silty Clay	very dense
	Overconsolidated Soil	medium dense
5	Sandy Silt to Clayey Silt	very dense
	Sandy Silt to Clayey Silt	dense
	Overconsolidated Soil	medium dense
	Clay	stiff
	Clayey Silt to Silty Clay	stiff
10	Clayey Silt to Silty Clay	firm
	Clay	very stiff
	Silty Clay to Clay	stiff
	Clay	firm
	Clay	firm
15	Silty Clay to Clay	firm
	Clay	soft
	Clay	very stiff
	Sandy Silt to Clayey Silt	medium dense
	Clayey Silt to Silty Clay	dense
20	Sandy Silt to Clayey Silt	dense
	Silty Sand to Sandy Silt	dense
	Silty Sand to Sandy Silt	medium dense
	Clayey Silt to Silty Clay	stiff
	Clayey Silt to Silty Clay	firm
25	Clayey Silt to Silty Clay	firm
	Silty Clay to Clay	stiff
	Clay	stiff
	Silty Clay to Clay	hard
	Silty Clay to Clay	stiff
30	Clay	very stiff
	Sandy Silt to Clayey Silt	medium dense
	Sandy Silt to Clayey Silt	medium dense
	Silty Sand to Sandy Silt	dense
	Sand to Silty Sand	medium dense
35	Silty Sand to Sandy Silt	dense
	Silty Sand to Sandy Silt	very dense
	Silty Sand to Sandy Silt	very dense
	Sand to Silty Sand	very dense
	Sand	dense
40	Silty Sand to Sandy Silt	dense
	Silty Sand to Sandy Silt	very dense
	Sand to Silty Sand	dense
	Sandy Silt to Clayey Silt	medium dense
	Silty Sand to Sandy Silt	dense
45	Silty Sand to Sandy Silt	very dense
	Silty Sand to Sandy Silt	very dense
	Sand to Silty Sand	dense
	Silty Sand to Sandy Silt	very dense
	Sand to Silty Sand	dense
50	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
55	Silty Sand to Sandy Silt	very dense
	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
60	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
	Silty Sand to Sandy Silt	very dense
	Silty Sand to Sandy Silt	very dense
	Sand to Silty Sand	dense
65	Silty Sand to Sandy Silt	very dense
	Sand to Silty Sand	dense
	Sand to Silty Sand	dense
	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
70	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
75	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
80	End of Sounding @ 78.1 feet	

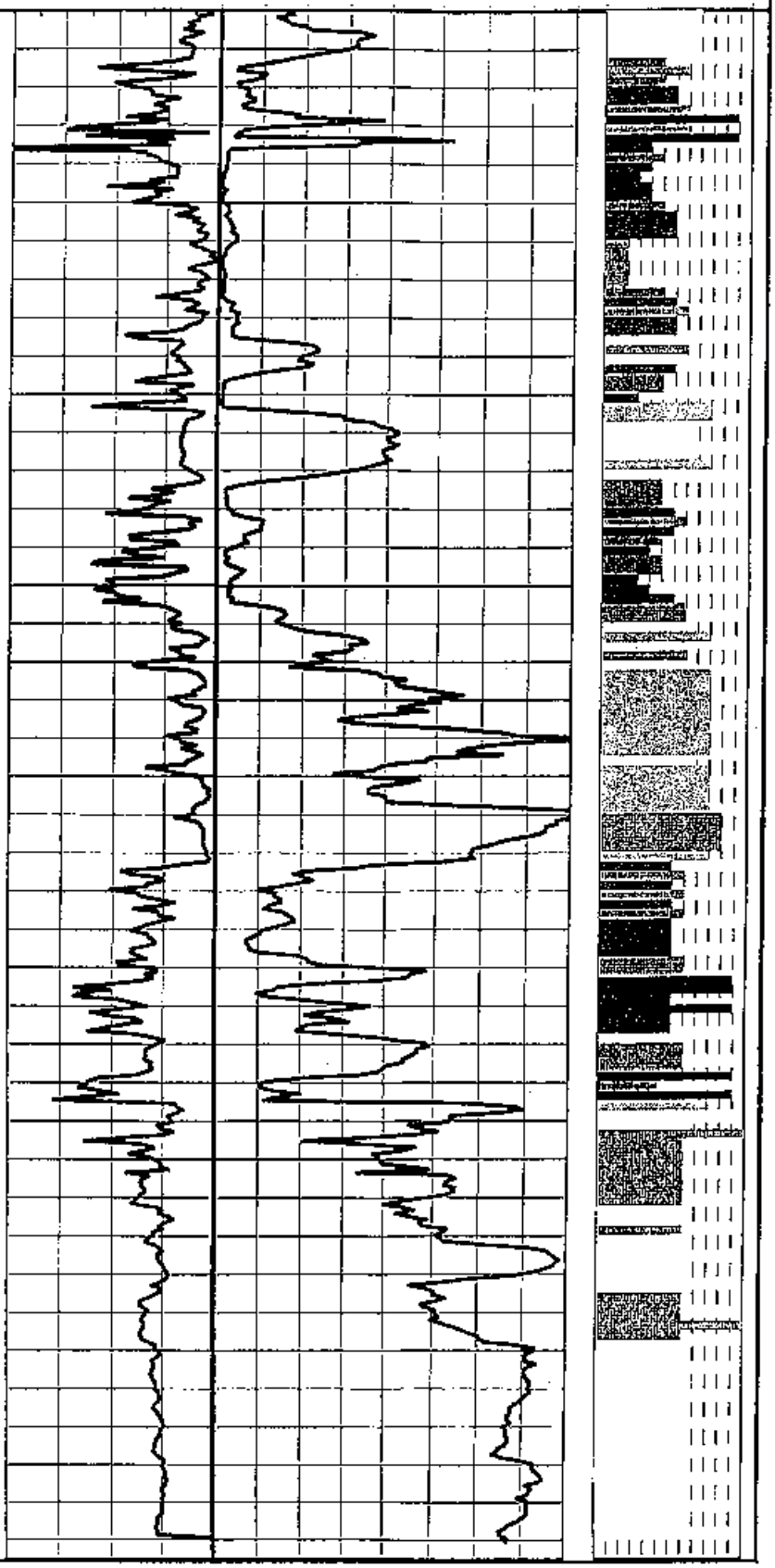


Earth Systems
Southern California

CPT No : CPT4
Project Name: Panay Way Parcel 21
Project No.: LA-01052-01
Location: See Site Exploration Plan

Cone Penetrometer: Holguin Fahan & Associates
Truck Mounted Electric Cone
with 23-ton reaction weight
Date: 5/15/2006

DEPTH (FEET)	Interpreted Soil Stratigraphy Robertson & Campanella ('89)	Density/Consistency
	Sand to Silty Sand	dense
	Sand to Silty Sand	very dense
	Sandy Silt to Clayey Silt	dense
	Sandy Silt to Clayey Silt	medium dense
	Sandy Silt to Clayey Silt	medium dense
5	Sandy Silt to Clayey Silt	very dense
	Clayey Silt to Silty Clay	very dense
	Clayey Silt to Silty Clay	stiff
	Clay	firm
10	Silty Clay to Clay	firm
	Sandy Silt to Clayey Silt	loose
	Sandy Silt to Clayey Silt	loose
	Sensitive fine grained	loose
	Sensitive fine grained	firm
15	Sensitive fine grained	firm
	Sandy Silt to Clayey Silt	loose
	Sandy Silt to Clayey Silt	medium dense
	Sand to Silty Sand	dense
	Silty Sand to Sandy Silt	medium dense
20	Clayey Silt to Silty Clay	firm
	Silty Sand to Sandy Silt	medium dense
	Sand	dense
	Sand to Silty Sand	very dense
	Sand	dense
25	Silty Sand to Sandy Silt	medium dense
	Clayey Silt to Silty Clay	stiff
	Silty Sand to Sandy Silt	medium dense
	Clayey Silt to Silty Clay	very stiff
	Clayey Silt to Silty Clay	stiff
30	Clayey Silt to Silty Clay	very stiff
	Clayey Silt to Silty Clay	very stiff
	Silty Sand to Sandy Silt	medium dense
	Sand	medium dense
	Silty Sand to Sandy Silt	dense
35	Sand	dense
	Sand	dense
	Sand	dense
	Sand	very dense
	Sand	dense
40	Sand to Silty Sand	dense
	Sand	dense
	Sand	very dense
	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	dense
45	Sand to Silty Sand	dense
	Sandy Silt to Clayey Silt	medium dense
	Silty Sand to Sandy Silt	medium dense
	Sandy Silt to Clayey Silt	medium dense
	Sandy Silt to Clayey Silt	hard
50	Silty Sand to Sandy Silt	dense
	Sandy Silt to Clayey Silt	dense
	Clayey Silt to Silty Clay	dense
	Sandy Silt to Clayey Silt	dense
	Silty Sand to Sandy Silt	dense
55	Silty Sand to Sandy Silt	very dense
	Sandy Silt to Clayey Silt	dense
	Overconsolidated Soil	medium dense
	Sand to Silty Sand	very dense
	Silty Sand to Sandy Silt	dense
60	Silty Sand to Sandy Silt	dense
	Silty Sand to Sandy Silt	very dense
	Silty Sand to Sandy Silt	very dense
	Sand to Silty Sand	dense
	Silty Sand to Sandy Silt	very dense
65	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
	Sand to Silty Sand	dense
	Silty Sand to Sandy Silt	very dense
	Silty Sand to Sandy Silt	very dense
70	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
75	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
80	End of Sounding @ 80.2 feet	



APPENDIX C

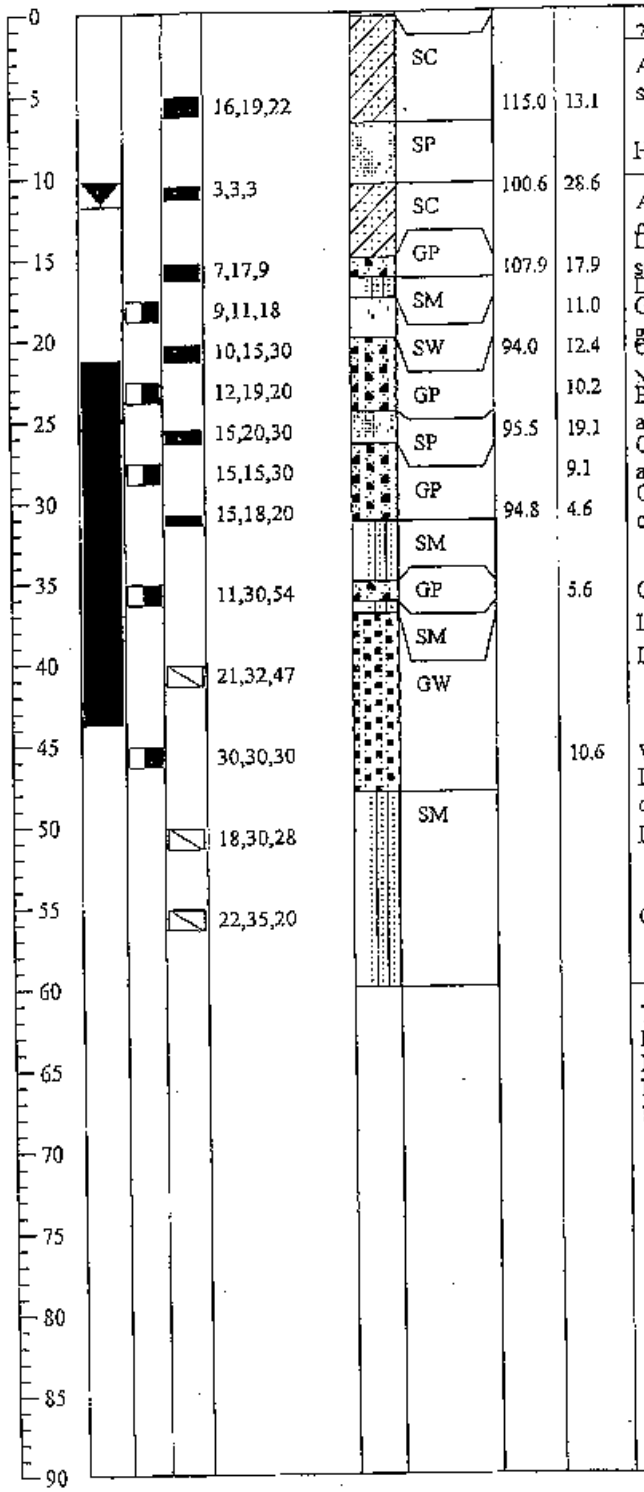
Logs of Borings and CPT Soundings –
Adjacent Sites (Parcels 19 and 20)

Earth Systems
Southern California
7949 Woodley Avenue, Van Nuys, California
Phone (818) 779-1999 FAX (818) 779-1990

Boring No: B2A
Project Name: Panay Way Parcel 19
Project Number: LA-01067-01
Boring Location: Per Plan

Drilling Date: May 30, 2006
Drilling Method: 8" HSA Mud Rotary
Drill Type: Mobile Drill B-90
Logged By: MRM

DESCRIPTION OF UNITS



2 inches of asphalt.

ARTIFICIAL FILL (af)- Brown fine to medium sandy clay, very moist, very stiff.

Gravel.

Hard drilling.

ALLUVIUM (Qa)- Brown medium to coarse sand, wet, dense, semi-angular clasts to approximately 1/4 inch.

Dark gray very fine clayey sand, wet, soft, strong sulferous odor, with kelp and small shell fragments.

Dark gray silty sand, very moist, dense with small shell fragments.

Gravelly medium to fine sand, wet, loose, with shell fragments and sub-angular gravel to 1in diameter.

Grayish white sandy gravel, wet, loose, with abundant large shell fragments.

No shell fragments.

Brown medium to coarse sand, wet, dense, semi-angular clasts to approximately 1/4 in.

Gray fine to coarse sand with gravel and shell fragments, wet, loose. Gravel to approximately 1/4in diameter, semi-angular to rounded.

Grayish white gravel, small ammount of medium to coarse sand. Wet, loose, clasts to approximately 1-1/2in, semi-angular to rounded.

Grayish white well-graded gravel, wet, loose.

Light grayish fine to coarse sand, wet, medium dense.

Difficult drilling at 37 to 38 feet.

Well-graded fine to coarse gravel, wet, loose.

Light gray fine to coarse sand with some subrounded gravel approximately 1" diameter.

Difficult drilling 45 to 50 feet.

Caving.

Total depth 60 feet.
Free groundwater encountered at approximately 12 feet.
Backfilled with soil cuttings.
Note: The stratification lines shown represent the approximate boundaries between soil and/or types and may be gradational.

Earth Systems
Southern California

7949 Woodley Ave., Van Nuys, CA 91406
(818) 779-1999 / (818) 779-1990

Boring No:B1
Project Name: 13953 Panay Way
Project Number: PL-05482-01
Boring Location: Per Plan

Drilling Date: September 26, 2000
Drilling Method: 8" HollowStem Auger, rope/cathead hammer
Drill Type: CME 55
Logged By: Rob Ferguson

Depth (Ft.)	Sample Type: Bulk	Sample Type: SPT	Sample Type: MOD Calif.	Penetration Resistance (Blows/6")	Symbol	USCS	Dry Density (pcf)	Moisture Content (%)	DESCRIPTION OF UNITS
0									Asphalt pavement.
			■	15,19		SC	120.1	10.3	FILL - Moderate brown clayey fine to coarse sand with gravel, moist, moderately compacted.
5			■	11,13		SP-SM	94.7	6.5	FILL - Dark yellow brown slightly silty fine to medium sand, moist, poorly compacted.
10			▨	2,2					
15		■		3,3,9		SP-SM		12.2	Gray-brown slightly silty fine to coarse sand with shell fragments, saturated, medium dense.
20			■	11,12		SM		21.9	Grey brown silty fine sand, saturated, medium dense.
25		■		12,10,11		SP-SM		11.1	Moderate yellow brown gravelly fine to coarse sand with silt, gravel to 1.5 inches, saturated, medium dense.
30			■	23,43			139.1	6.1	Dense, more silt.
35		■		14,25,28				11.5	Decreasing silt, gravel to 2 inch.
40									
45									Total Depth = 38 feet
50									Groundwater encountered at approximately 14 feet.
55									Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradational.
60									
65									
70									

Earth Systems
Southern California

7949 Woodley Ave., Van Nuys, CA 91406
(818) 779-1999 / (818) 779-1990

Boring No:B2
Project Name: 13953 Panay Way
Project Number: PL-05482-01
Boring Location: Per Plan

Drilling Date: October 26, 2000
Drilling Method: 8" Hollow Stem Auger, Auto trip hammer
Drill Type: CME 95
Logged By: Mark Russell

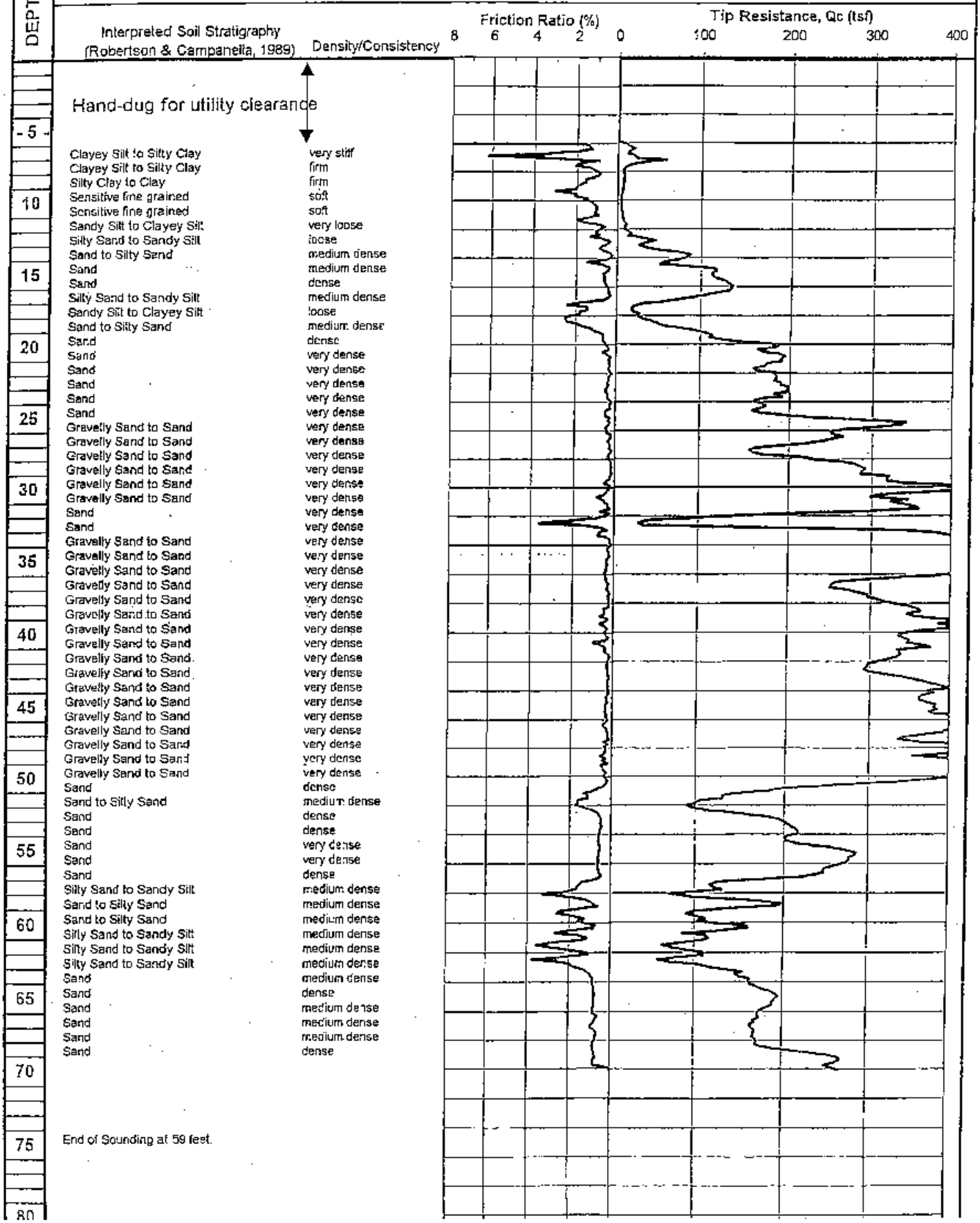
Depth (Ft.)	Sample Type (Bulk / SPT / MOD Calif.)	Penetration Resistance (Blows/6")	Symbol	USCS	Dry Density (pcf)	Moisture Content (%)	DESCRIPTION OF UNITS
							Page 1 of 1
0							2" Asphalt pavement
0				CL			FILL - Moderate brown sandy clay with debris including gravel, brick, wood, and asphalt fragments, very moist, poorly compacted.
5	MOD Calif.	4,7			109.2	18.2	
5				SM			FILL - Moderate olive-grey silty fine to medium sand with shell fragments, wet, poorly compacted.
10	SPT	push 18"				40	
10				SM			Moderate olive-grey silty fine to medium sand with shell fragments, saturated, loose.
15	MOD Calif.	4,4			94.8	29.3	
15				ML			Olive grey sandy silt with fine sand with few organic fibers, saturated, medium stiff.
20	SPT	2,2,3				21.6	
20				SP-SM			Moderate olive grey silty fine to coarse sand, loose, saturated, numerous shell fragments to 3/4."
25	MOD Calif.	3,6			106.9	21.8	
25							
30	SPT	11,17,27				22.3	
30				SP-SM			Moderate olive grey slightly silty fine to medium sand with occasional rounded gravel, saturated, dense.
35	MOD Calif.	20,29			132.5	7.5	
35							
40	SPT	8,10,17				17.8	
40							
45	MOD Calif.	40,50		SP-SM	115.1	18.7	Moderate orange/rusty brown slightly silty medium to coarse sand, saturated, very dense.
45							
50	SPT	9,12,18		SP-SM		16.6	Moderate orange brown slightly silty fien to medium sand, saturated, medium dense to dense. Color change to moderate olive brown.
50							
55	MOD Calif.	21,32			103.4	18.5	
55							
60	SPT	6,9,15		SM		23.8	Moderate olive grey silty fine to medium sand, saturated, medium dense.
60							Chunks of organics (wood).
65	MOD Calif.	18,26			96.8	28.5	Dense, occasional fine gravel and small organic fragments.
65							
70	SPT	9,13,16				25.8	Total Depth = 71 feet. Groundwater encountered at approximately 16 feet.
70							Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradational.

Earth Systems
Southern California

CPT Sounding : CPT-1A

Project Name: Panay Way Parcel 20(19)
Project No.: PL-05482-01
Location: See Site Exploration Plan

Cone Penetrometer: Gregg In-Situ, Inc.
Truck Mounted Electric Cone
with 23-ton reaction weight
Date: 9/22/00



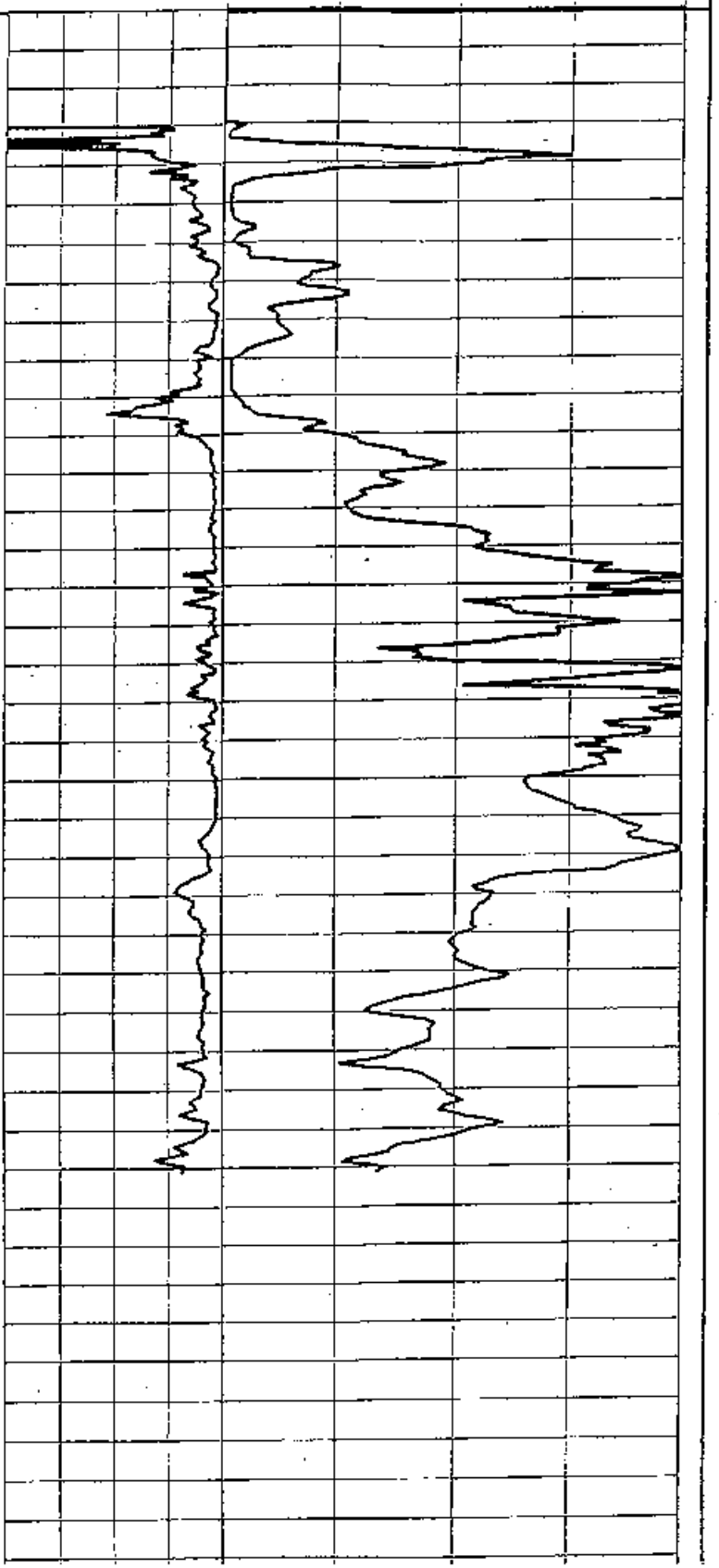
Earth Systems
Southern California

CPT Sounding : CPT-2

Project Name: Panay Way Parcel 20
Project No.: PL-05482-01
Location: See Site Exploration Plan

Cone Penetrometer: Gregg In-Situ, Inc.
Truck Mounted Electric Cone
with 23-ton reaction weight
Date: 9/22/00

DEPTH (FEET)	Interpreted Soil Stratigraphy (Robertson & Campanella, 1989)	Density/Consistency
	Hand-dug for utility clearance	
- 5 -	Overconsolidated Soil	medium dense
	Sand to Silty Sand	very dense
	Silty Sand to Sandy Silt	loose
10	Sensitive fine grained	firm
	Sandy Silt to Clayey Silt	very loose
	Sandy Silt to Clayey Silt	very loose
	Sand to Silty Sand	medium dense
	Sand to Silty Sand	medium dense
15	Sand	medium dense
	Sand to Silty Sand	medium dense
	Sand to Silty Sand	medium dense
	Sandy Silt to Clayey Silt	very loose
	Sensitive fine grained	firm
20	Clayey Silt to Silty Clay	stiff
	Sandy Silt to Clayey Silt	loose
	Sand to Silty Sand	medium dense
	Sand	dense
	Sand	dense
25	Sand	dense
	Sand	medium dense
	Sand	very dense
	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	very dense
30	Gravelly Sand to Sand	very dense
	Sand	very dense
	Gravelly Sand to Sand	very dense
	Sand	very dense
	Sand	very dense
35	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	very dense
40	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	very dense
	Gravelly Sand to Sand	very dense
45	Sand	very dense
	Sand to Silty Sand	very dense
	Sand	dense
	Sand	dense
	Sand	dense
50	Sand	very dense
	Sand	dense
	Sand	medium dense
	Sand	dense
	Sand	medium dense
55	Sand	medium dense
	Sand	dense
	Sand	dense
	Sand	dense
	Sand to Silty Sand	medium dense
60		
65		
70		
75	End of Sounding at 59 feet.	

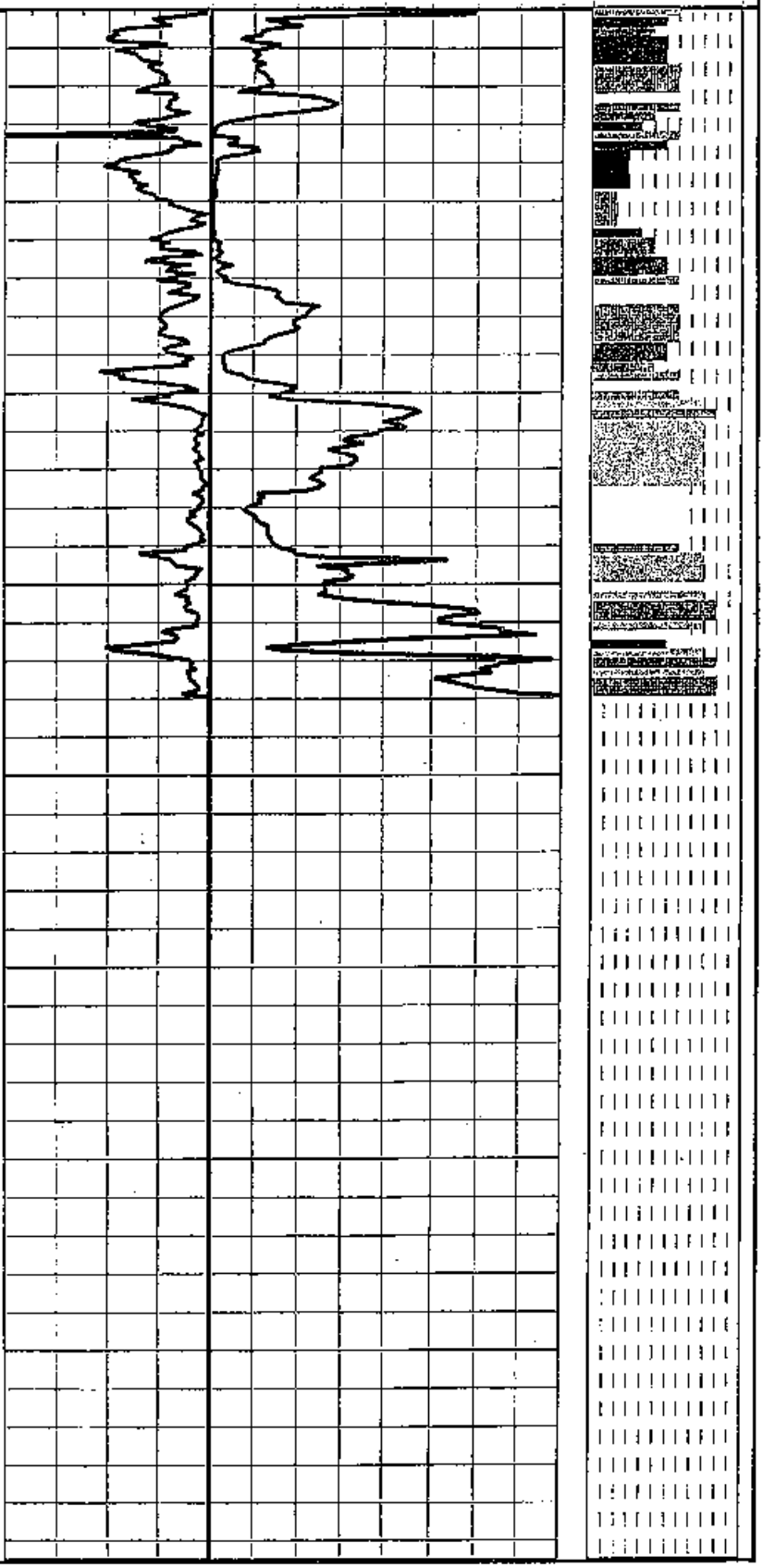


Earth Systems
Southern California

CPT No : CPT2A
Project Name: Panay Way Parcel 19
Project No.: LA-01067-01
Location: See Site Exploration Plan

Cone Penetrometer: Holguin Fahan & Associates
Truck Mounted Electric Cone
with 23-ton reaction weight
Date: 5/15/2008

DEPTH (FEET)	Interpreted Soil Stratigraphy Robertson & Campanella ('89)	Density/Consistency
	Silty Sand to Sandy Silt	dense
	Sandy Silt to Clayey Silt	dense
	Sandy Silt to Clayey Silt	dense
	Silty Sand to Sandy Silt	dense
5	Silty Sand to Sandy Silt	very dense
	Silty Sand to Sandy Silt	medium dense
	Sandy Silt to Clayey Silt	medium dense
	Clayey Silt to Silty Clay	medium dense
	Clay	firm
10	Clay	soft
	Sensitive fine grained	very soft
	Sensitive fine grained	soft
	Clayey Silt to Silty Clay	firm
	Sandy Silt to Clayey Silt	loose
15	Sand to Silty Sand	medium dense
	Sand to Silty Sand	dense
	Silty Sand to Sandy Silt	dense
	Silty Sand to Sandy Silt	medium dense
	Clayey Silt to Silty Clay	medium dense
20	Silty Sand to Sandy Silt	dense
	Sand	dense
	Sand	dense
	Sand	dense
	Sand	dense
25	Sand	medium dense
	Sand to Silty Sand	medium dense
	Sand to Silty Sand	medium dense
	Sand to Silty Sand	medium dense
	Sand to Silty Sand	dense
30	Sand	medium dense
	Sand	dense
	Gravelly Sand to Sand	dense
	Sand to Silty Sand	very dense
	Sand to Silty Sand	very dense
35	Sand	very dense
	Gravelly Sand to Sand	very dense
40		
45		
50		
55		
60		
65		
70		
75		
80		



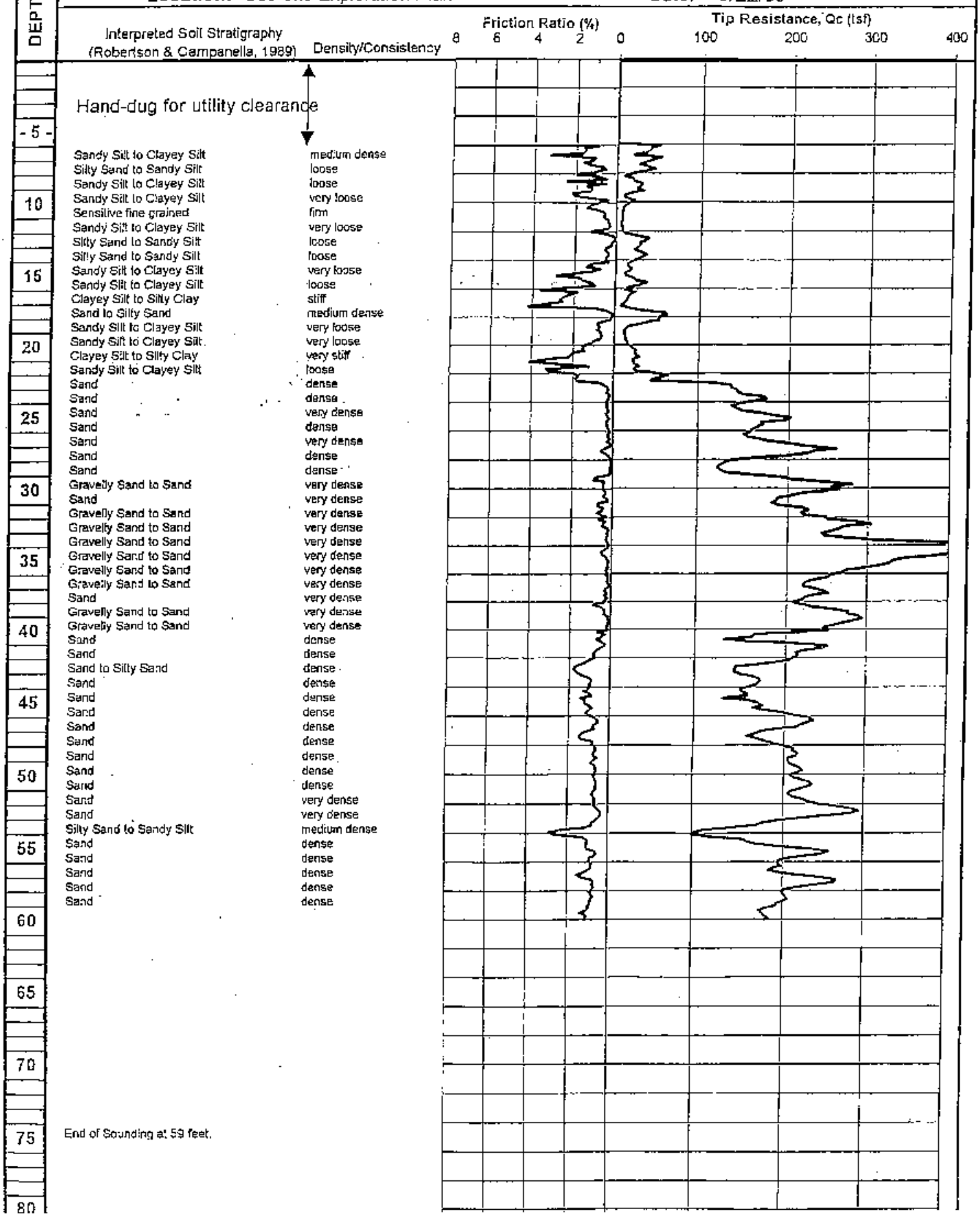
End of Sounding @ 36.3 feet

Earth Systems
Southern California

CPT Sounding : CPT-3

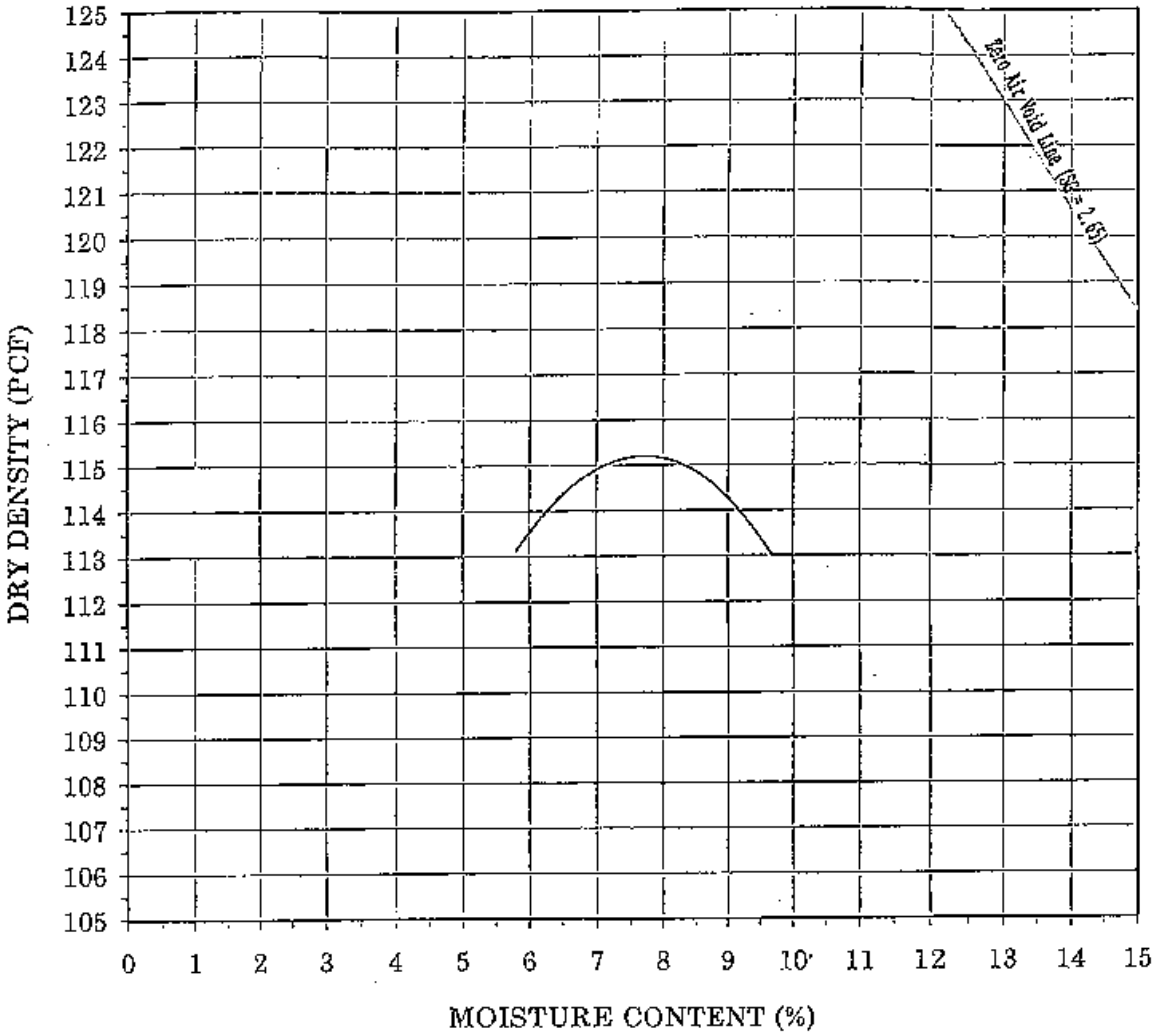
Project Name: Panay Way Parcel 20
Project No.: PL-05482-01
Location: See Site Exploration Plan

Cone Penetrometer: Gregg In-Situ, Inc.
Truck Mounted Electric Cone
with 23-ton reaction weight
Date: 9/22/00



APPENDIX D

Summary of Laboratory Test Results



Maximum Density - Optimum Moisture Characteristics*

Sample Location: B3 at 0 to 5 feet

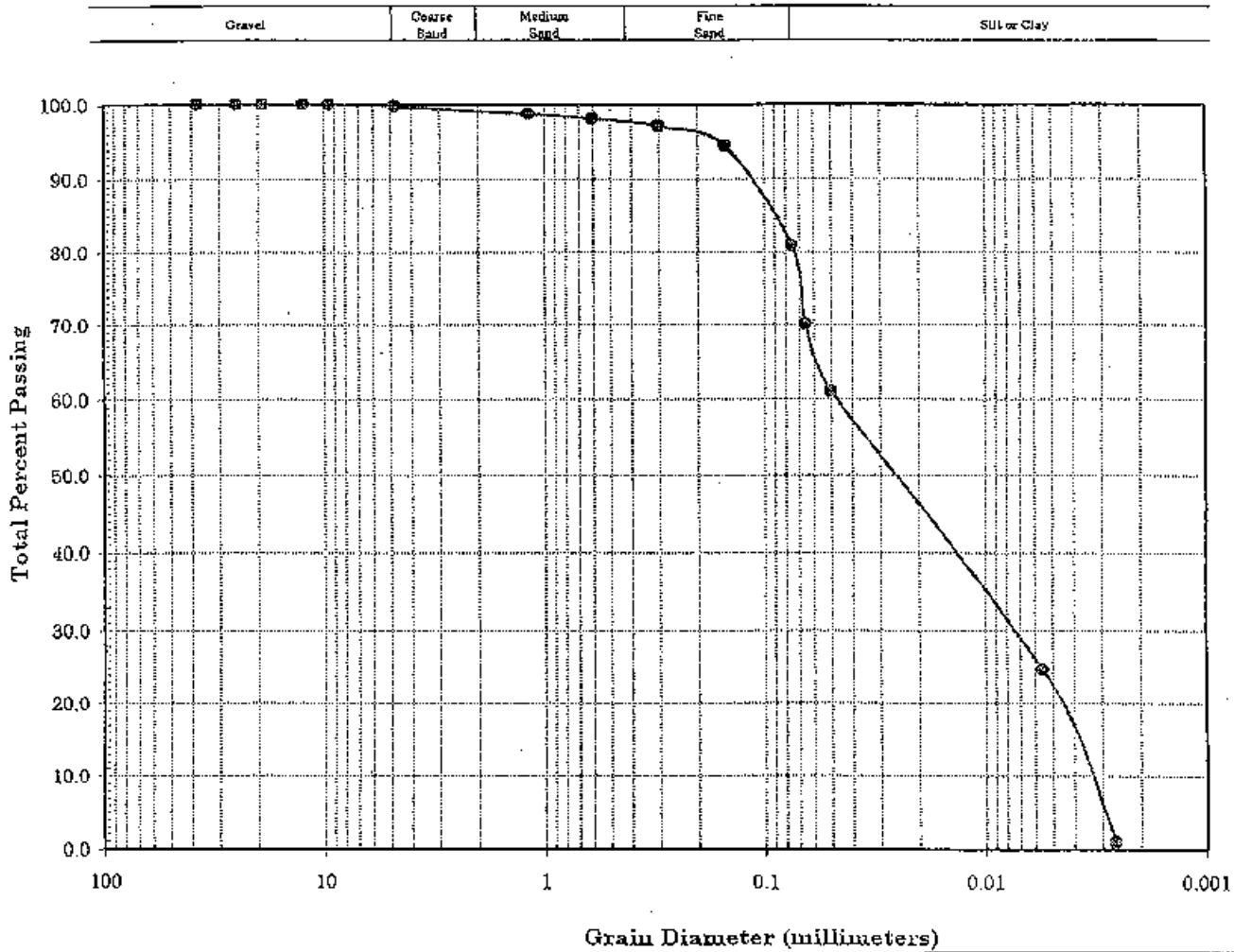
Material: Silty fine Sand

Maximum Density (pcf): 115.2

Optimum Moisture: 7.7%

* Test Method: ASTM D-1557

MAXIMUM DENSITY - OPTIMUM MOISTURE	
Panay Way, Parcel 21 Marina Del Ray, California	
Earth Systems Southern California	
8/21/2006	LA-01052-01



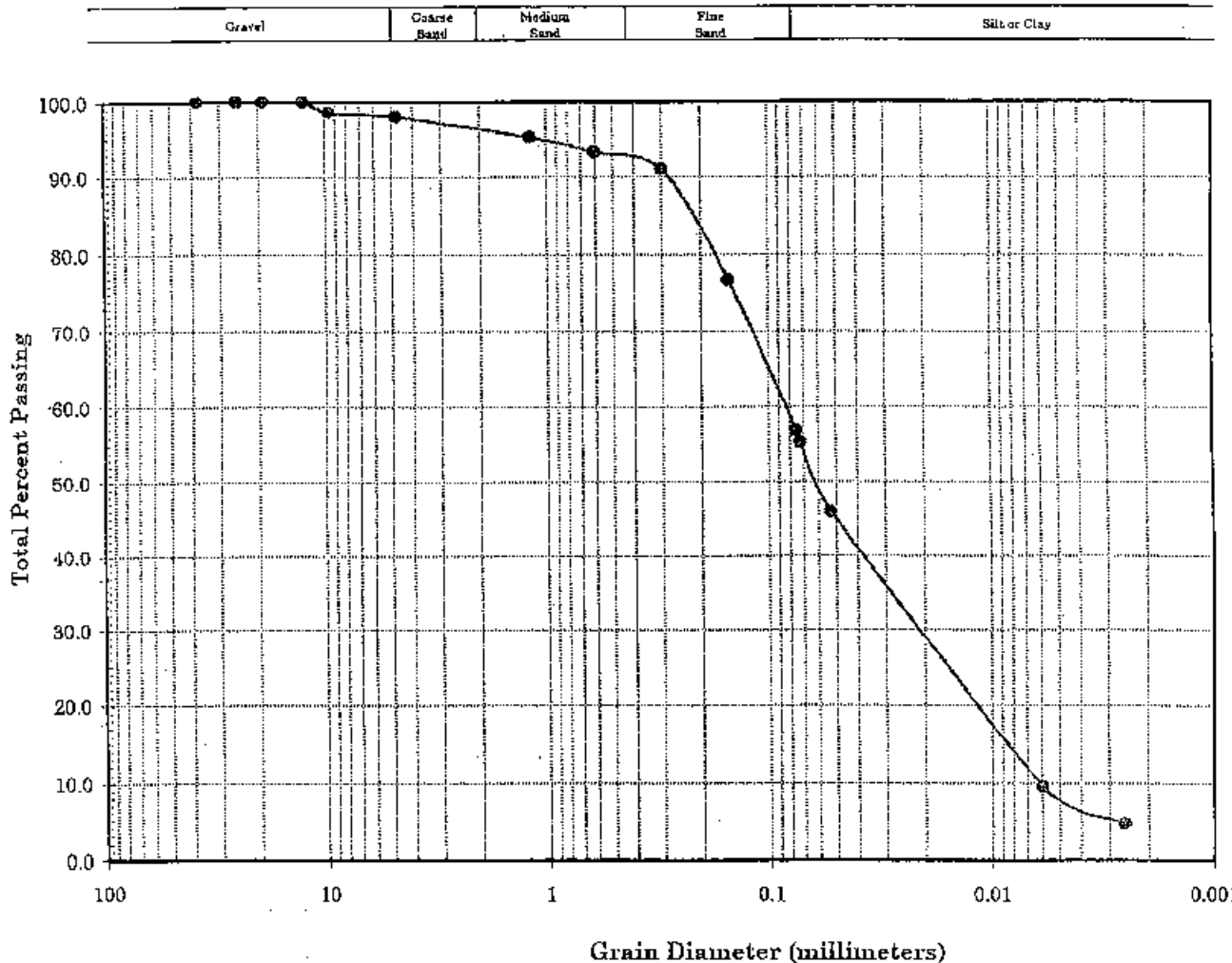
Sample Location: B1 at 15 feet
Soil Type: Silt with fine sand and clay (ML)
Percent Fines: 81%
Percent Clay: 20%

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2006 | LA-01052-01



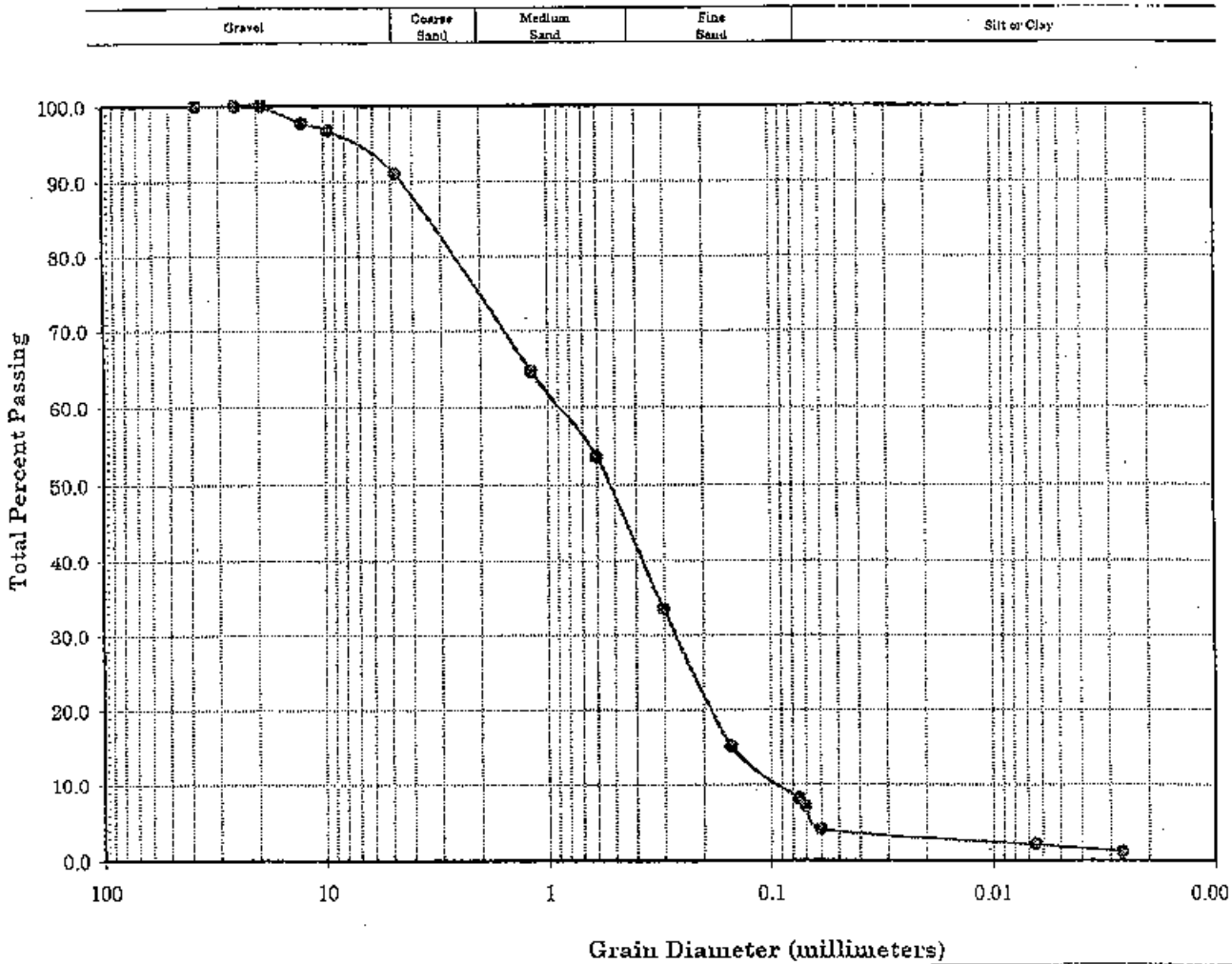
Sample Location: B1 at 22.5 feet
Soil Type: fine Sandy Silt (ML)
Percent Fines: 57%
Percent Clay: 8%

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2006	LA-01052-01



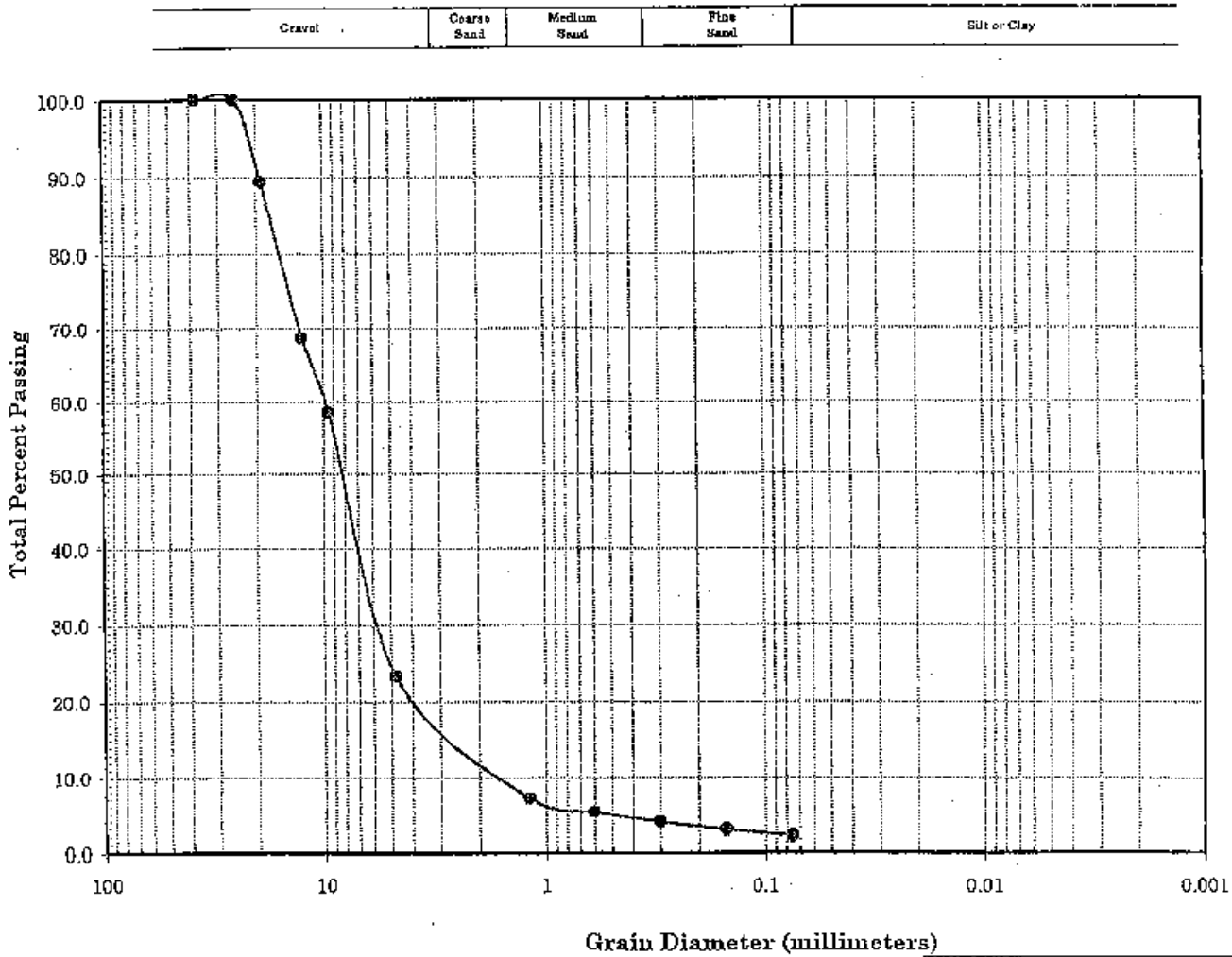
Sample Location: B1 at 27.5 feet
Soil Type: Sand with silt and gravel (SW)
Percent Fines: 8%
Percent Clay: 2%

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2006	LA-01052-01



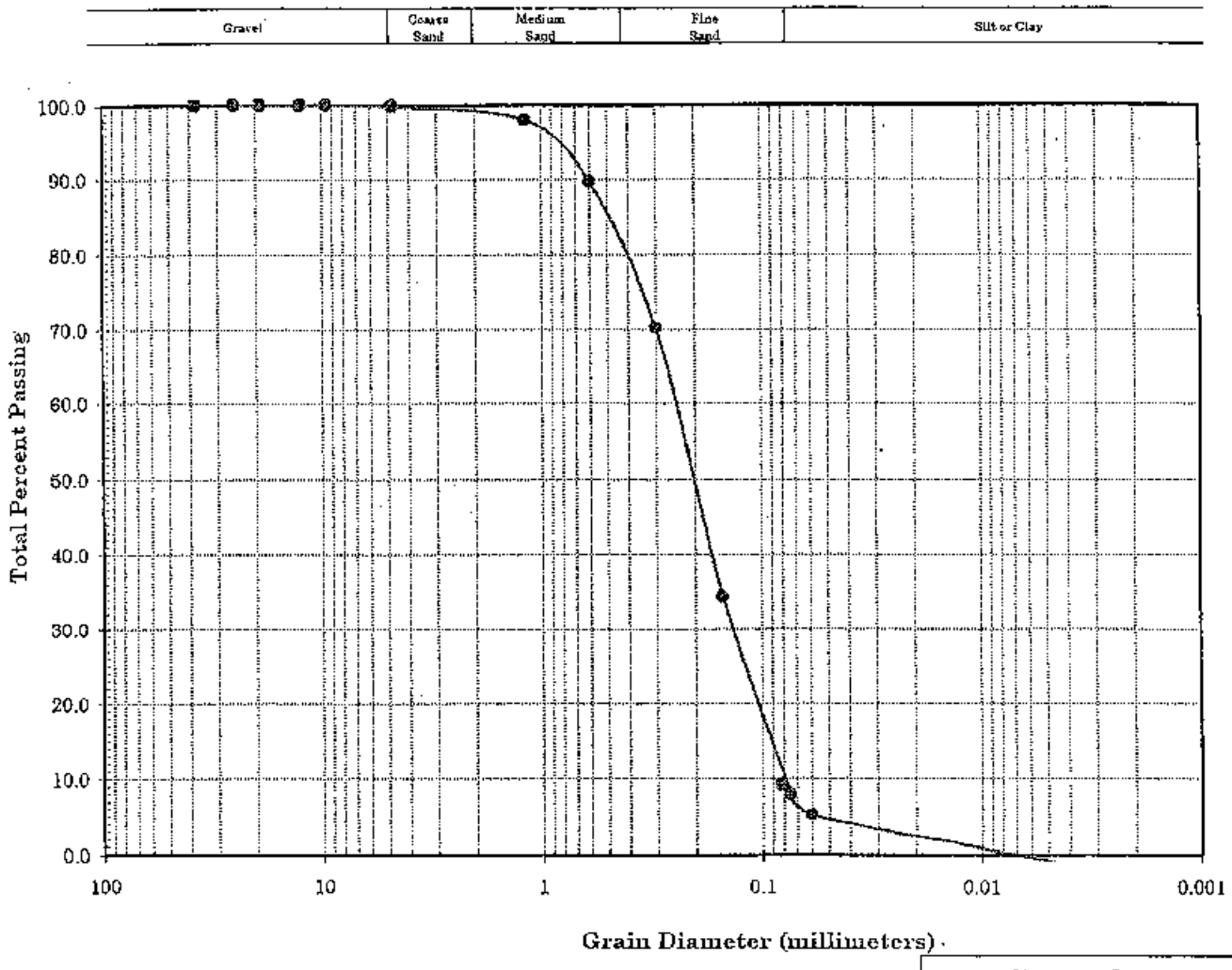
Sample Location: B1 at 35 feet
Soil Type: Gravel with sand (GW)
Percent Fines: 2%
Percent Clay: n/a

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2006	LA-01052-01



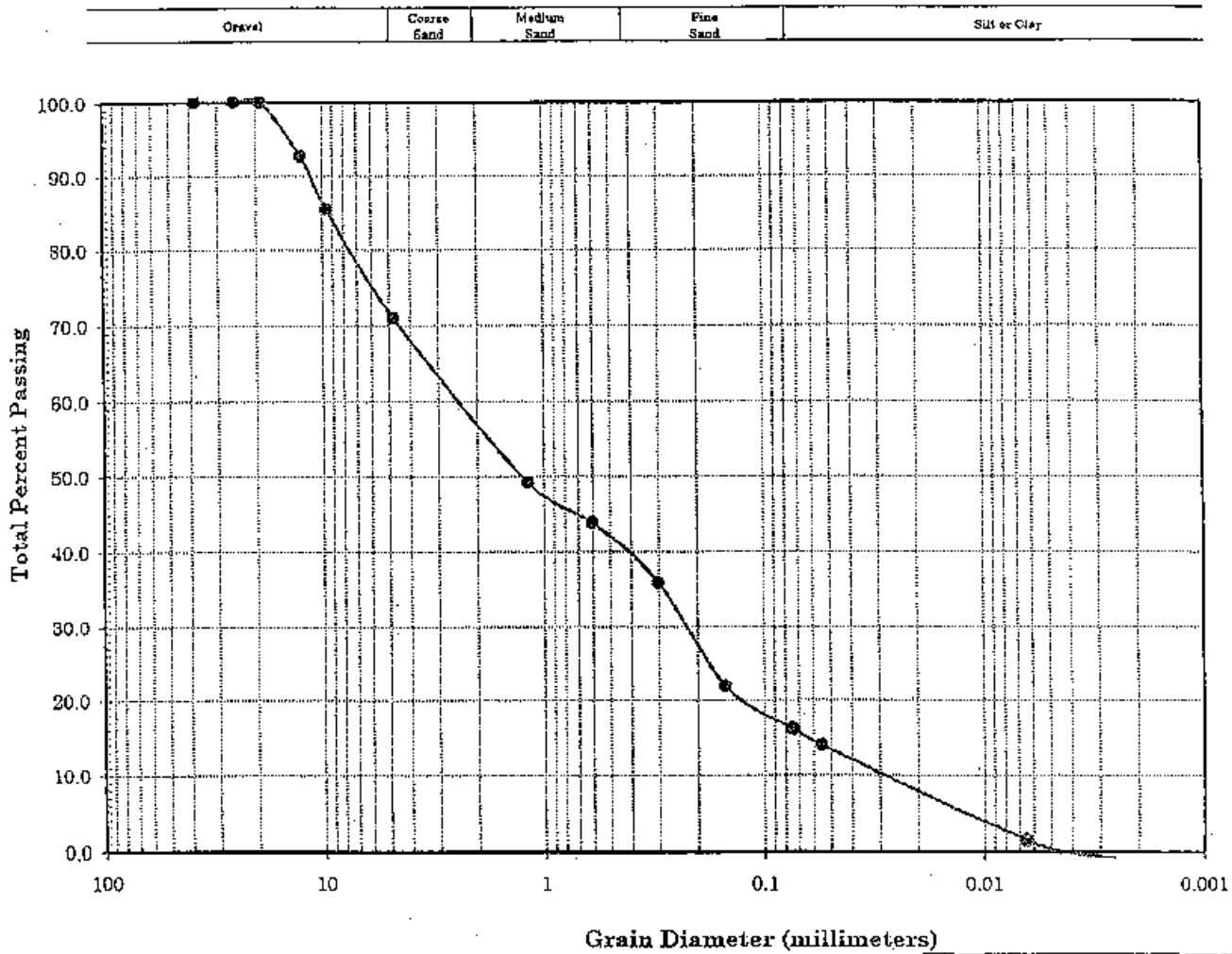
Sample Location: B1 at 45 feet
Soil Type: Sand (SW)
Percent Fines: 8%
Percent Clay: 0%

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems Southern California

8/21/2006	LA-01052-01



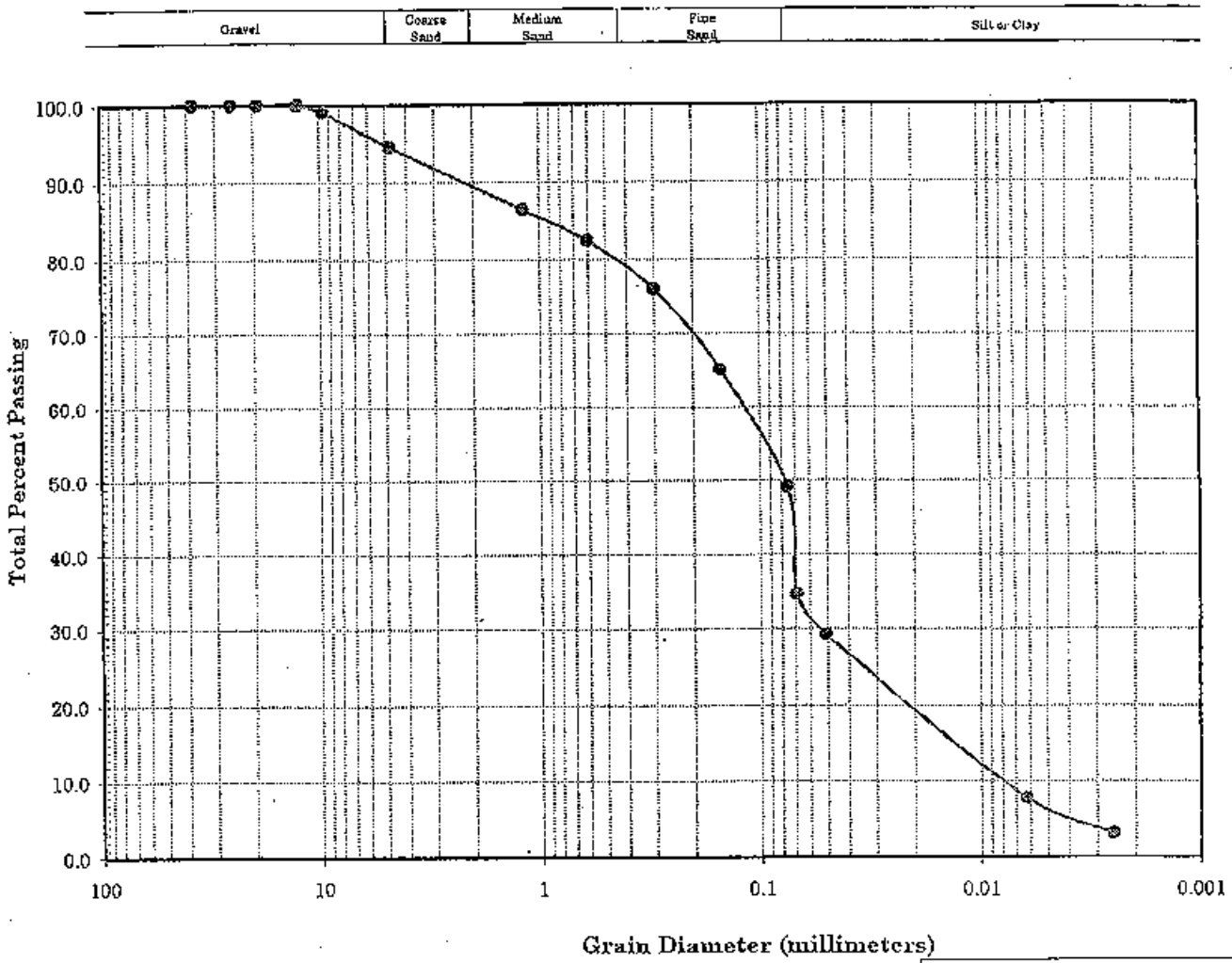
Sample Location: B2 at 17.5 feet
Soil Type: Gravelly Sand with silt (SM)
Percent Fines: 16%
Percent Clay: 1%

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems Southern California

8/21/2006	LA-01052-01



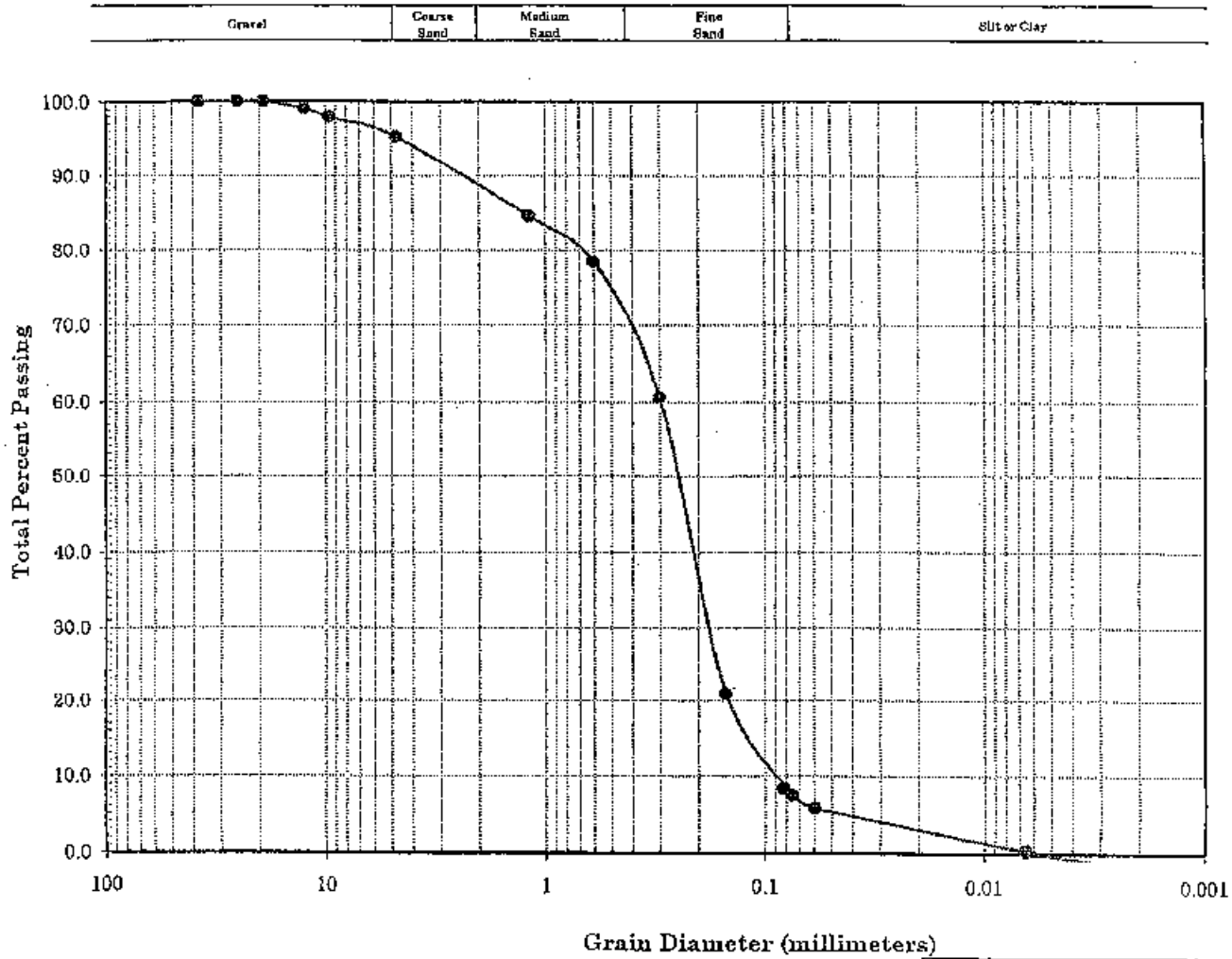
Sample Location: B2 at 22.5 feet
Soil Type: Silty Sand (SM)
Percent Fines: 49%
Percent Clay: 6%

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2006	LA-01052-01



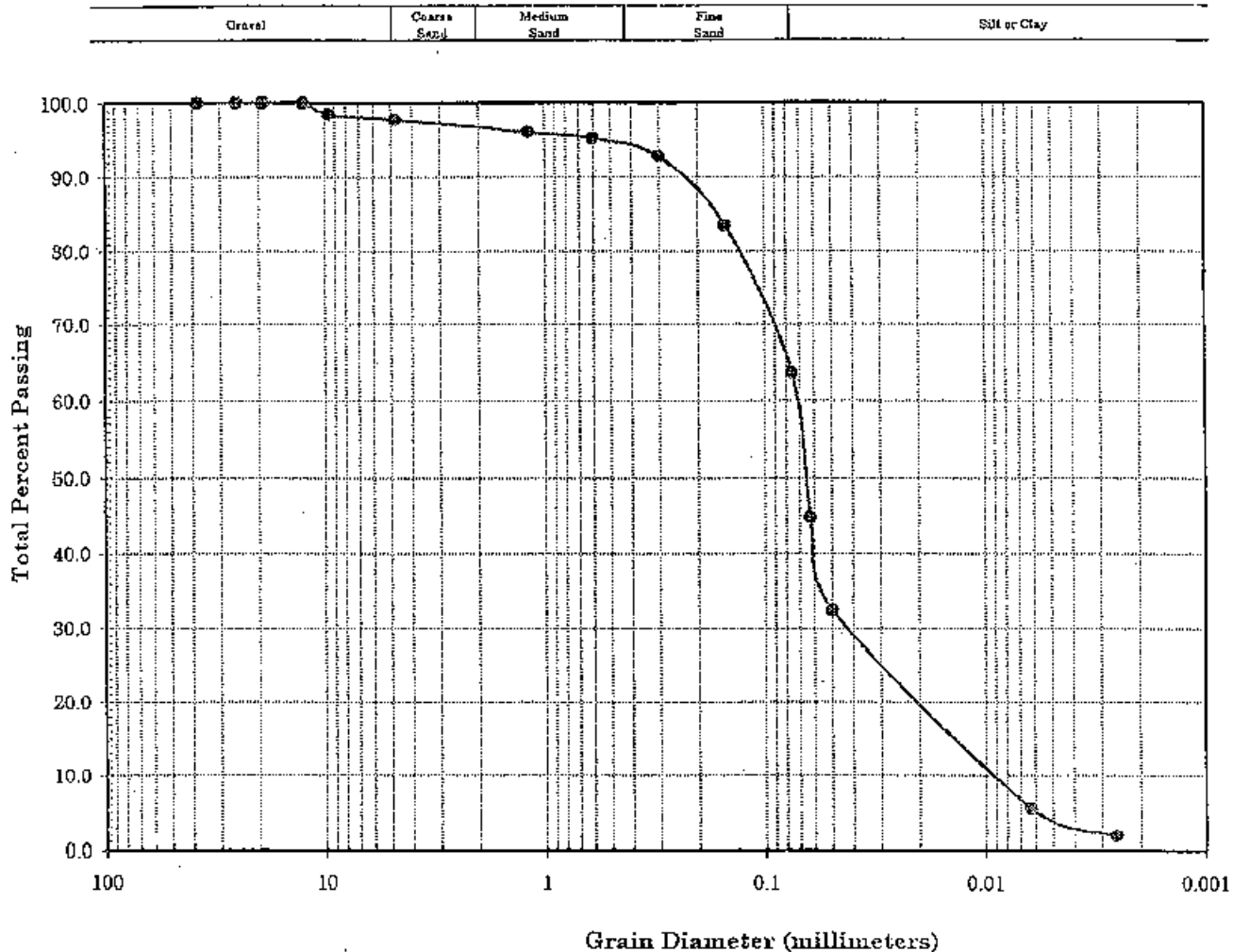
Sample Location: B2 at 27.5 feet
Soil Type: Sand with silt and gravel (SP)
Percent Fines: 7%
Percent Clay: 0%

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2006	LA-01052-01



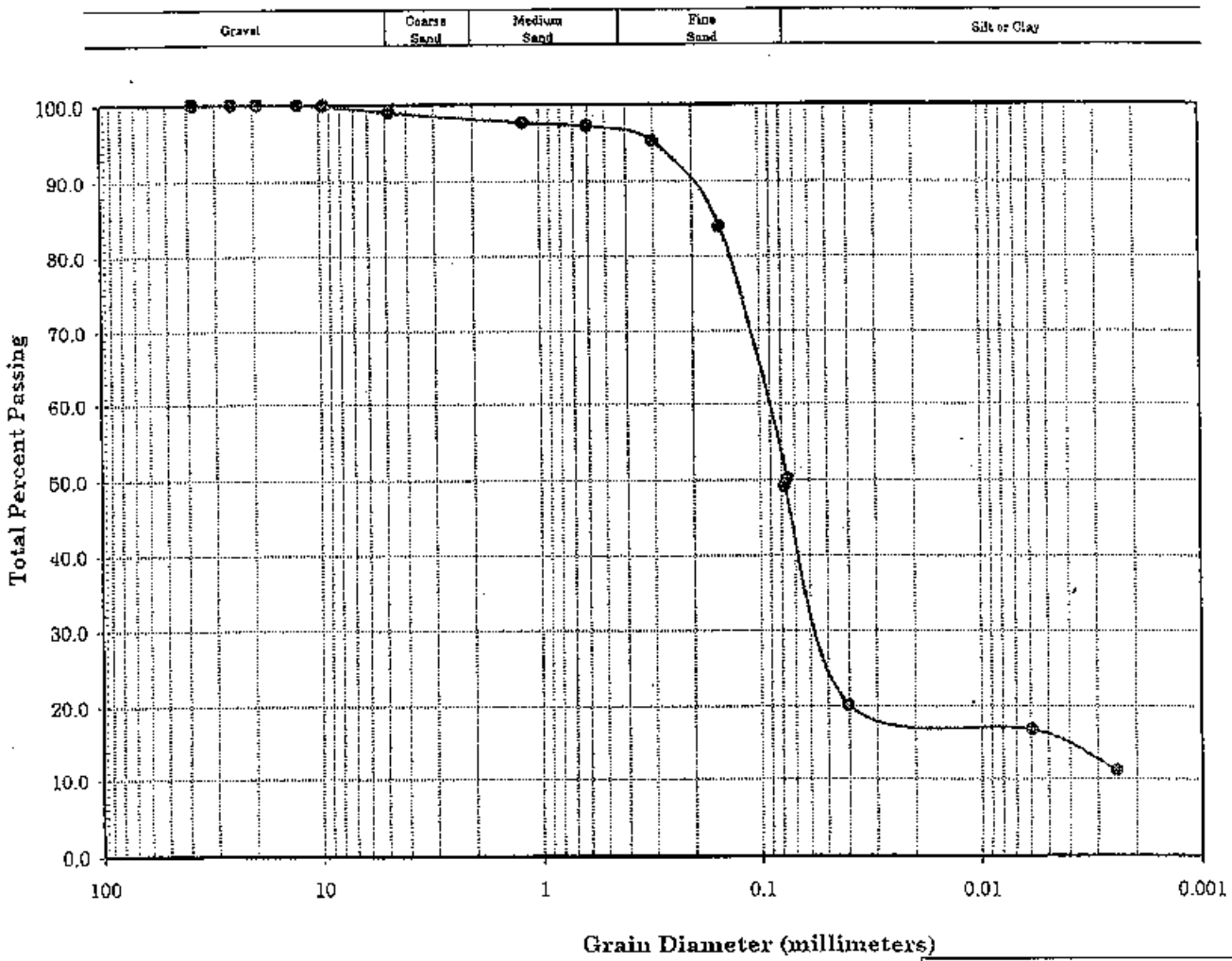
Sample Location: B4 at 17.5 feet
Soil Type: Sandy Silt (ML)
Percent Fines: 63%
Percent Clay: 4%

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2006	LA-01052-01



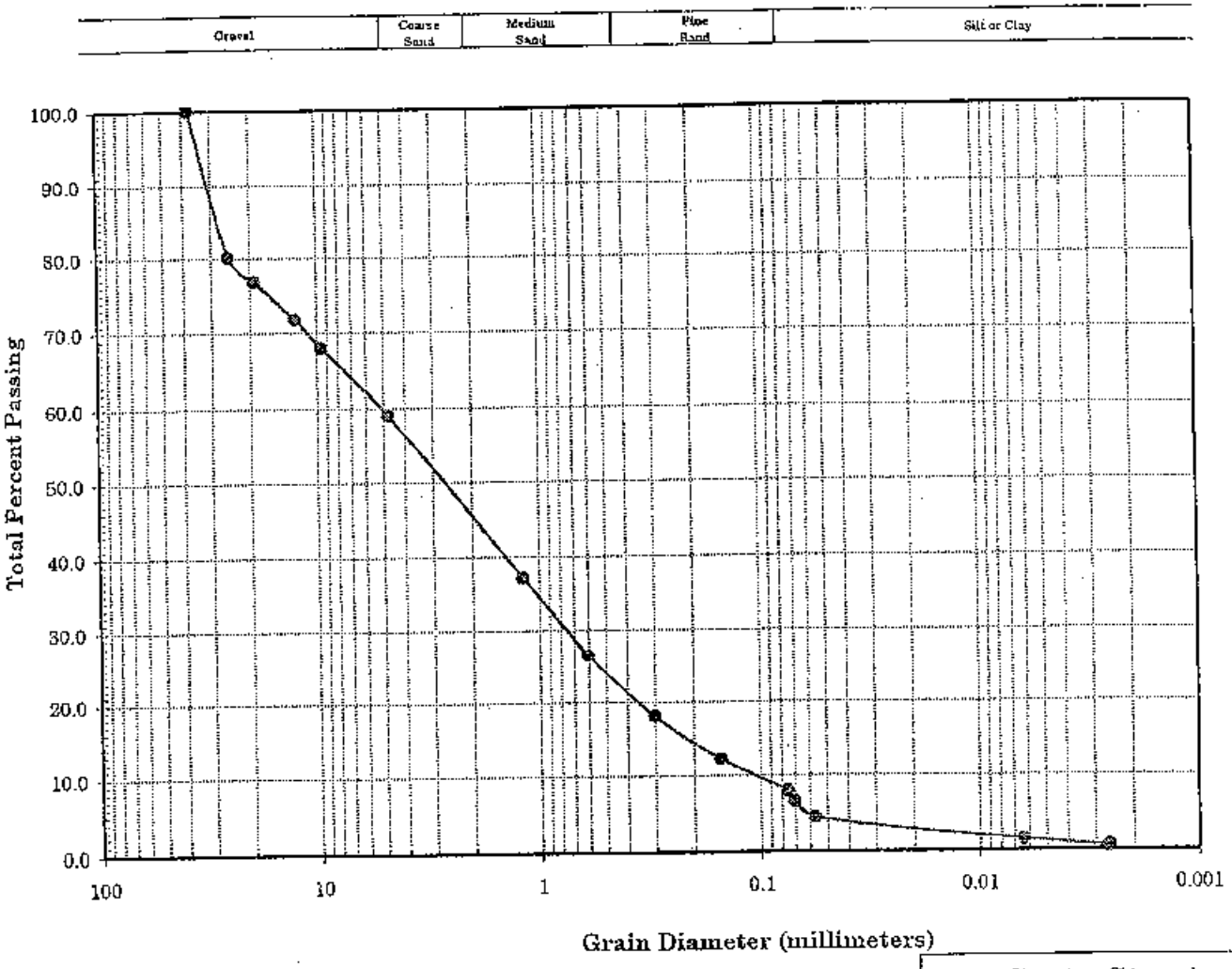
Sample Location: B4 at 27.5 feet
Soil Type: Sandy Silt with clay (ML)
Percent Fines: 50%
Percent Clay: 15%

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2006	LA-01052-01



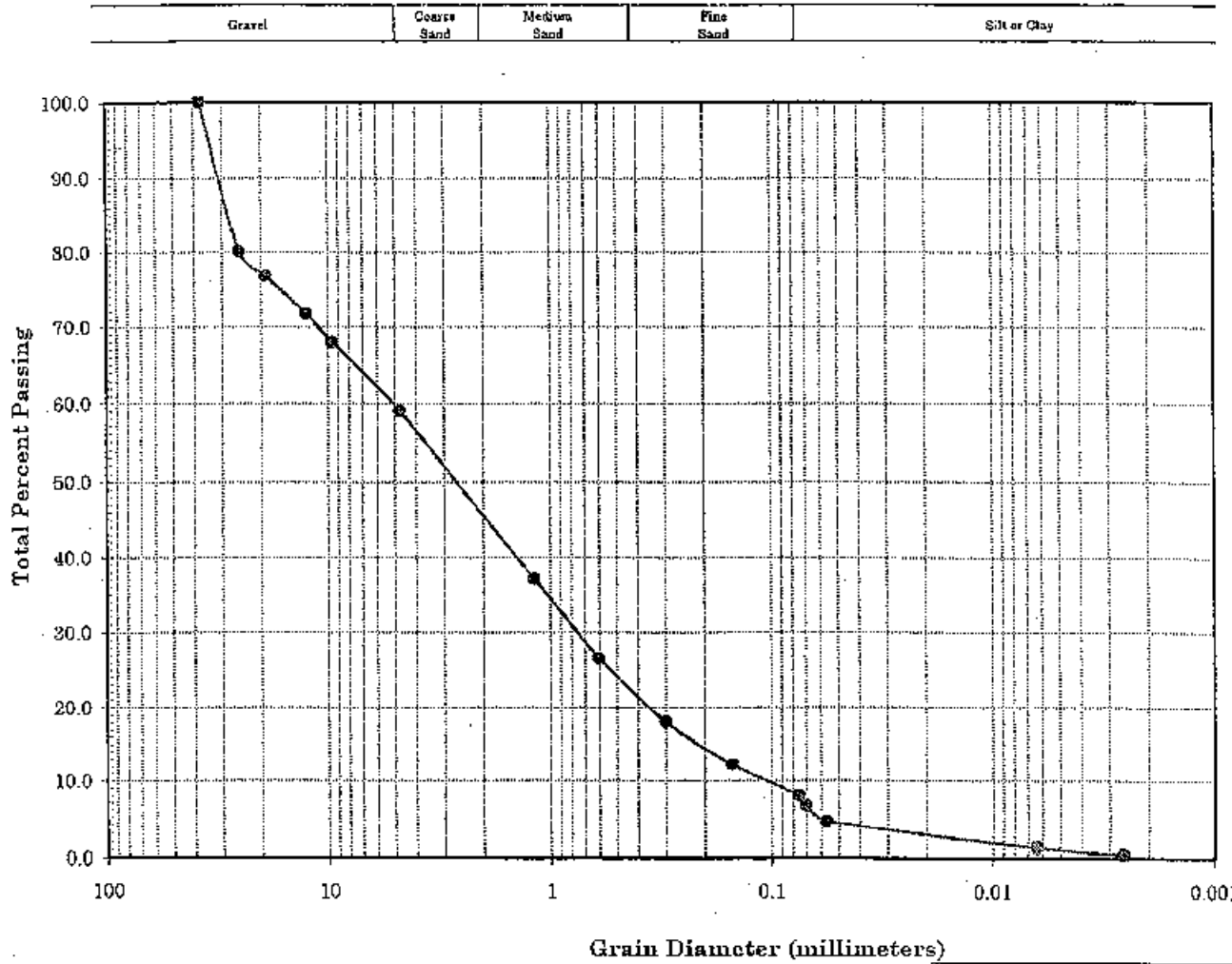
Sample Location: B4 at 35 feet
Soil Type: Gravelly Sand (SW)
Percent Fines: 8%
Percent Clay: 1%

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2006	LA-01052-01



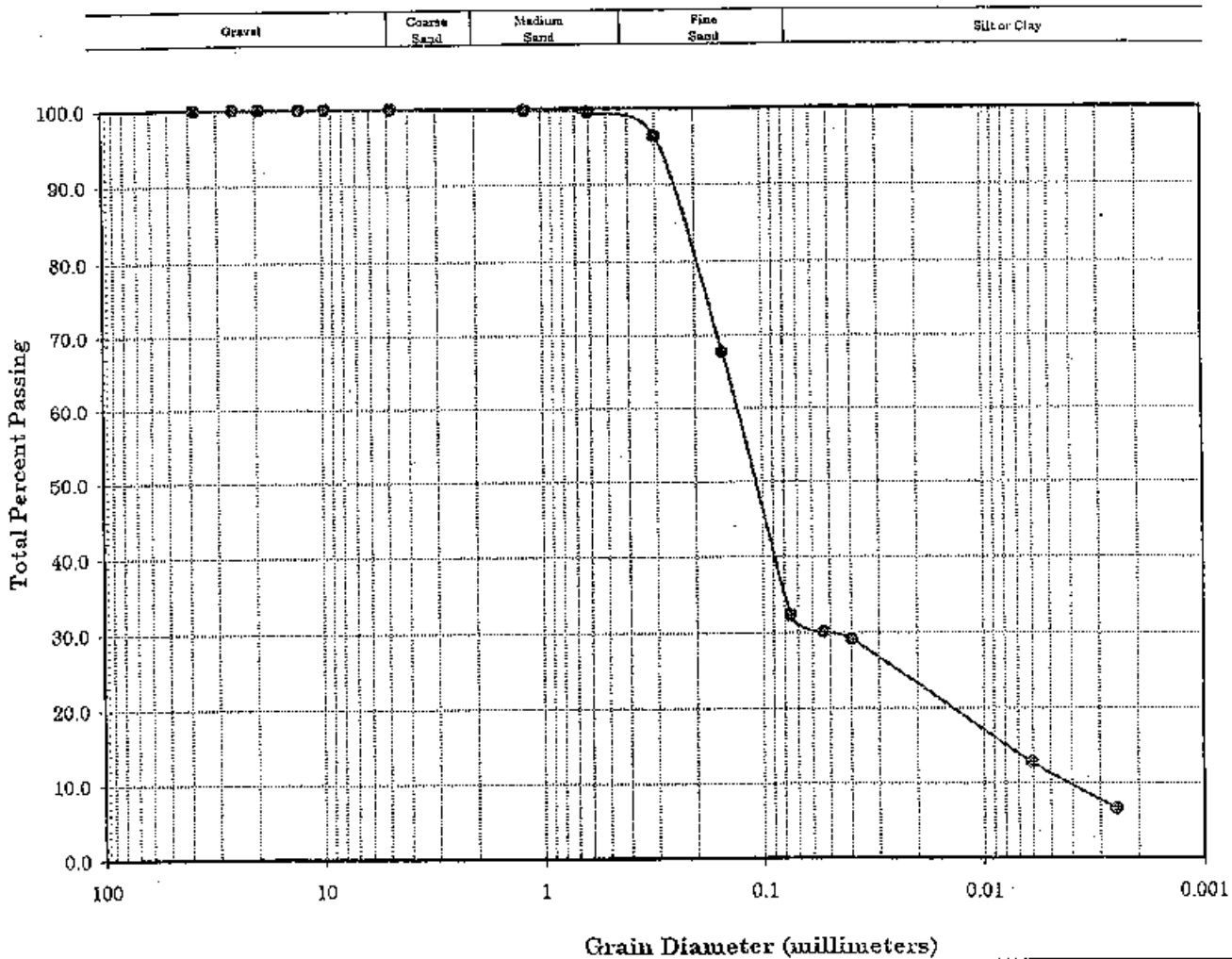
Sample Location: B4 at 35 feet
Soil Type: Gravelly Sand (SW)
Percent Fines: 8%
Percent Clay: 1%

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

6/21/2006 | LA-01052-01



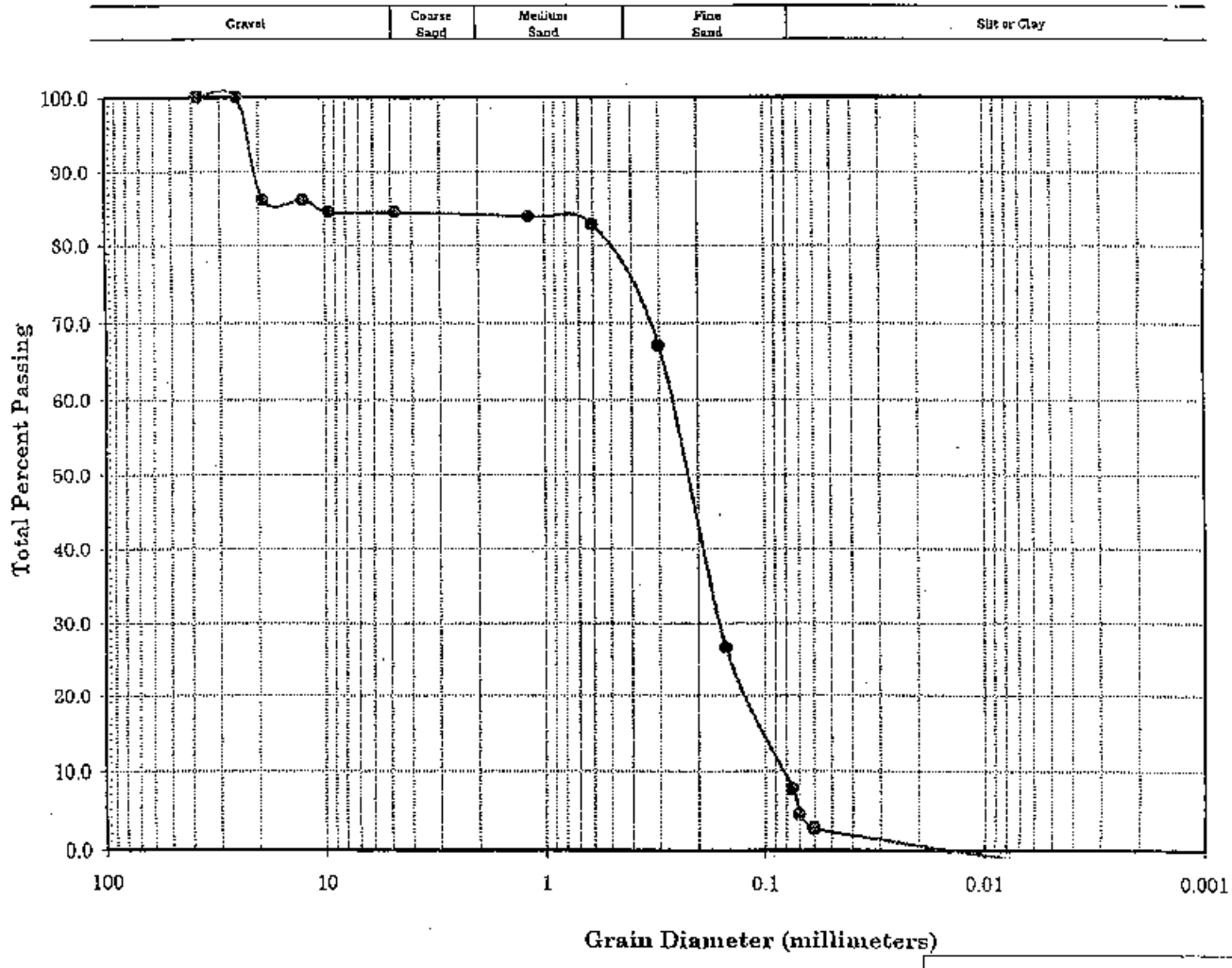
Sample Location: B4 at 50 feet
Soil Type: Silty Sand with clay (SM)
Percent Fines: 32%
Percent Clay: 11%

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2006	LA-01052-01



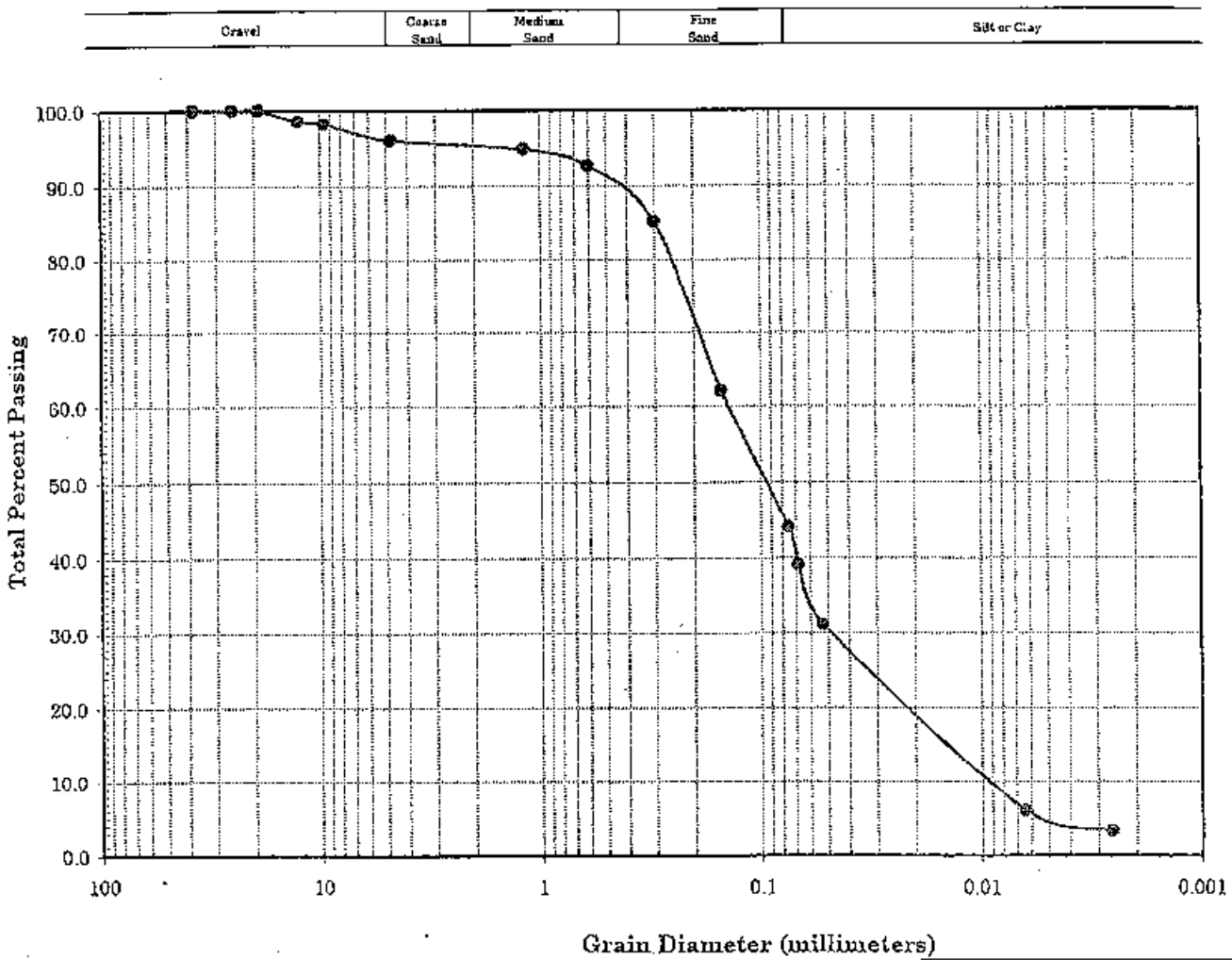
Sample Location: B4 at 70 feet
Soil Type: Gravelley Sand with silt (SP)
Percent Fines: 8%
Percent Clay: 0%

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2006	LA-01052-01



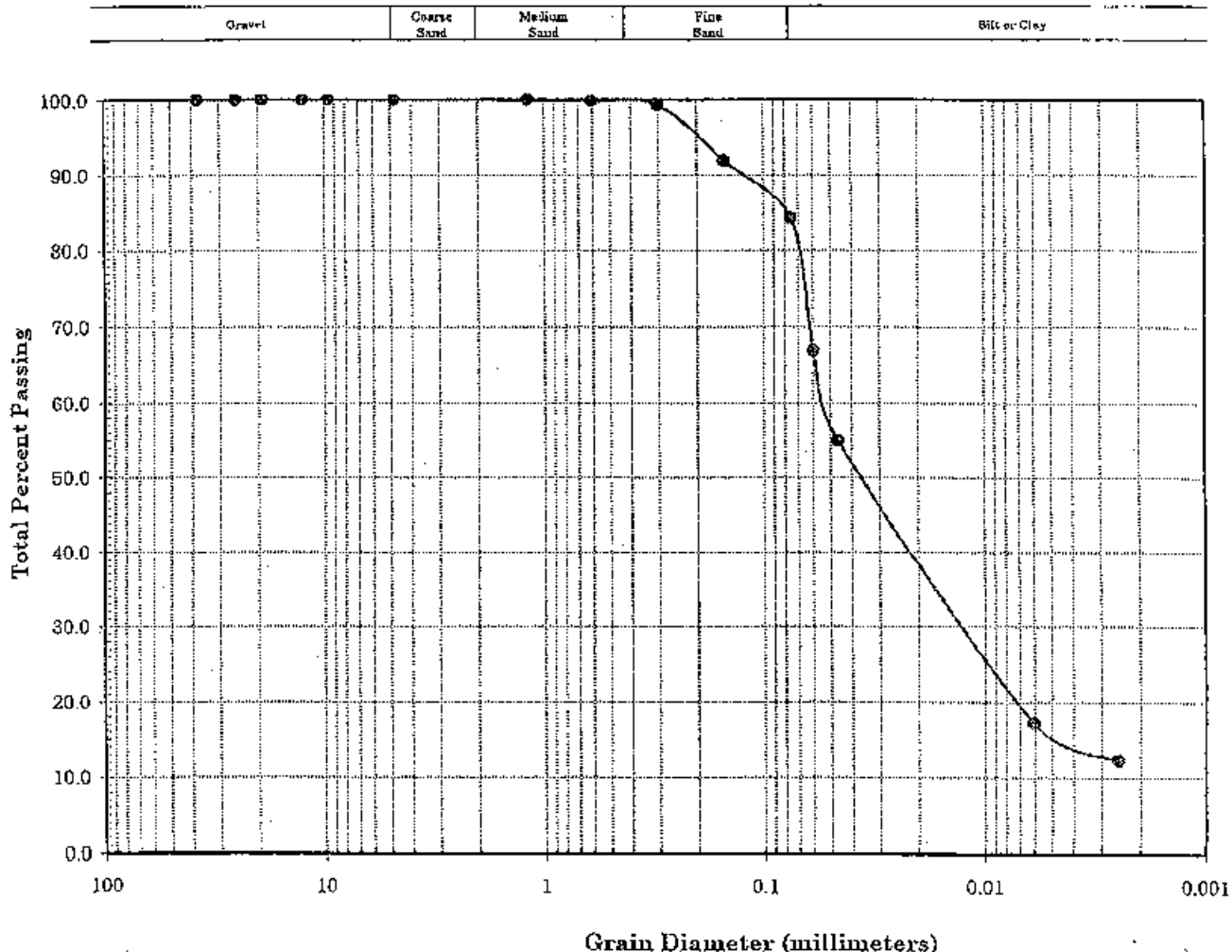
Sample Location: B5 at 17.5
Soil Type: Silty Sand (SM)
Percent Fines: 44%
Percent Clay: 5%

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2006	LA-01052-01



Sample Location: B5 at 25 feet
Soil Type: Silt with sand and clay (ML)
Percent Fines: 84%
Percent Clay: 16%

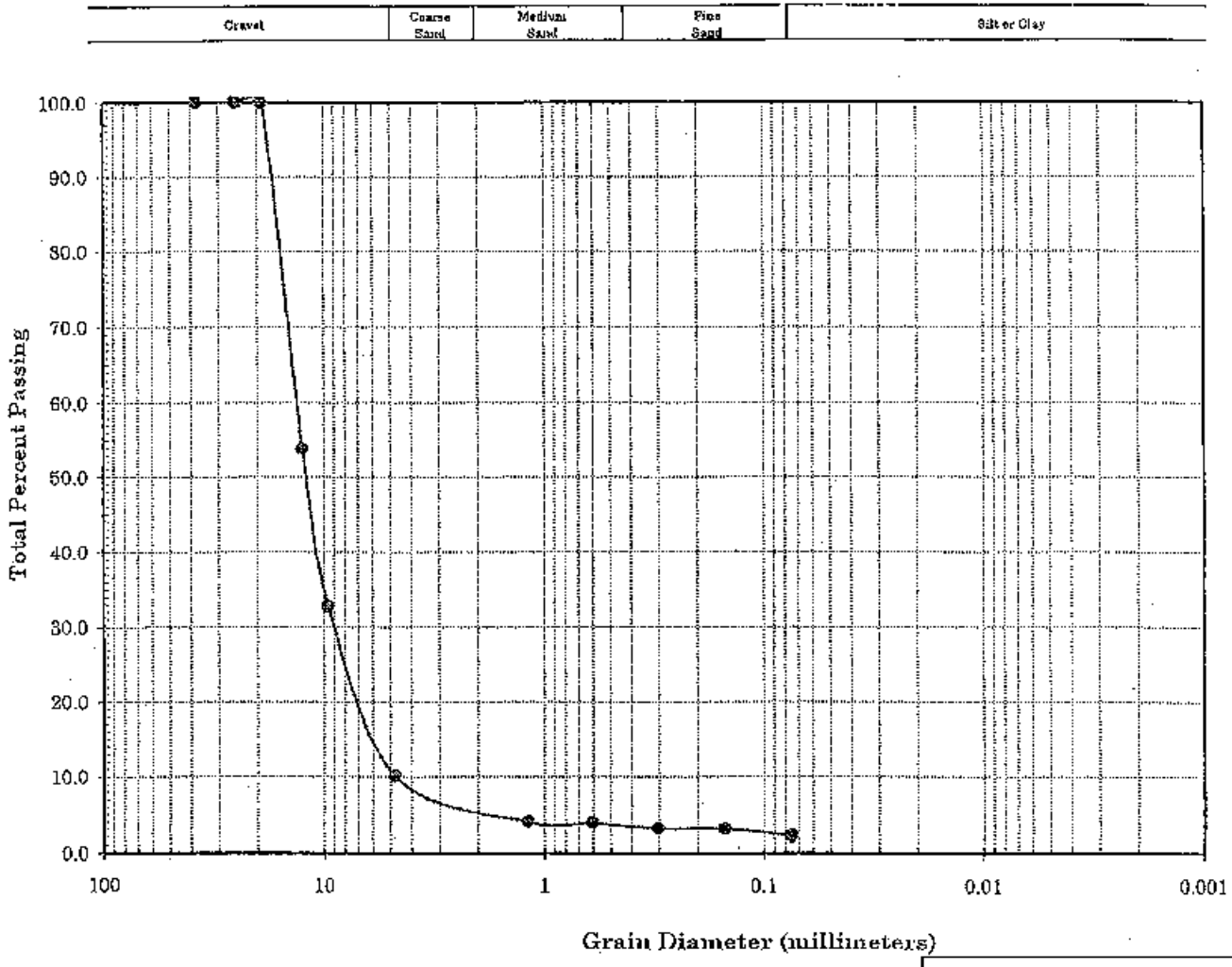
Grain Size Analysis

Panay Way, Parcel 21

Marina Del Ray, California

Earth Systems Southern California

8/21/2006	LA-01052-01



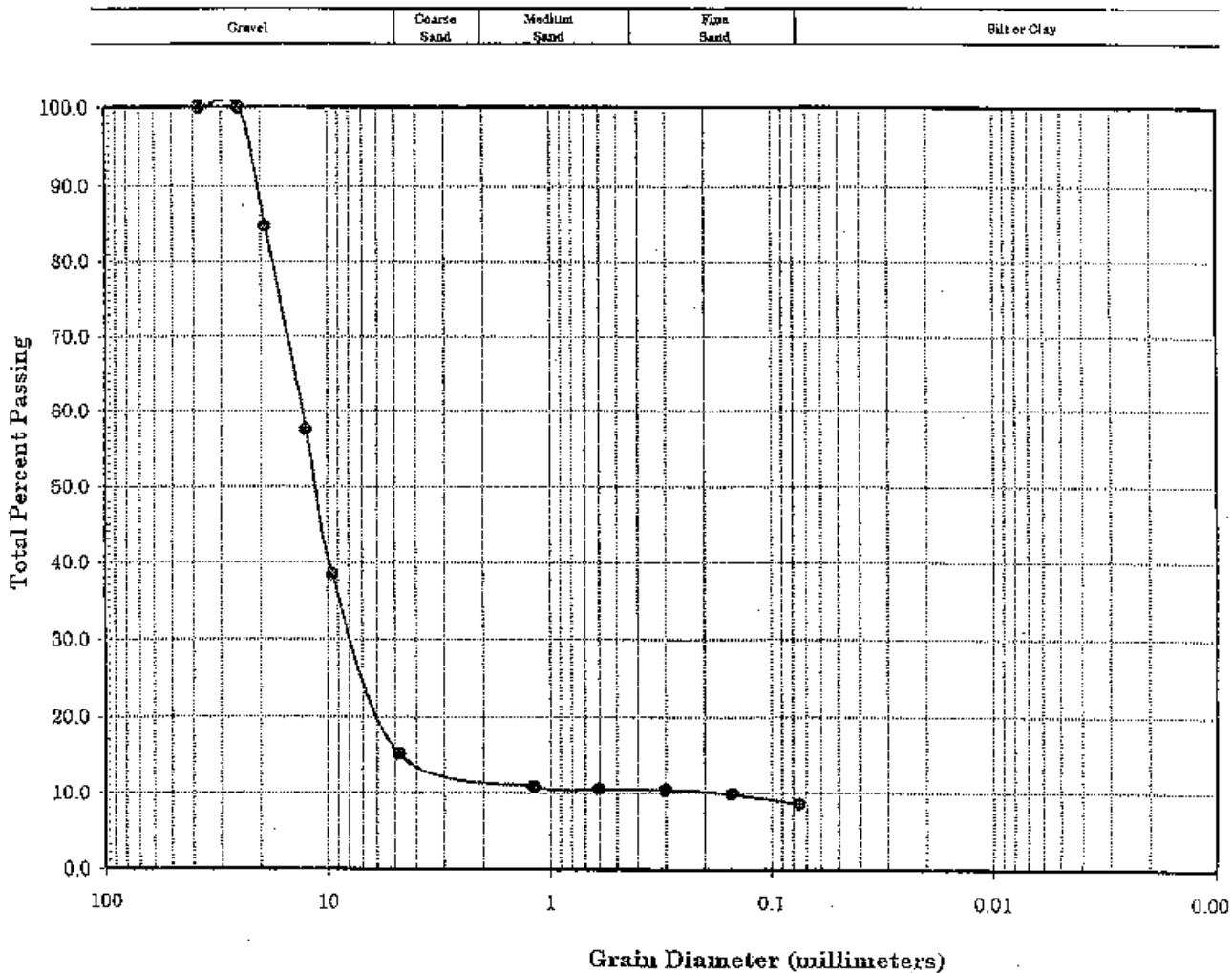
Sample Location: B5 at 50 feet
Soil Type: Gravel with sand (GP)
Percent Fines: 2%
Percent Clay: 0%

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2006	LA-01052-01



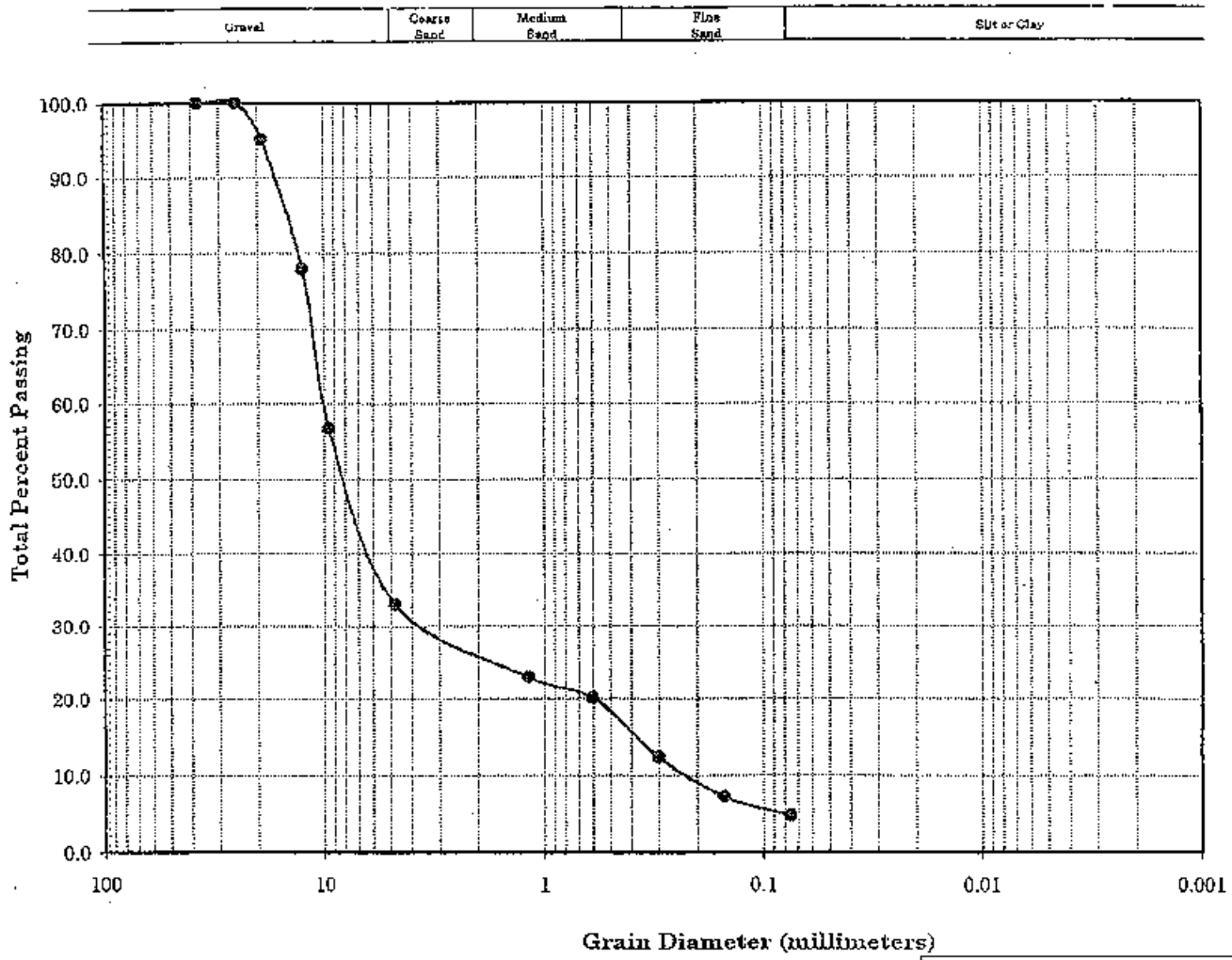
Sample Location: B5 at 55 feet
Soil Type: Gravel with sand (GP)
Percent Fines: 8%
Percent Clay: n/a

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2006	LA-01052-01



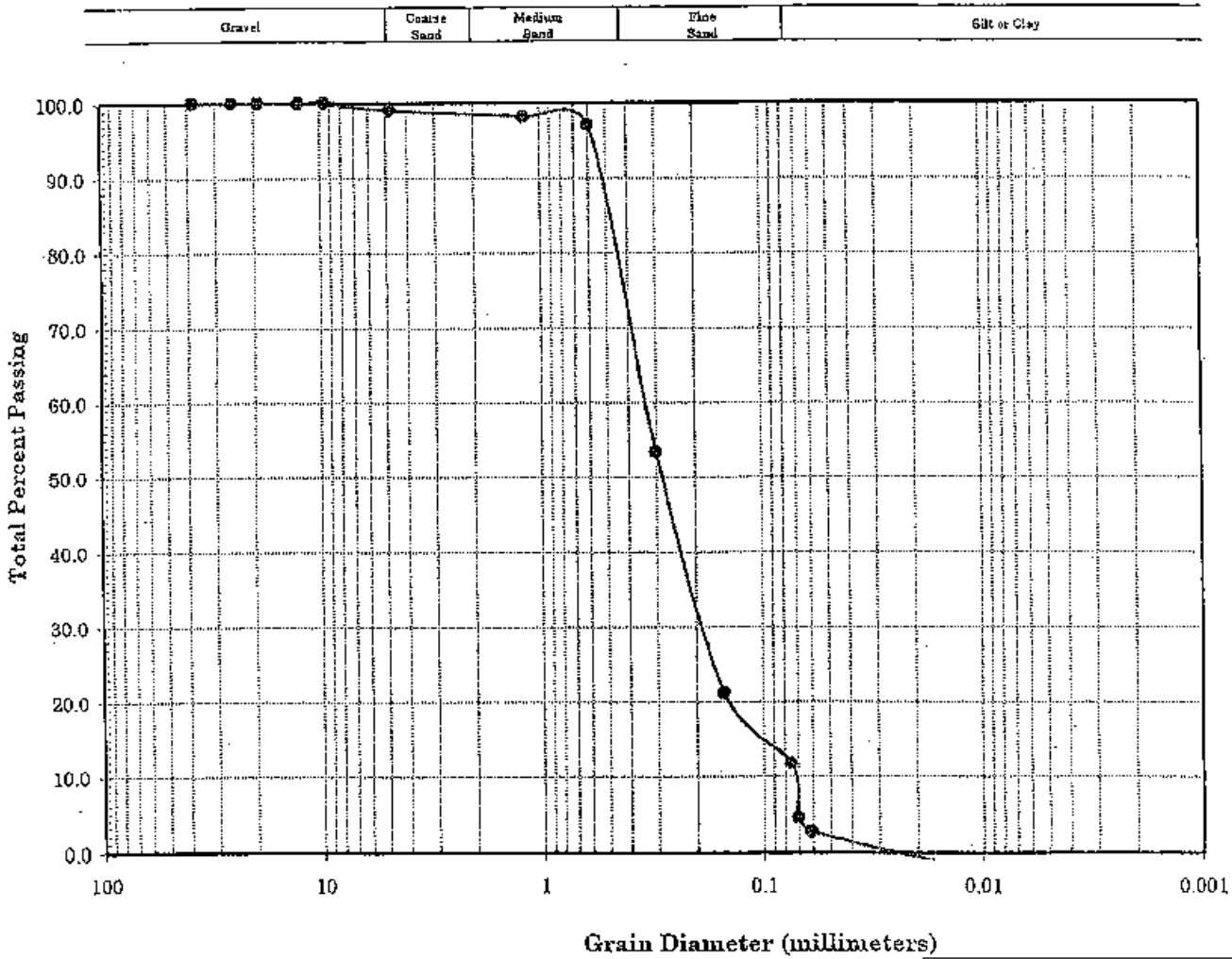
Sample Location: B5 at 65 feet
Soil Type: Sandy Gravel (GP)
Percent Fines: 5%
Percent Clay: n/a

Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2006	LA-01052-01



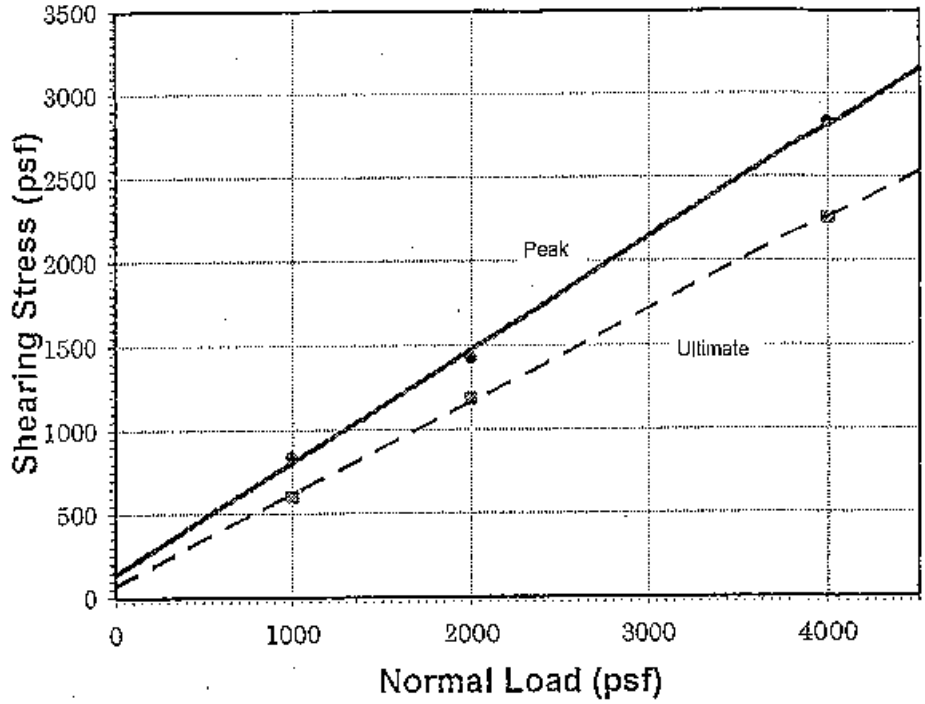
Sample Location: B5 at 75 feet
Soil Type: Silty Sand (SP-SM)
Percent Fines: 12%
Percent Clay: 0%

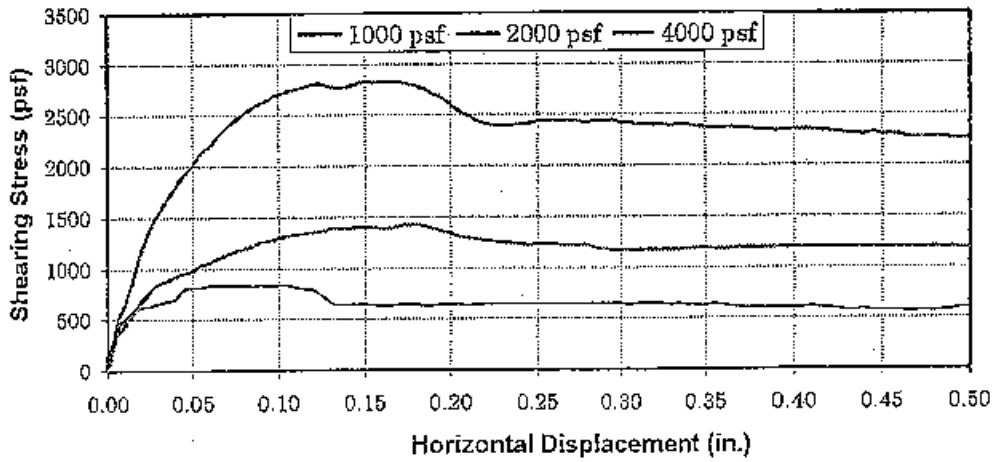
Grain Size Analysis

Panay Way, Parcel 21
Marina Del Ray, California

Earth Systems
Southern California

8/21/2008	LA-01052-01





DIRECT SHEAR DATA*

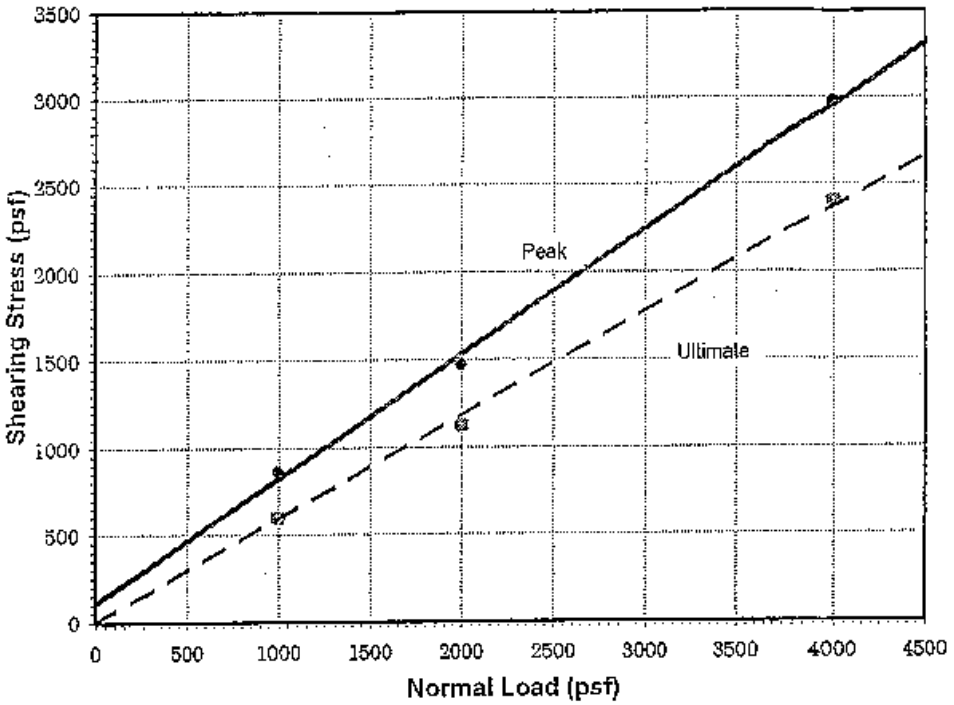
Sample Location: B4 at 55 feet
Material: Silty Sand (SM)
Dry Density (pcf): 94.3
Intial % Moisture: 25.4
Average Degree of Saturation: 94%
Shear Rate (in/min): 0.015

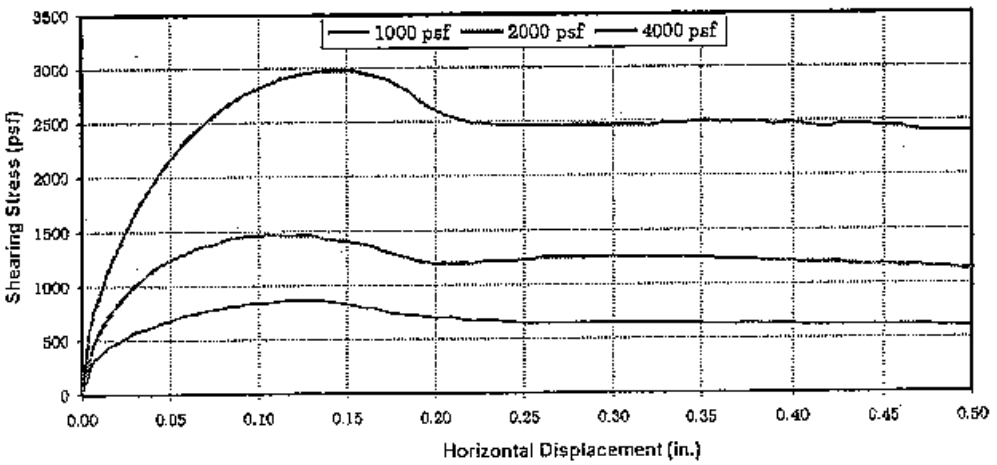
	Peak	Ultimate
ϕ Angle of Friction (degrees):	34	29
c Cohesive Strength (psf):	130	60

Test Type: Peak and Ultimate (1 Pass)

* Test Method: ASTM D-3080

DIRECT SHEAR TEST	
Panay Way Parcel 21	
Marina del Rey, California	
Earth Systems Southern California	
8/21/2006	LA-01052-01





DIRECT SHEAR DATA*

Sample Location: B4 at 65 feet
Material: Silty Sand (SM)
Dry Density (pcf): 91.8
Intial % Moisture: 31.3
Average Degree of Saturation: 100%
Shear Rate (in/min): 0.015

	Peak	Ultimate
ϕ Angle of Friction (degrees):	35	31
c Cohesive Strength (psf):	110	0

Test Type: Peak and Ultimate (1 Pass)

* Test Method: ASTM D-3080

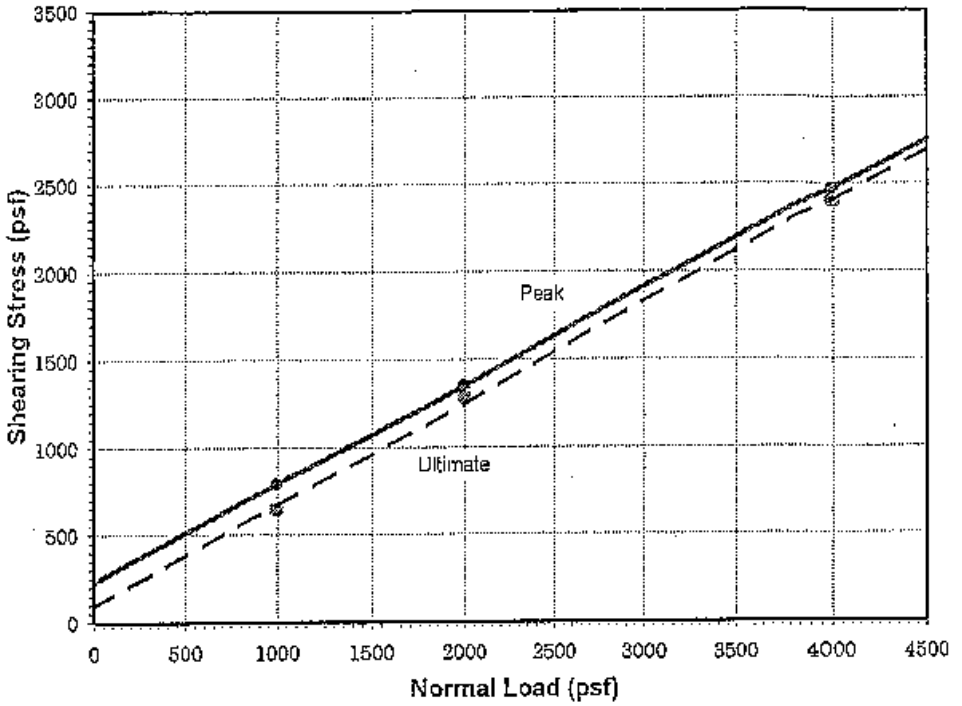
DIRECT SHEAR TEST

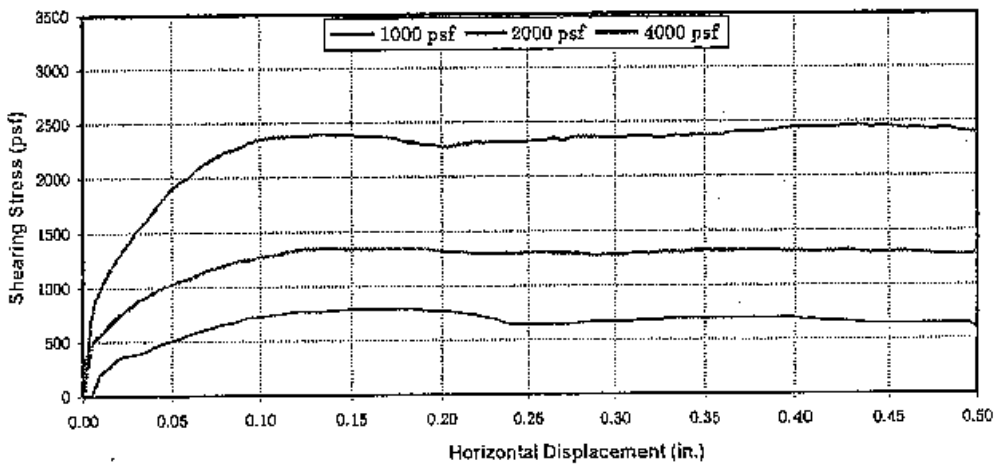
Panay Way Parcel 21

Marina del Rey, California

Earth Systems
Southern California

8/21/2006 | LA-01052-01





DIRECT SHEAR DATA*

Sample Location: B5 at 10 feet
Material: Sandy Silt (ML)
Dry Density (pcf): 87.7
Intial % Moisture: 29.3
Average Degree of Saturation: 100%
Shear Rate (in/min): 0.015

	Peak	Ultimate
ϕ Angle of Friction (degrees):	29	30
c Cohesive Strength (psf):	230	80

Test Type: Peak and Ultimate (1 Pass)

* Test Method: ASTM D-3080

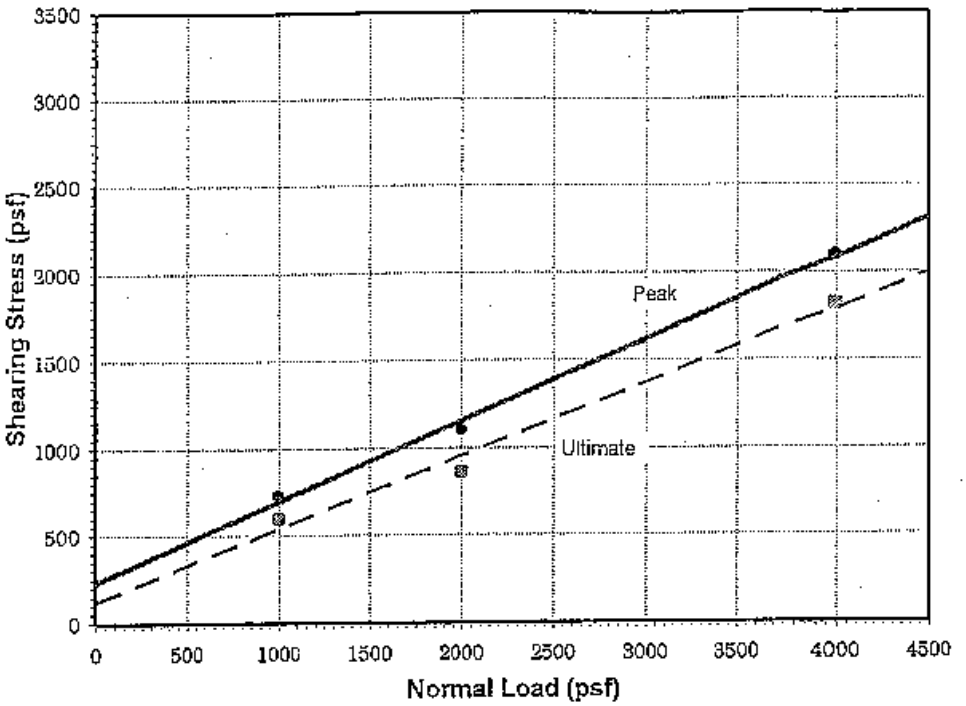
DIRECT SHEAR TEST

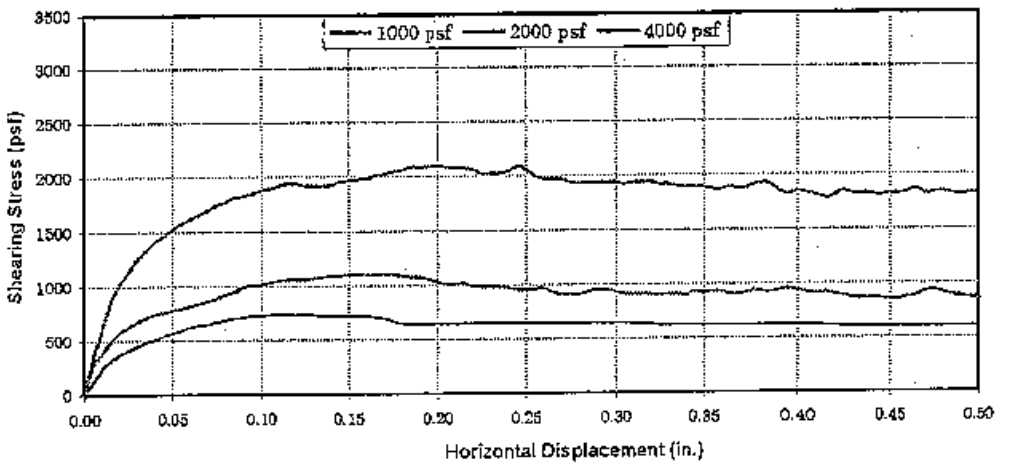
Panay Way Parcel 21

Marina del Rey, California

Earth Systems
Southern California

8/21/2006 | LA-01052-01





DIRECT SHEAR DATA*

Sample Location: B5 at 30 feet
Material: Clayey Silt (ML)
Dry Density (pcf): 90.1
Intial % Moisture: 31.6
Average Degree of Saturation: 100%
Shear Rate (in/min): 0.015

	Peak	Ultimate
ϕ Angle of Friction (degrees):	25	23
c Cohesive Strength (psf):	230	120

Test Type: Peak and Ultimate (1 Pass)

* Test Method: ASTM D-3080

DIRECT SHEAR TEST

Panay Way Parcel 21

Marina del Rey, California

Earth Systems
Southern California

8/21/2006 | LA-01052-01

Table 1 - Laboratory Tests on Soil Samples

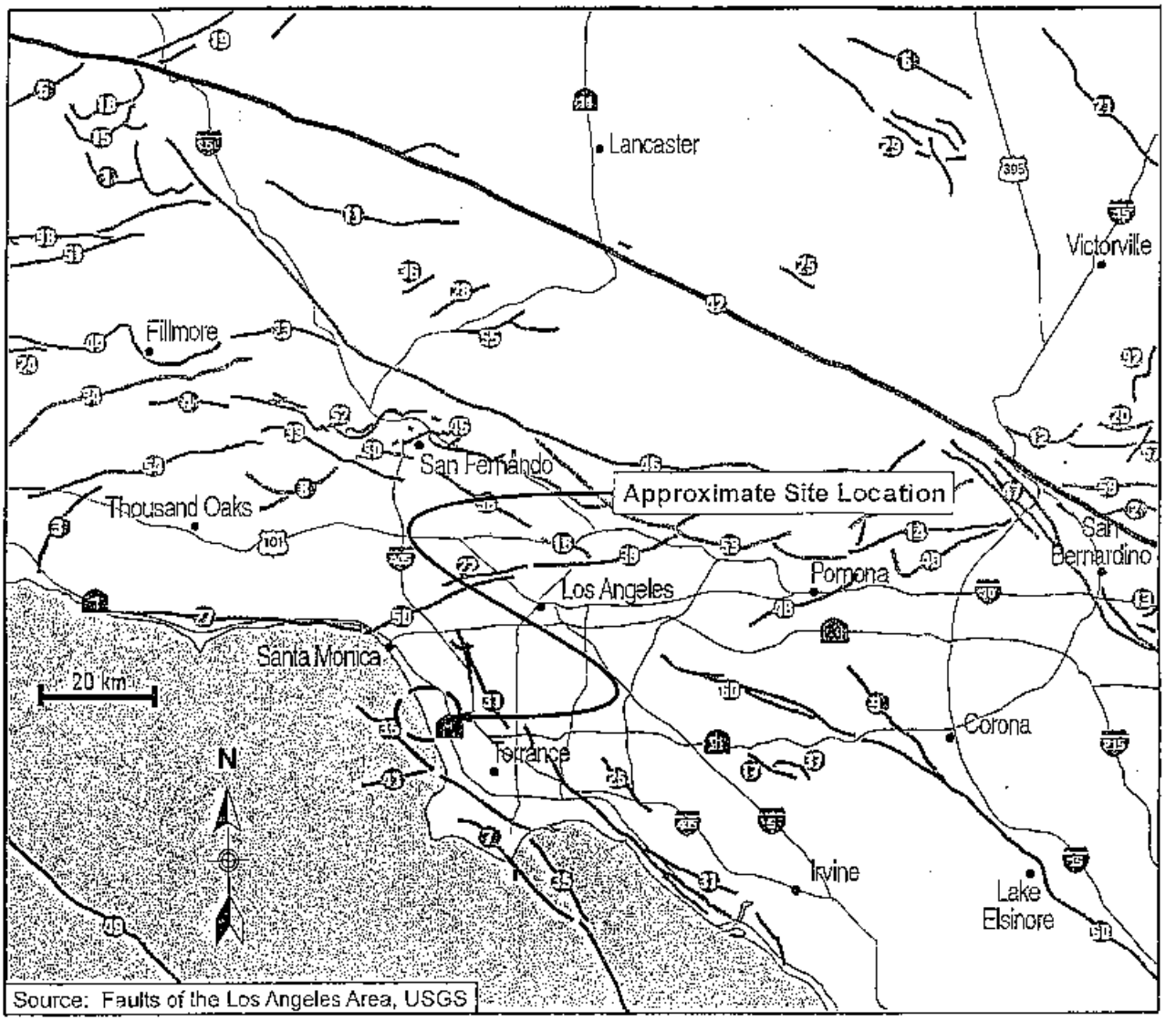
Earth Systems So.Ca.
Panay Way Parcel 21, Marina Del Rey, CA
Your #LA-01052-01, MJS&A #06-1097LAB
22-Jun-06

Sample ID			B3 @ 0-5' Fill
Resistivity		**Units**	
as-received		ohm-cm	200,000
saturated		ohm-cm	1,200
pH			7.7
Electrical Conductivity		mS/cm	0.86
Chemical Analyses			
Cations			
calcium	Ca^{2+}	mg/kg	799
magnesium	Mg^{2+}	mg/kg	43
sodium	Na^{1+}	mg/kg	84
potassium	K^{1+}	mg/kg	58
Anions			
carbonate	CO_3^{2-}	mg/kg	ND
bicarbonate	HCO_3^{1-}	mg/kg	220
flouride	F^{1-}	mg/kg	3
chloride	Cl^{1-}	mg/kg	15
sulfate	SO_4^{2-}	mg/kg	1,673
phosphate	PO_4^{3-}	mg/kg	ND
Other Tests			
ammonium	NH_4^{1+}	mg/kg	ND
nitrate	NO_3^{1-}	mg/kg	0.8
sulfide	S^{2-}	qual	na
Redox		mV	na

Electrical conductivity in millisiemens/cm and chemical analysis were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

APPENDIX E

Seismic Data



1 Alamo thrust
2 Arrowhead fault
3 Bailey fault
4 Big Mountain fault
5 Big Pine fault
6 Blake Ranch fault
7 Cabrillo fault
8 Chatsworth fault
9 Chino fault
10 Clamshell-Sawpit fault
11 Clearwater fault
12 Cleghorn fault
13 Crafton Hills fault zone
14 Cucamonga fault zone
15 Dry Creek
16 Eagle Rock fault
17 El Modeno
18 Frazier Mountain thrust
19 Garlock fault zone
20 Grass Valley fault
21 Helendale fault
22 Hollywood fault
23 Holser fault
24 Lion Canyon fault
25 Llano fault
26 Los Alamitos fault
27 Malibu Coast fault
28 Mint Canyon fault
29 Mirage Valley fault zone
30 Mission Hills fault
31 Newport Inglewood fault zone
32 North Frontal fault zone
33 Northridge Hills fault
34 Oak Ridge fault
35 Palos Verdes fault zone
36 Pelona fault
37 Peralta Hills fault
38 Pine Mountain fault
39 Raymond fault
40 Red Hill (Etiwanda Ave) fault
41 Redondo Canyon fault
42 San Andreas Fault
43 San Antonio fault
44 San Cayetano fault
45 San Fernando fault zone
46 San Gabriel fault zone
47 San Jacinto fault
48 San Jose fault
49 Santa Cruz-Santa Catalina Ridge f.z.
50 Santa Monica fault
51 Santa Ynez fault
52 Santa Susana fault zone
53 Sierra Madre fault zone
54 Simi fault
55 Soledad Canyon fault
56 Stoddard Canyon fault
57 Tunnel Ridge fault
58 Verdugo fault
59 Waterman Canyon fault
60 Whittier fault

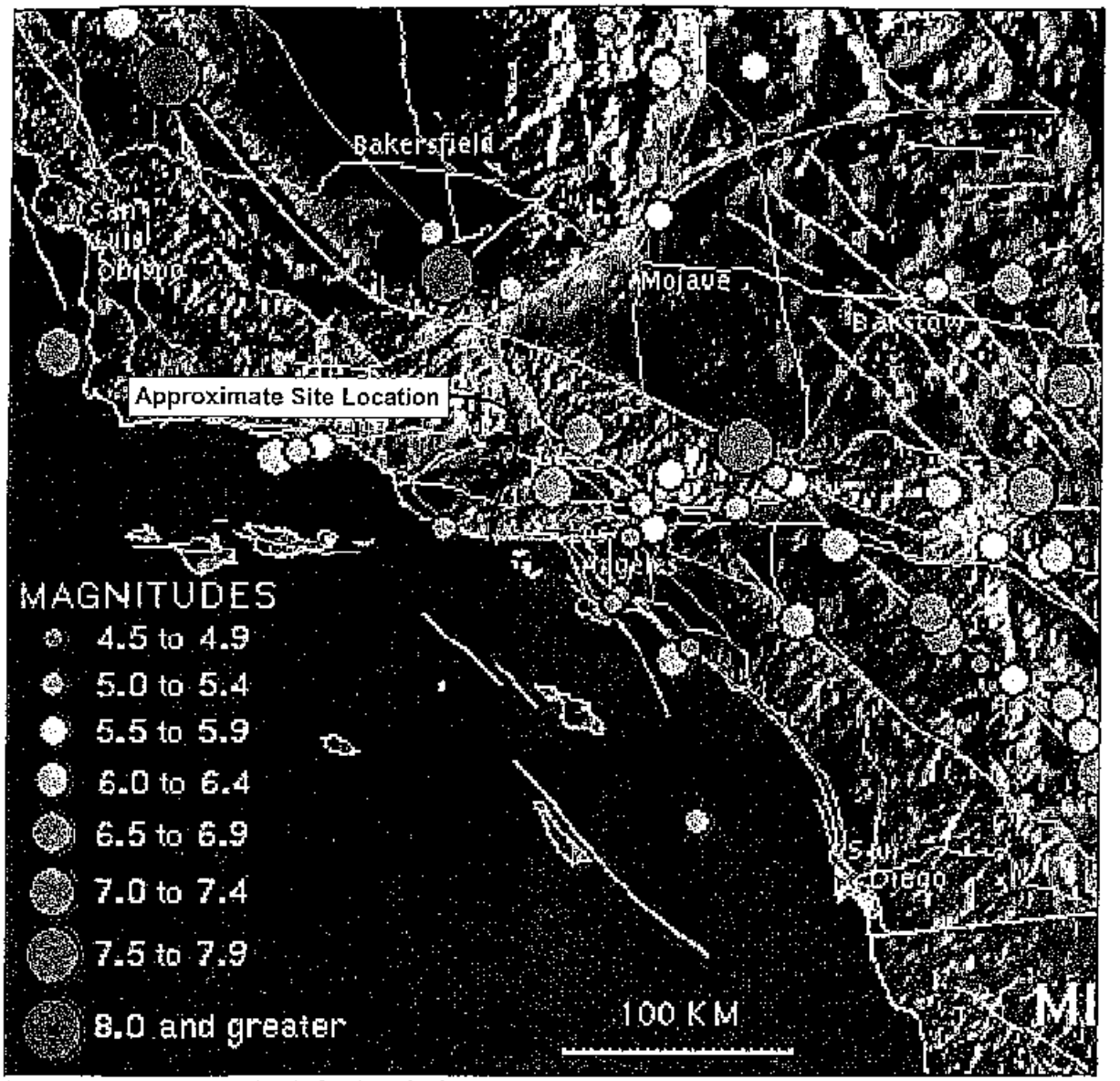
Plate E1

Regional Fault Map

PROPOSED COMMERCIAL DEVELOPMENT
PANAY WAY PARCEL 21
MARINA DEL REY, CALIFORNIA

Earth Systems
Southern California

8/21/2006	LA-01052-01



Source: Historical Earthquakes in Southern California, Southern California Earthquake Data Center

Map of southern California, with epicenters of historic earthquakes (as far back as 1812) of particular note plotted over the background topography. Shown, too, are major highways (in tan) and the surface traces of major faults (in greenish-blue). This map does not show the epicenters of all earthquakes greater than magnitude 4.5 recorded in the southern California area since the 19th century. It is meant as an overview of large and destructive, fairly recent, or unusual earthquakes. The magnitudes given by the scale are generally moment magnitudes (denoted M_w), for earthquakes above magnitude 6, and local magnitudes (denoted M_L), for most earthquakes below magnitude 6 and for earthquakes which occurred before accurate instrumental measurements of magnitude were possible (*i.e.* before 1933).

N

Plate E2

Regional Epicenter Map

PROPOSED COMMERCIAL DEVELOPMENT
PANAY WAY PARCEL 21
MARINA DEL REY, CALIFORNIA

Earth Systems
Southern California

8/21/2006	LA-01052-01

Table E-1
Fault Parameters &
& Deterministic Estimates of Mean Peak Ground Acceleration (PGA)

Fault Name or Seismic Zone	Distance from Site (mi)	(km)	Fault Type	UBC	Maximum Magnitude Mmax (Mw)	Avg Slip Rate (mm/yr)	Avg Return Period (yrs)	Fault Length (km)	Date of Last Rupture (year)	Largest Historic Event >5.5M	(year)	Mean Site PGA, g (g)
Reference Notes: (1)			(2)	(3)	(4)	(2)	(2)	(2)		(5)		(6)
Palos Verdes	4.5	7.2	SS	B	7.1	3	650	96				0.46
Santa Monica	4.9	7.9	DS	B	6.6	1	816	28				0.42
Malibu Coast	5.7	9.3	DS	B	6.7	0.3	2908	37				0.40
Newport-Inglewood (L.A.Basin)	6.0	9.6	SS	B	6.9	1	1006	64		6.4	1933	0.36
Hollywood	7.6	12.3	DS	B	6.4	1	626	17				0.28
Elysian Park Thrust	13.2	21.2	BT	B*	6.7	1.5	549	34				0.21
Anacapa-Dume	13.8	22.2	DS	B	7.3	3	529	75				0.28
Raymond	16.5	26.5	DS	B	6.5	0.5	1541	21				0.15
Verdugo	17.5	28.2	DS	B	6.7	0.5	1608	29				0.16
Northridge (E. Oak Ridge)	20.8	33.5	BT	B*	6.9	1.5	818	31				0.15
Sierra Madre	20.9	33.6	DS	B	7.0	3	384	57		5.8	1991	0.16
Sierra Madre (San Fernando)	21.7	34.9	DS	B	6.7	2	1000	18				0.13
Santa Susana	22.8	36.7	DS	B	6.6	5	138	27				0.12
Whittier	24.9	40.1	SS	B	6.8	2.5	641	38		6.0	1987	0.10
San Gabriel	25.4	40.9	SS	B	7.0	1	1264	72				0.12
Simi-Santa Rosa	29.1	46.9	DS	B	6.7	1	933	30				0.10
Clamshell-Sawpit	29.4	47.3	DS	B	6.5	0.5	1461	16				0.08
Holser	30.7	49.4	DS	B	6.5	0.4	1876	20				0.08
Oak Ridge (Onshore)	32.7	52.7	DS	B	6.9	4	299	49				0.10
San Jose	32.7	52.7	DS	B	6.5	0.5	1471	20				0.07
San Cayetano	36.1	58.1	DS	B	6.8	6	150	44				0.08
Chino-Central Ave. (Elsinore)	38.8	62.4	DS	B	6.7	1	882	28				0.07
Newport-Inglewood (Offshore)	40.9	65.9	SS	B	6.9	1.5	651	66				0.06
Cucamonga	42.7	68.6	DS	A	7.0	5	650	28				0.08
San Andreas - 1857 Rupture	44.4	71.4	SS	A	7.8	34	206	345	1857	7.8	1857	0.11
San Andreas - Mojave	44.4	71.4	SS	A	7.1	30	550	99	1857	7.8	1857	0.07
Channel Is. Thrust (Eastern)	46.5	74.9	BT	B*	7.4	1.5	1420	63				0.09
Ventura - Pitas Point	46.7	75.2	DS	B	6.8	1	1112	40				0.06
Elsinore-Glen Ivy	47.6	76.6	SS	B	6.8	5	340	36		6.0	1910	0.05
Oak Ridge(Blind Thrust Offshore)	47.9	77.2	BT	B*	6.9	3	377	39				0.06
Santa Ynez (East)	49.2	79.3	SS	B	7.0	2	669	68				0.06
San Andreas - Carrizo	49.9	80.3	SS	A	7.2	34	206	145				0.06
Montalvo-Oak Ridge Trend	50.6	81.5	BT	B*	6.6	1	730	37				0.05
M.Ridge-Arroyo Parida-Santa Ana	52.9	85.2	DS	B	6.7	0.4	1076	69				0.05
Red Mountain	55.5	89.3	DS	B	6.8	2	507	39				0.05
San Jacinto-San Bernardino	57.1	91.9	SS	B	6.7	12	100	36		6.7	1899	0.04
San Andreas - Southern	57.6	92.7	SS	A	7.4	24	220	203	c. 1690			0.06
Coronado Bank	57.7	92.8	SS	B	7.4	3	653	185				0.06

Notes:

1. Jennings (1994) and CDMG (1996)
2. CDMG & USGS (1996), SS = Strike-Slip, DS = Dip Slip
3. ICBO (1997), where Type A faults: Mmax > 7 and slip rate >5 mm/yr &Type C faults: Mmax <6.5 and slip rate < 2 mm/yr
4. CDMG (1996) based on Wells & Coppersmith (1994), Mw = moment magnitude
5. Modified from Ellsworth Catalog (1990) in USGS Professional Paper 1515
6. The estimates of the mean Site PGA are based on the following attenuation relationships:
   Average of: (1) 1997 Boore, Joyner & Fumal; (2) 1997 Sadigh et al; (3) 1997 Campbell
   (mean plus sigma values are about 1.6 times higher)
   Based on Site Coordinates: 33.979 N Latitude, 118.454 W Longtude and Site Soil Type D

Department of Conservation

California Geological Survey

Probablistic Seismic Hazards Assessment Page

Earthquakes (Recent & Historic)

California Fault Database

Loss Estimation

Aquist-Priolo Earthquake Fault Zoning Act

Seismic Shaking Hazard Maps of California

CGS Links

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Site Map

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California Geological Survey

Search This S

Probabilistic Seismic Hazards Mapping Ground Motion Page

User Selected Site

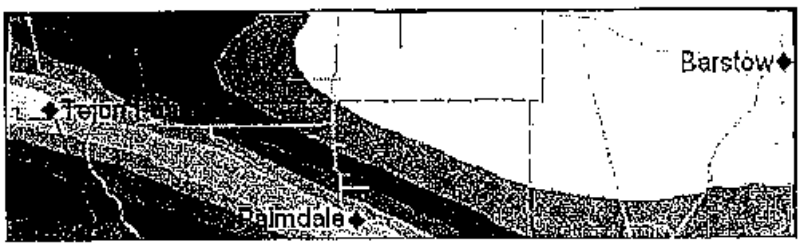
Longitude	-118.4536
Latitude	33.9793

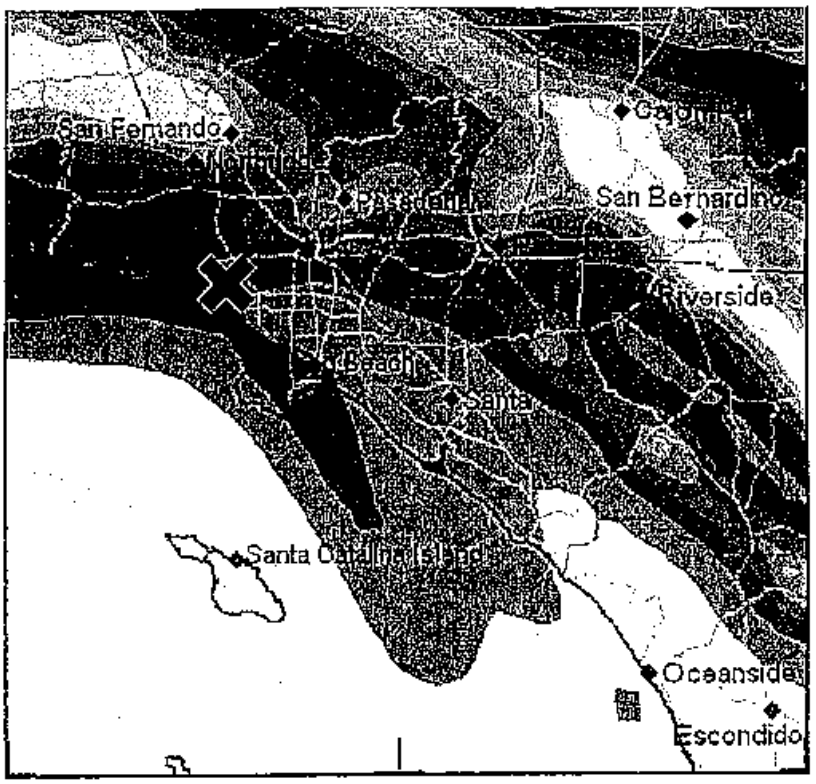
Ground Motions for User Selected Site

Ground motions (10% probability of being exceeded in 50 years) are expresse of the acceleration due to gravity (g). Three values of ground motion are show ground acceleration (Pga), spectral acceleration(Sa) at short (0.2 second) and l long (1.0 second) periods. Ground motion values are also modified by the loca conditions. Each ground motion value is shown for 3 different site conditions: (conditions on the boundary between site categories B and C as defined by the code), soft rock (site category C) and alluvium (site category D).

Ground Motion	Firm Rock	Soft Rock	Alluvium
Pga	0.426	0.426	0.458
Sa 0.2 sec	1.015	1.015	1.11
Sa 1.0 sec	0.368	0.453	0.543

NEHRP Soil Corrections were used to calculate Soft Rock and Alluvium.
Ground Motion values were interpolated from a grid (0.05 degree spacing) of calculated values. Interpolated ground motion may not equal values calculated for a specific site, therefore these values are not intended for design or analysis.





Shaking (
Pga (Peak G
Acceleratl
Firm Roc
< 10%
10 - 2
20 - 3
30 - 4
40 - 5
50 - 6
60 - 7
70 - 8
> 80%
The unit "g"
acceleration
gravity.

Click here to return to the statewide PSHA map or enter new coordinat

Longitude: _____ Latitude: _____ Submit

Please enter coordinates as Decimal Degrees
Example: Longitude -122.0017 Latitude 36.9894

Back to Top of Page

Last edited on May 01, 2006

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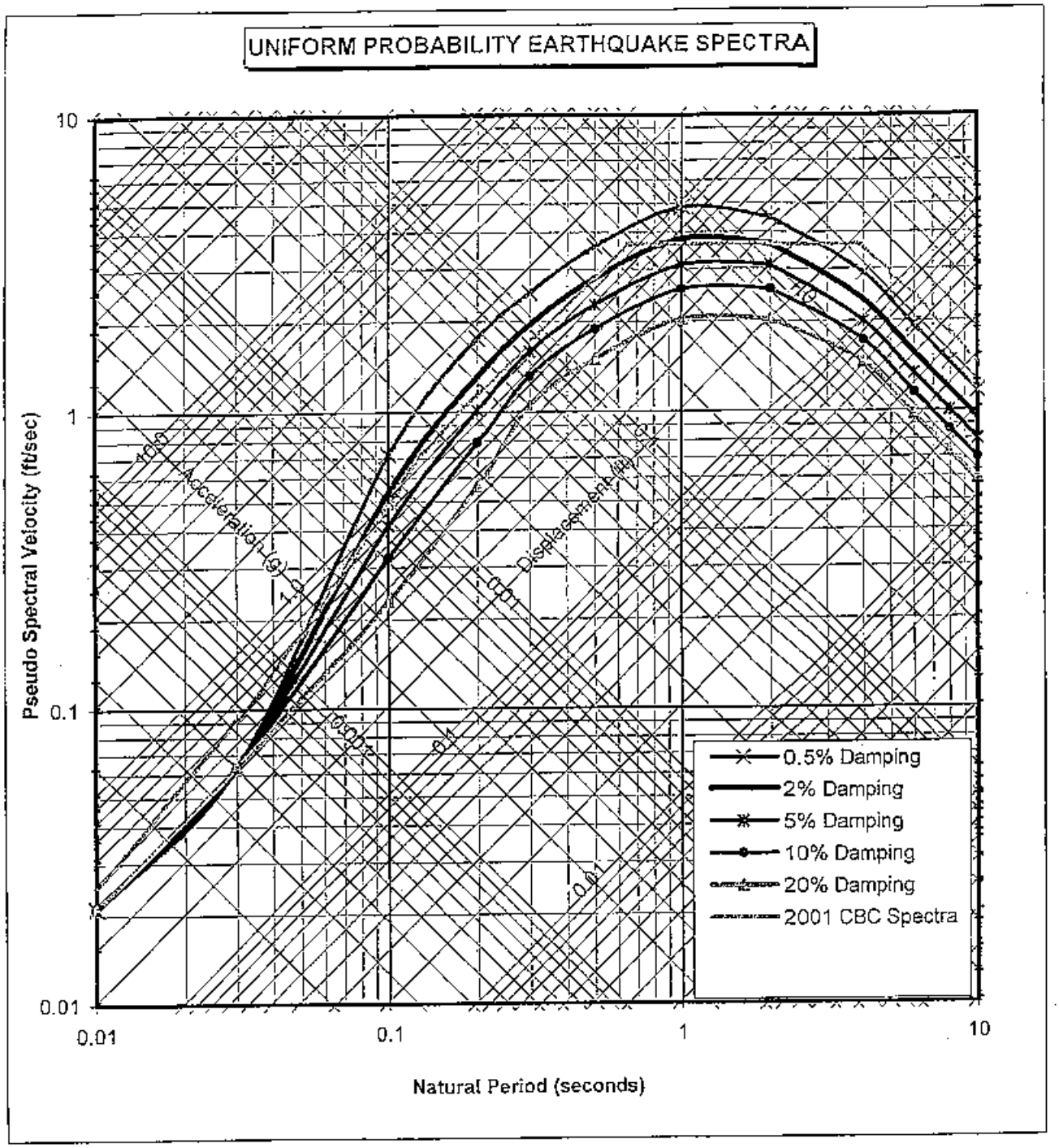


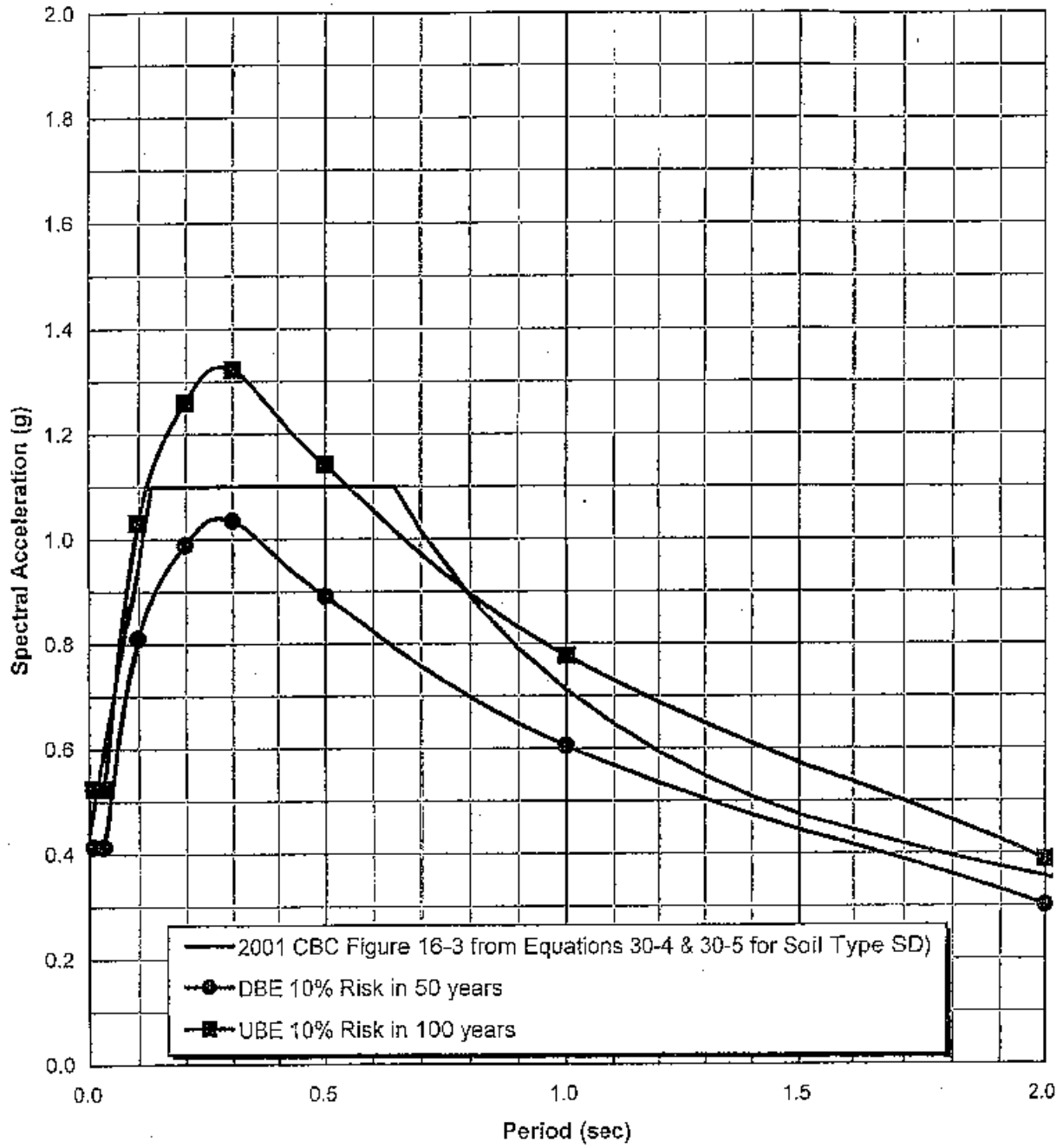
Attenuation relationship from:
Average of Boore et al (1997), Sadigh (1997), Campbell & Borzognia (2003), and Abrahamson & Silva (1997)

475-year Earthquake Spectra at Different Damping

Panay Way Parcel 21, Marina Del Rey
File No.: LA-01052-01

Earth Systems
Southern California

DESIGN RESPONSE SPECTRA

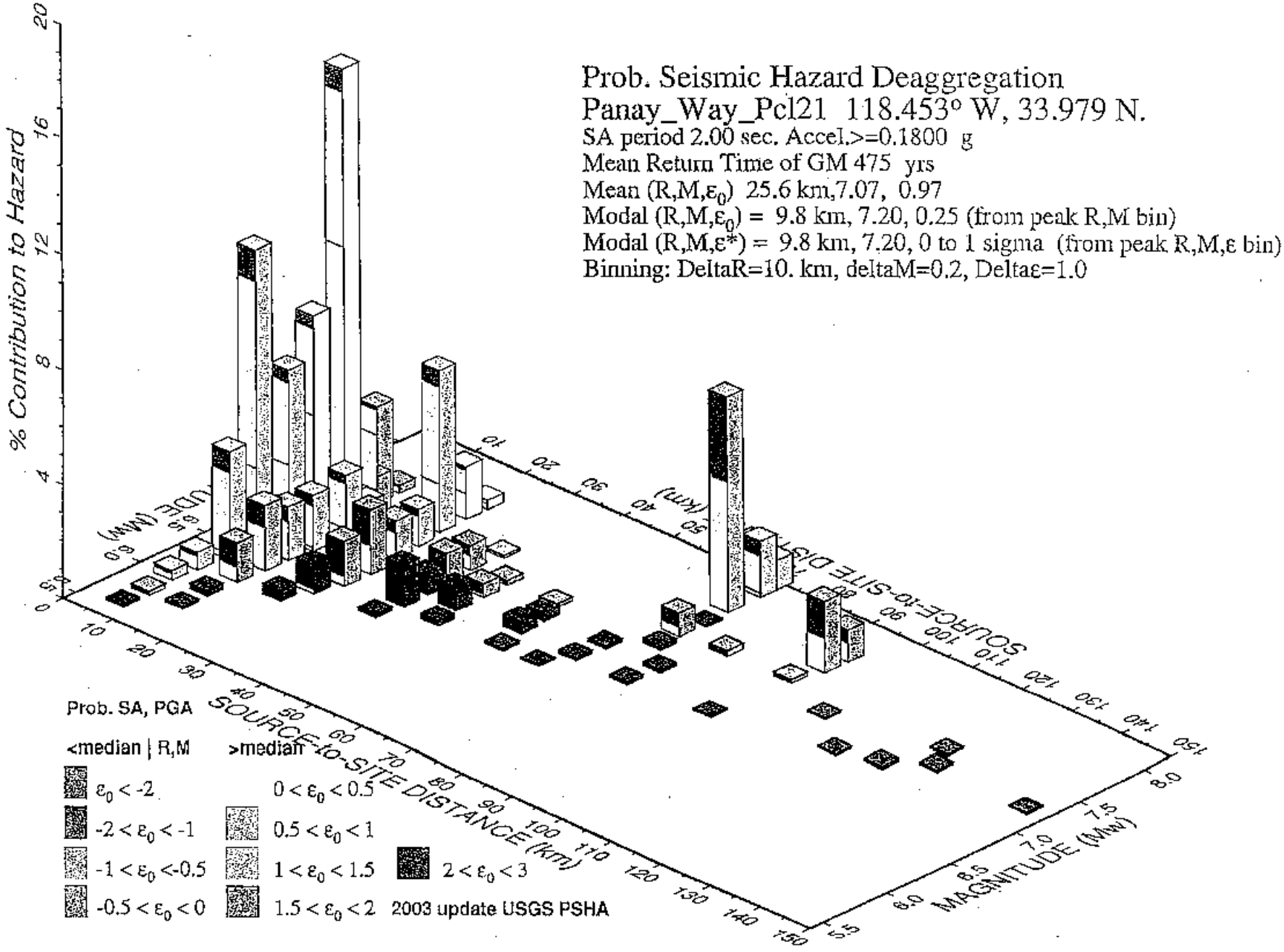


Attenuation relationship from:
Average of Boore et al (1997), Sadigh (1997), Campbell & Borzognia (2003), and Abrahamson & Silva (1997)

Design Response Spectra

Panay Way Parcel 21, Marina Del Rey
File No.: LA-01052-01

Earth Systems
Southern California



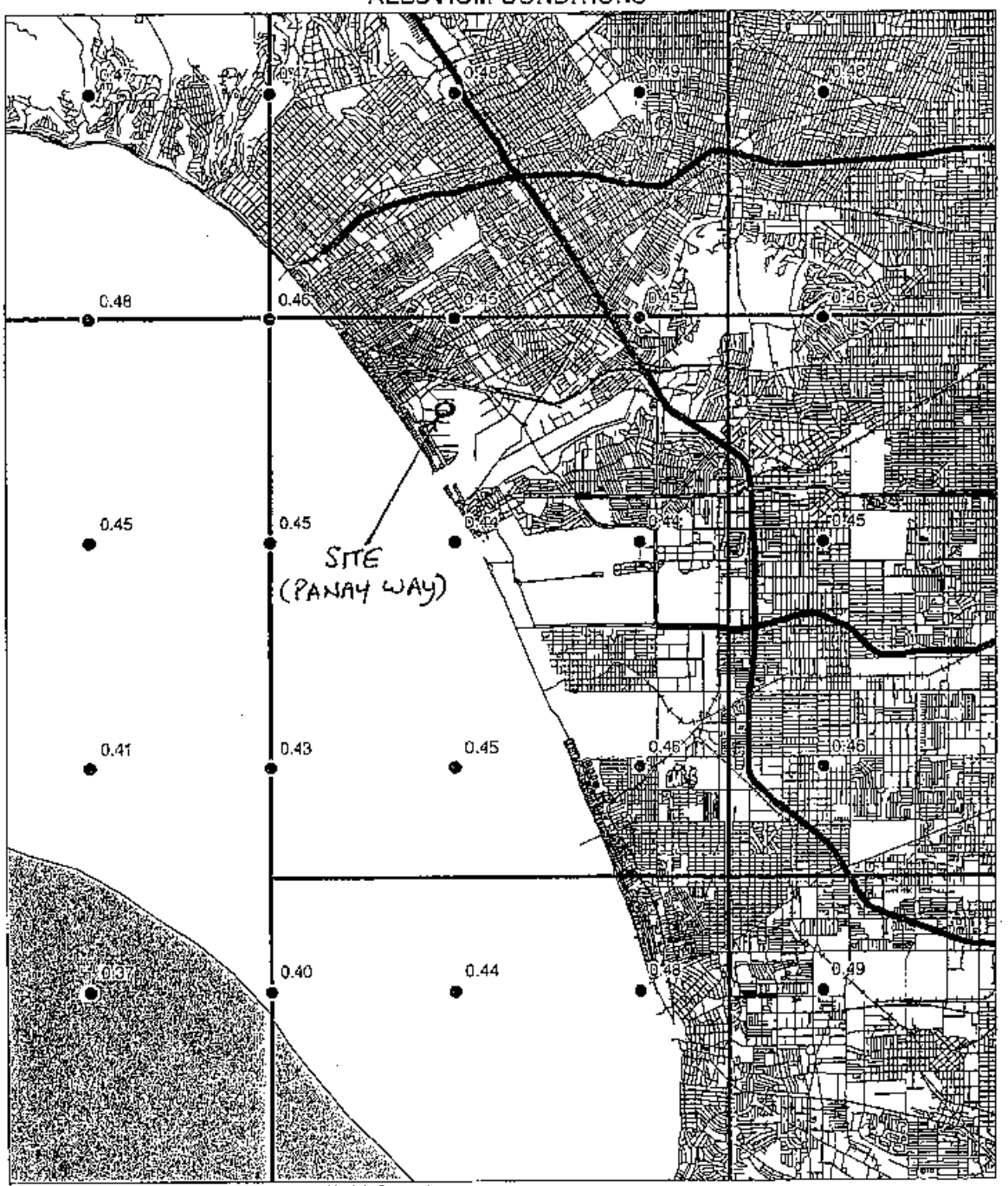
Jul 31 13:02 Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on ROCK avg Vs=760 m/s top 30 m USGS CGHT PSHA2002v3 UPDATE Bins with R 0.05% contrib. omitted

VENICE 7.5 MINUTE QUADRANGLE AND PORTIONS OF ADJACENT QUADRANGLES

10% EXCEEDANCE IN 50 YEARS PEAK GROUND ACCELERATION (g)

1998

ALLUVIUM CONDITIONS



Base map modified from MapInfo Street Works ©1998 MapInfo Corporation

0 2.5 5
Kilometers

Department of Conservation
Division of Mines and Geology

Figure 3.3

APPENDIX F

Liquefaction Analyses

LIQUEFY-v 2.26.XLS - A SPREADSHEET FOR EMPIRICAL ANALYSIS OF LIQUEFACTION POTENTIAL AND INDUCED GROUND SUBSIDENCE
Developed 2005 by Shelton L. Stringer, GE – Earth Systems Southwest

Project: Panay Way Parcel 21
Job No: LA-01052-01
Date: 8/24/2006
Boring: B1 Data Set: 1

Methods: Liquefaction Analysis using 1996 & 1998 NCEER workshop method [Youd & Idriss, editors] Journal of Geotechnical and Environmental Engineering (JGEE), October 2001, Vol 127, No. 10, ASCE
Settlement Analysis from Tokimatsu and Seed (1987), JGEE ,Vol 113, No.8, ASCE
Modified by Pradal, JGEE, Vol 124, No. 4, ASCE

EARTHQUAKE INFORMATION:
Magnitude: 7.1 7.5
PGA, g: 0.50 0.43
MSF: 1.15
GWT: 11.0 feet
Calc GWT: 5.0 feet
Remediate to: 0.0 feet

SPT N VALUE CORRECTIONS:
Energy Correction to N60 (C_E): 1.10
Drive Rod Corr. (C_R): 1 Default
Rod Length above ground (feet): 3.0
Borehole Dia. Corr. (C_B): 1.10
Sampler Liner Correction for SPT?: 1.2 Yes
Cal Mod/ SPT Ratio: 0.63

Total (ft) Liquified Thickness
2

Total (in.) Induced Subsidence
0.7

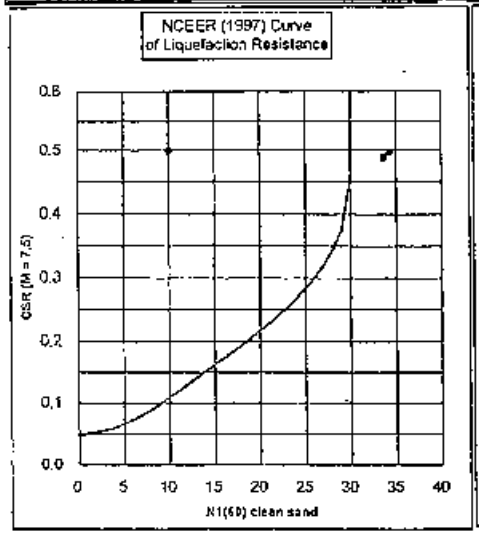
Required SF: 1.25
Threshold Acceler., g: 0.11 Minimum Calculated SF: 0.22

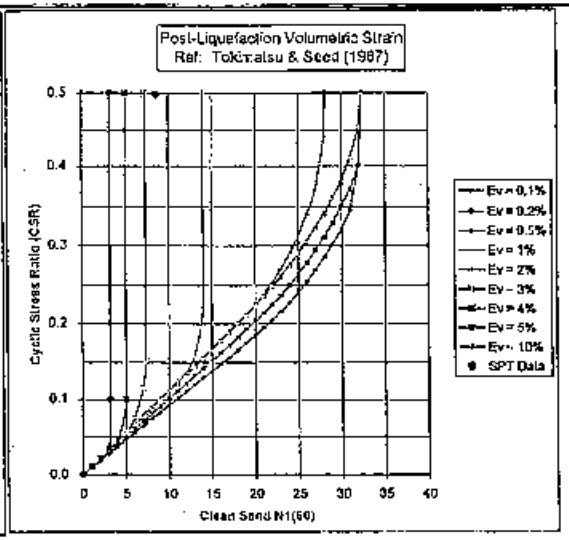
SETTLEMENT (SUBSIDENCE) OF DRY SANDS

Nc = 11.5

Base Depth (feet)	Cal Mod N	SPT N	Liquef. Suscepl. (0 or 1)	Total Unit Wt. (pcf)	Fines Content (%)	Depth of SPT (feet)	Rod Length (feet)	TotStress at SPT po (tsf)	EffStress at SPT p'o (tsf)	rd	C_{rd}	C_R	C_S	$N_{1(60)}$	Rel. Dens. Dr (%)	Trigger $\Delta N_{1(60)}$	Equiv. Sand $N_{1(60)cs}$	Kσ	M = 7.5 Available CRR	M =7.5 Induced CSR*	Liquefac. Safety Factor	Post FC Adj. $\Delta N_{1(60)}$	Post FC Adj. $N_{1(60)cs}$	Volumetric Strain (%)	Induced Subsidence (in.)
				110				0.000																	
7.0	20	13	1	84	25	5.0	8.0	0.210	0.210	0.99	1.70	0.75	1.00	19.4	53	6.5	26.0	1.00	0.299	0.260	Non-Liq.	6.5	26.0	0.00	0.00
12.0	70	44	1	105	25	10.0	13.0	0.452	0.452	0.98	1.53	0.76	1.00	61.9	94	10.0	71.9	1.00	1.200	0.423	2.84	10.0	71.9	0.00	0.00
16.0	15	9		112	81	15.0	18.0	0.725	0.600	0.97	1.00	0.86	1.00	9.9				1.00	Infin.	0.481	Non-Liq.		9.9	0.00	0.00
19.0		20		120	60	17.5	20.5	0.871	0.668	0.96	1.00	0.90	1	27.9				1.00	Infin.	0.493	Non-Liq.		27.9	0.00	0.00
21.0	5	3	1	127	60	20.0	23.0	1.024	0.743	0.96	1.19	0.93	1.00	4.2	25	5.8	10.1	1.00	0.110	0.496	0.22	4.4	8.6	2.81	0.67
24.0		15	1	135	57	22.5	25.5	1.189	0.830	0.95	1.13	0.96	1.25	24.5	59	9.9	34.4	1.00	1.200	0.496	2.42	9.9	34.4	0.00	0.00
26.0	91	57	1	131	5	25.0	28.0	1.356	0.919	0.94	1.07	0.98	1.00	73.2	100	0.0	73.2	1.00	1.200	0.493	2.43	0.0	73.2	0.00	0.00
29.0		32	1	128	8	27.5	30.5	1.517	1.002	0.93	1.03	1.00	1.30	51.7	86	1.0	52.7	1.00	1.200	0.490	2.45	1.0	52.7	0.00	0.00
33.0	35	22	1	120	25	30.0	33.0	1.673	1.080	0.92	0.99	1.00	1.00	26.4	61	7.3	33.7	1.00	1.200	0.487	2.46	7.3	33.7	0.00	0.00
38.0		82	1	110	2	35.0	38.0	1.993	1.214	0.89	0.93	1.00	1.30	120	100	0.0	120.4	1.01	1.200	0.475	2.52	0.0	120.4	0.00	0.00
42.0	59	37	1	108	5	40.0	43.0	2.235	1.331	0.85	0.89	1.00	1.00	40.1	76	0.0	40.1	0.97	1.200	0.485	2.47	0.0	40.1	0.00	0.00
50.0		50	1	110	8	45.0	48.0	2.509	1.448	0.80	0.85	1.00	1.30	97.2	96	1.1	98.4	0.93	1.200	0.485	2.48	1.1	98.4	0.00	0.00

p (tsf)	G_{max} (tsf)	τ_{av} (tsf)	Shear Strain γ	Strain E_{ys}	Strain E_{vc}	Dry Sand Subsidence (in.)
0.141	495	0.068	3.8E-04			
0.303	1,022	0.144	2.3E-04			
0.485						
0.583						
0.696	900	0.318	1.6E-03			
0.796	1,297	0.367	5.5E-04			
0.908	1,762	0.415	3.6E-04			
1.016	1,689	0.460	4.5E-04			
1.121	1,529	0.501	6.1E-04			
1.315	2,531	0.568	3.0E-04			
1.498	1,873	0.618	5.5E-04			
1.681	2,370	0.655	3.9E-04			





$N_{1(60)} = C_N * C_E * C_B * C_R * C_S * N$
C_R = 0.75 for Rod lengths < 3m, 1.0 for > 10m
= min(1,max(0.75,1.4666-2.556/(z(ft))^0.5))
C_N = (1 atm/p'o)^0.5, max 1.7
C_S = max(1.1,min(1.3,1+$N_{1(60)}$/100)) for SPT without liners
MSF = $10^{2.24}/M^{2.56}$
z = Depth (m)
pa = 1 atm = 101 KPa = 1.058 tsf

p = 0.67*po
τ_{av} = 0.65*PGA*po*rd
G_{max} = 447*$N_{1(60)cs}^{(1/3)}$*$p^{0.5}$
a = 0.0389*(p/1)+0.124
b = 5400*(p/1)^(-0.6)
γ = [1+a*EXP(b*τ_{av}/G_{max})]/[(1+a)*τ_{av}/G_{max}]
E_{ys} = γ*($N_{1(60)cs}$/20)^1.2
E_{vc} = (Nc/15)^0.45*E15
Nc = (MAG-4)^2.17
S = 2*H*E_{vc}

rd = (1-0.4113*z^0.5+0.04052*z+0.001753*z^1.5)/(1-0.4177*z^0.5+0.05729*z-0.006205*z^1.5+0.00121*z^2)
$\Delta N_{1(60)}$ = min(10,IF(FC<35,exp(1.76-(190/FC^2)),5)+IF(FC<=5,1,IF(FC<35,0.98+(FC^1.5/1000),1.2))*N1(60) - N1(60)
$N_{1(60)cs}$ = $N_{1(60)cs}$ + $\Delta N_{1(60)}$
Kσ = min of 1.0 or (p'o/1.058)^[IF(Dr>0.7,0.6,IF(Dr<0.5,0.8,0.7))-1]
Dr = ($N_{1(60)}$/70)^0.5
CSReq = 0.65*PGA*(po/p'o)*rd
CSR* = CSReq/MSF/Kσ
$CRR_{7.5}$ = (0.048-0.004721*N+0.0008136*N^2-0.00003673*N^3)/(1-0.1248*N+0.009576*N^2-0.0003285*N^3+0.000003714*N^4)
N = $N_{1(60)cs}$

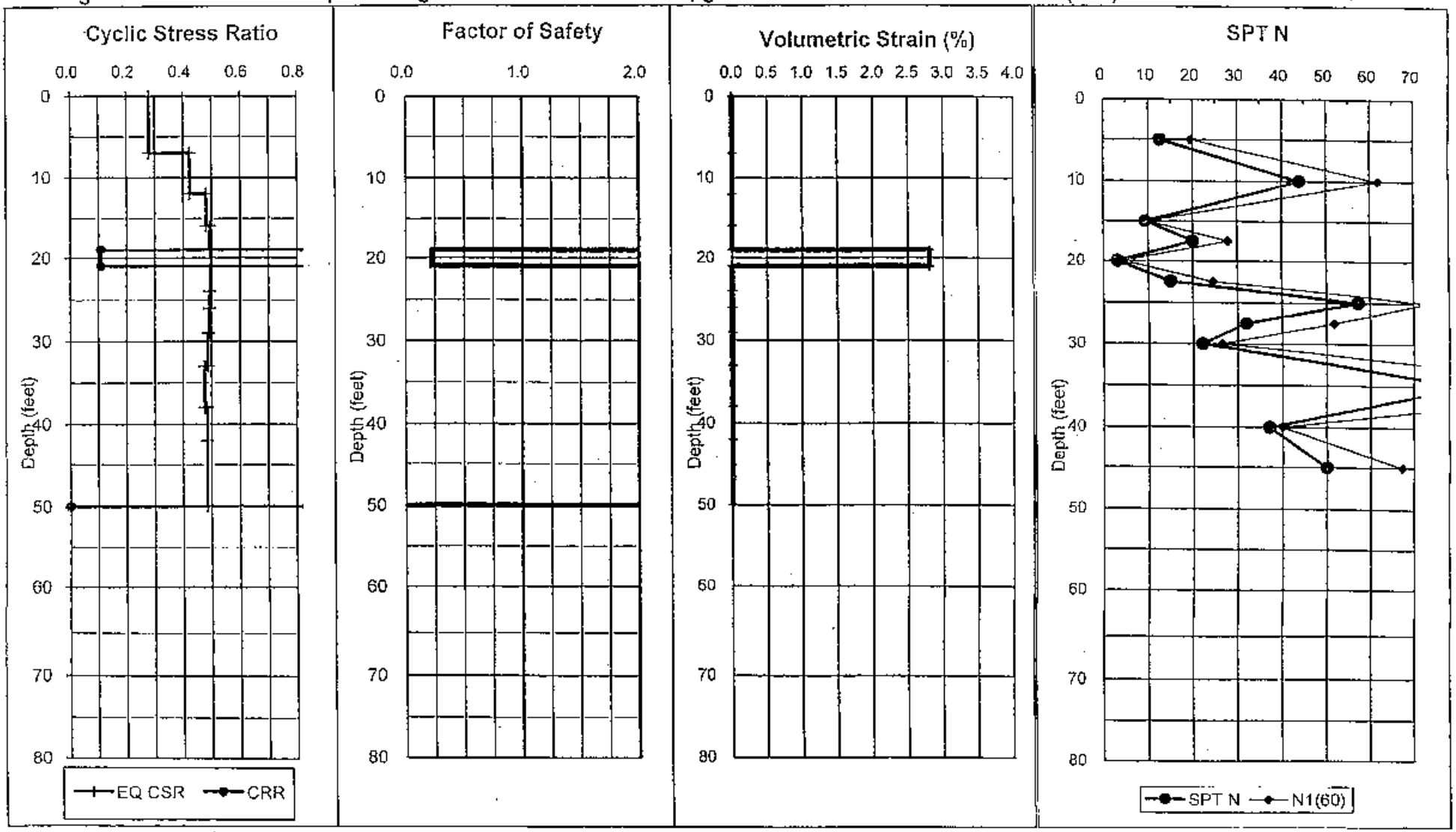
SF = $CRR_{7.5,1atm}$/CSR*

EARTH SYSTEMS - EVALUATION OF LIQUEFACTION POTENTIAL AND INDUCED SUBSIDENCE

Panay Way Parcel 21 **Project No: LA-01052-01** 1996/1998 NCEER Method

Ground Compaction Remediated to 0 foot depth

Boring: B1 Earthquake Magnitude: 7.1 PGA, g: 0.50 Calc GWT (feet): 5



Total Thickness of Liquefiable Layers: 2.0 feet

Estimated Total Ground Subsidence: 0.7 inches

LIQUEFY-v 2.26.XLS - A SPREADSHEET FOR EMPIRICAL ANALYSIS OF LIQUEFACTION POTENTIAL AND INDUCED GROUND SUBSIDENCE
Developed 2005 by Shelton L. Stringer, GE - Earth Systems Southwest

Project: Poway Way Parcel 21
Job No: LA-01052-01
Date: 8/24/2005
Boring: B2 Data Set: 2

Methods: Liquefaction Analysis using 1996 & 1998 NCEER workshop method (Youd & Idriss, editors)
Journal of Geotechnical and Enviromental Engineering (JGEE), October 2001, Vol 127, No. 10, ASCE
Settlement Analysis from Tokimatsu and Seed (1987),JGEE ,Vol 113, No.8, ASCE
Modified by Pradel, JGEE, Vol 124, No. 4, ASCE

EARTHQUAKE INFORMATION:
Magnitude: 7.1 7.5
PGA, g: 0.50 0.43
MSF: 1.15
GWT: 11.0 feet
Calc GWT: 5.0 feet
Remediate to: 0.0 feet

SPT N VALUE CORRECTIONS:
Energy Correction to N60 (C_E): 1.10
Drive Rod Corr. (C_R): 1 Default
Rod Length above ground (feet): 3.0
Borehole Dia. Corr. (C_B): 1.10
Sampler Liner Correction for SPT?: 1.2 Yes
Cal Mod/ SPT Ratio: 0.63

Total (ft) Liquefied Thickness
8

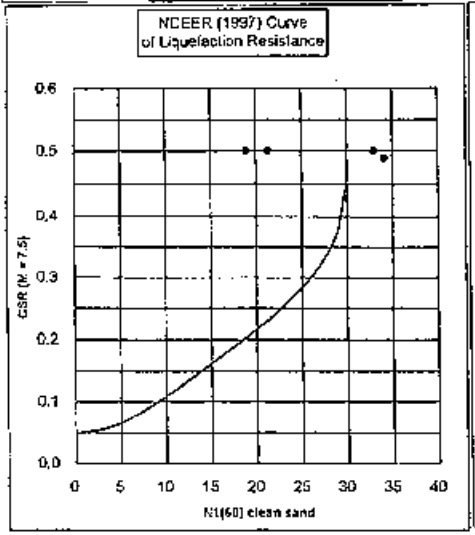
Total (in.) Induced Subsidence
1.8

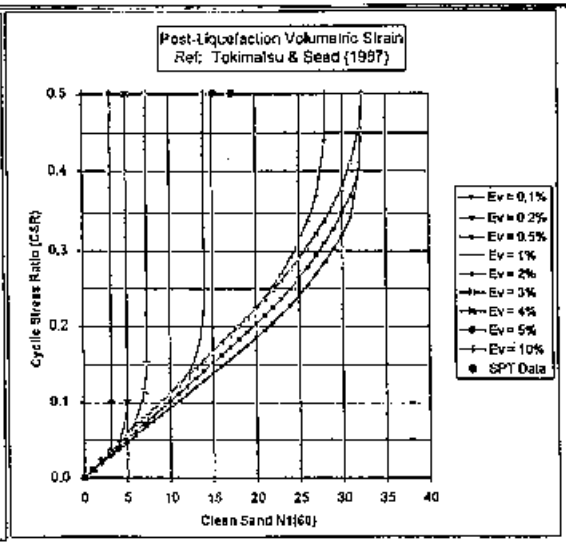
Threshold Acceler., g: 0.20 Minimum Calculated SF: 0.40 Required SF: 1.25

SETTLEMENT (SUBSIDENCE) OF DRY SANDS

Nc = 11.6

Base Depth (feet)	Cal Mod N	SPT N	Liquef. Suscept. (0 or 1)	Total Unit Wt. (pcf)	Fines Content (%)	Depth of SPT (feet)	Rod Length (feet)	Tot.Stress at SPT po (tsf)	Eff.Stress at SPT p'o (tsf)	rd	C_N	C_R	C_S	$N_{1(60)}$	Rel. Dens. Dr (%)	Trigger FC Adj. $\Delta N_{1(60)}$	Equiv. Sand $N_{1(60)cs}$	Ko	M = 7.5 Available CRR	M =7.5 Induced CSR*	Liquefac. Safety Factor	Post FC Adj $\delta N_{1(60)}$	$N_{1(60)cs}$	Volumetric Strain (%)	Induced Subsidence (in.)	p (tsf)	G_{max} (tsf)	τ_{av} (tsf)	Shear Strain γ	Strain E_{ys}	Strain Enc	Dry Sand Subsidence (in.)
				110				0.000																								
7.0	62	39	1	84	25	5.0	8.0	0.210	0.210	0.99	1.70	0.75	1.00	60.3	93	10.0	70.3	1.00	1.200	0.280	Non-Liq.	10.0	70.3	0.00	0.00	0.141	652	0.068	1.7E-04			
12.0	65	41	1	100	25	10.0	13.0	0.444	0.444	0.98	1.54	0.78	1.00	57.9	91	10.0	67.9	1.00	1.200	0.427	2.81	10.0	67.9	0.00	0.00	0.297	995	0.141	2.4E-04			
16.0	32	20	1	112	20	15.0	18.0	0.712	0.587	0.97	1.34	0.86	1.00	28.3	64	5.9	34.2	1.00	1.200	0.487	2.46	5.9	34.2	0.00	0.00	0.477	1,002	0.224	4.6E-04			
18.0		32	1	100	16	17.5	20.5	0.843	0.640	0.96	1.29	0.90	1	58.4	91	5.9	64.3	1.00	1.200	0.506	2.37	5.9	64.3	0.00	0.00	0.565	1,346	0.254	3.2E-04			
21.0	27	17	1	127	60	20.0	23.0	0.995	0.714	0.96	1.22	0.93	1.00	23.4	58	9.7	33.1	1.00	1.200	0.510	2.35	9.7	33.1	0.00	0.00	0.667	1,171	0.309	5.3E-04			
24.0		58	1	100	49	22.5	25.5	1.134	0.775	0.95	1.17	0.96	1.30	####	100	10.0	112.4	1.00	1.200	0.518	2.32	10.0	112.4	0.00	0.00	0.759	1,660	0.350	2.6E-04			
26.0	75	47	1	131	40	25.0	28.0	1.274	0.837	0.94	1.12	0.98	1.00	63.2	95	10.0	73.2	1.00	1.200	0.522	2.30	10.0	73.2	0.00	0.00	0.854	1,728	0.390	3.5E-04			
29.0		43	1	100	7	27.5	30.5	1.415	0.900	0.93	1.08	1.00	1.30	73.3	100	0.7	74.1	1.00	1.200	0.523	2.29	0.7	74.1	0.00	0.00	0.948	1,828	0.429	3.5E-04			
33.0	19	12	1	100	25	30.0	33.0	1.540	0.947	0.92	1.06	1.00	1.00	15.3	47	6.0	21.4	1.00	0.232	0.527	0.44	2.0	17.3	1.77	0.85	1.031	1,260	0.461	8.3E-04			
38.0		43	1	100	25	35.0	38.0	1.790	1.041	0.89	1.01	1.00	1.30	58	99	10.0	78.2	1.00	1.200	0.528	2.27	10.0	78.2	0.00	0.00	1.199	2,093	0.518	3.6E-04			
42.0	18	11	1	108	25	40.0	43.0	2.048	1.143	0.85	0.96	1.00	1.00	13.2	43	5.9	19.0	1.00	0.205	0.515	0.40	2.0	15.2	1.92	0.92	1.372	1,397	0.566	8.7E-04			





$N_{1(60)} = C_N * C_E * C_B * C_R * C_S * N$

C_R = 0.75 for Rod lengths < 3m, 1.0 for > 10m
= min(1,max(0.75,1.4668-2.556/(z(ft))$^{0.5}$))

C_N = (1 atm/p'o)$^{0.5}$, max 1.7

C_S = max(1.1,min(1.3,1+$N_{1(60)}$/100)) for SPT without liners

MSF = $10^{2.24}$/$M^{2.56}$

z = Depth (m)

pa = 1 atm = 101 KPa = 1.058 tsf

p = 0.67*po

τ_{av} = 0.65*PGA*po*rd

G_{max} = 447*$N_{1(60)cs}^{(1/3)}$*$p^{0.5}$

a = 0.0389*(pi/1)+0.124

b = 6400*(pi/1)$^{(-0.5)}$

γ = [1+a*EXP{b*τ_{av}/G_{max}}]/[(1+a)*τ_{av}/G_{max}]

E_{ys} = γ*($N_{1(60)cs}$/20)$^{1.2}$

E_{nc} = (Nc/15)$^{0.45}$*E15

Nc = (MAG-4)$^{2.17}$

S = 2*H*E_{nc}

rd = (1-0.4113*z^0.5+0.04052*z+0.001753*z^1.5)/(1-0.4177*z^0.5+0.05729*z-0.006205*z^1.5+0.00121*z^2))

$\Delta N_{1(60)}$ = min(10,IF(FC<35,exp(1.76-(190/FC^2)),5)+IF(FC<=5,1,IF(FC<35,0.99+(FC^1.5/1000),1.2))*N1(60) - N1(60)

$N_{1(60)cs}$ = $N_{1(60)cs}$ + $\Delta N_{1(60)}$

Ko = min of 1.0 or (p'o/p'o/1.058)$^{IF(Dr>0.7,0.6,IF(Dr<0.5,0.8,0.7))-1}$

Dr = ($N_{1(60)}$/70)$^{0.5}$

CSReq = 0.65*PGA*(po/p'o)*rd

CSR* = CSReq/MSF/Kσ

$CRR_{7.5}$ = (0.048-0.004721*N+0.0008135*N^2-0.00001573*N^3)/(1-0.1248*N+0.009578*N^2-0.0003285*N^3+0.00003714*N^4)

N = $N_{1(60)cs}$

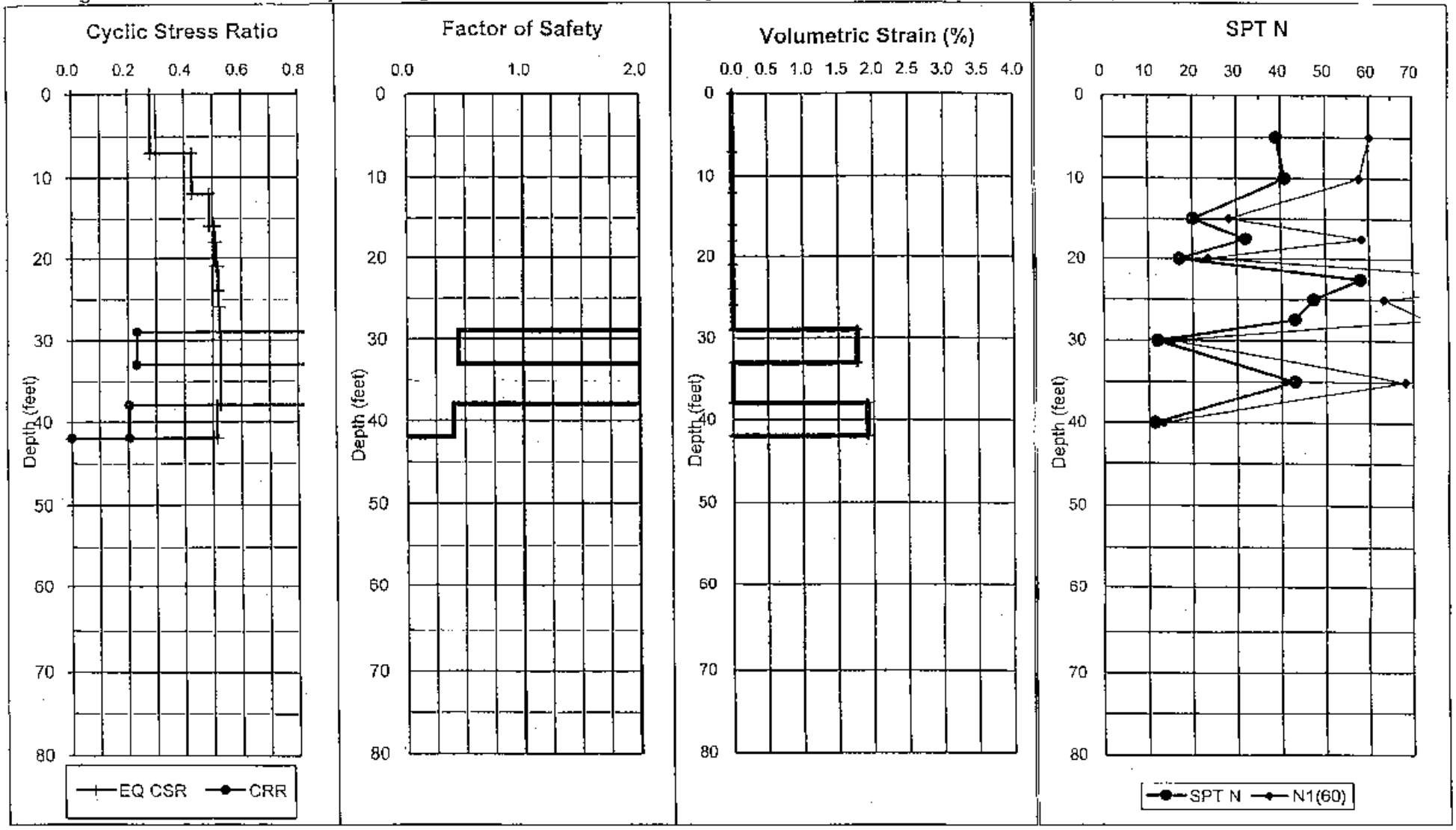
SF = $CRR_{7.5,1atm}$/CSR*

EARTH SYSTEMS - EVALUATION OF LIQUEFACTION POTENTIAL AND INDUCED SUBSIDENCE

Panay Way Parcel 21 **Project No: LA-01052-01** 1996/1998 NCEER Method

Ground Compaction Remediated to 0 foot depth

Boring: B2 Earthquake Magnitude: 7.1 PGA, g: 0.50 Calc GWT (feet): 5



Total Thickness of Liquefiable Layers: 8.0 feet

Estimated Total Ground Subsidence: 1.8 inches

LIQUEFY-v 2.26.XLS - A SPREADSHEET FOR EMPIRICAL ANALYSIS OF LIQUEFACTION POTENTIAL AND INDUCED GROUND SUBSIDENCE
Developed 2005 by Shelton L. Stringer, GE - Earth Systems Southwest

Project: Panay Way Parcel 21
Job No: LA-01052-01
Date: 8/24/2006
Boring: B4 Data Set: 3

Methods: Liquefaction Analysis using 1996 & 1998 NCEER workshop method (Youd & Idriss, editors) Journal of Geotechnical and Environmental Engineering (JGEE), October 2001, Vol 127, No. 10, ASCE
Settlement Analysis from Tokimatsu and Seed (1987),JGEE ,Vol 113, No.8, ASCE
Modified by Pradel, JGEE, Vol 124, No. 4, ASCE

EARTHQUAKE INFORMATION:
Magnitude: 7.1 7.5
PGA, g: 0.50 0.43
MSF: 1.15
GWT: 11.0 feet
Calc GWT: 5.0 feet
Remediate to: 0.0 feet

SPT N VALUE CORRECTIONS:
Energy Correction to N60 (C_E): 1.10
Drive Rod Corr. (C_R): 1 Default
Rod Length above ground (feet): 3.0
Borehole Dia. Corr. (C_B): 1.10
Sampler Liner Correction for SPT?: 1.2 Yes
Cal Mod SPT Ratio: 0.53

Total (ft) Liquefied Thickness
23

Total (in.) Induced Subsidence
7.7

Threshold Accelar., g: 0.08 Minimum Calculated SF: 0.12
Required SF: 1.25

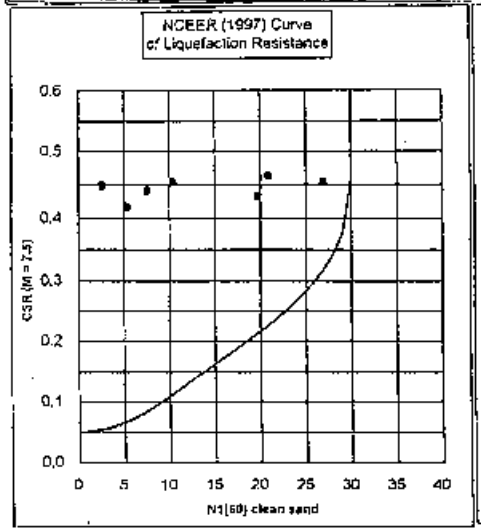
SETTLEMENT (SUBSIDENCE) OF DRY SANDS

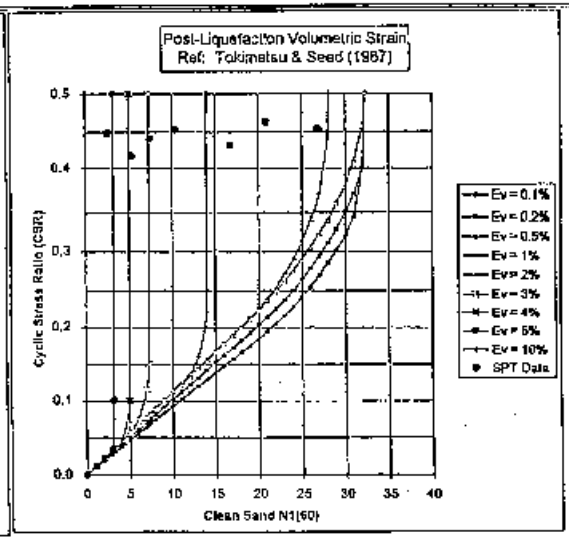
Nc = 11.6

Base Depth (feet)	Cal Mod N	SPT N	Liquef. Suscept. (0 or 1)	Total Unit Wt. (pcf)	Fines Content (%)	Depth of SPT (feet)	Rod Length (feet)	Tot.Stress al SPT po (tsf)	Eff.Stress al SPT p'o (tsf)	rd	C_N	C_R	C_S	$N_{1(60)}$	Rel. Dens. Dr (%)	Trigger FC Adj. $\Delta N_{1(60)}$	Equiv. Sand $N_{1(60)cs}$	K_σ	M = 7.5 Available CRR	M =7.5 Induced CSR*	Liquefac. Safety Factor	Post FC Adj. $\Delta N_{1(60)}$	Post $N_{1(60)cs}$	Volumetric Strain (%)	Induced Subsidence (in.)
				110				0.000																	
7.0	43	27	1	119	5	5.0	8.0	0.298	0.298	0.99	1.70	0.75	1.00	41.8	77	0.0	41.8	1.00	1.200	0.260	Non-Liq.	0.0	41.8	0.00	0.00
12.0	53	33	1	124	5	10.0	13.0	0.603	0.603	0.98	1.33	0.76	1.00	40.6	76	0.0	40.6	1.00	1.200	0.373	3.21	0.0	40.6	0.00	0.00
16.0	7	4	1	120	5	15.0	18.0	0.907	0.782	0.97	1.16	0.86	1.00	5.4	28	0.0	5.4	1.00	0.066	0.417	0.16	0.0	5.4	3.86	1.85
18.0		9	1	120	63	17.5	20.5	1.057	0.854	0.96	1.11	0.90	1	12.3	42	7.5	19.7	1.00	0.213	0.431	0.49	4.5	16.8	1.80	0.43
21.0	10	6	1	124	5	20.0	23.0	1.211	0.930	0.96	1.07	0.93	1.00	7.6	33	0.0	7.6	1.00	0.085	0.441	0.19	0.0	7.6	2.96	1.07
24.0		2	1	120	5	22.5	25.5	1.363	1.004	0.95	1.03	0.96	1.10	2.6	19	0.0	2.6	1.00	0.054	0.448	0.12	0.0	2.6	6.41	2.31
26.0	14	9	1	120	5	25.0	28.0	1.513	1.076	0.94	0.99	0.98	1.00	10.4	39	0.0	10.4	1.00	0.113	0.453	0.25	0.0	10.4	2.54	0.81
29.0		13		120	51	27.5	30.5	1.663	1.148	0.93	1.00	1.00	1.19	18.7				1.00	Infin.	0.456	Non-Liq.		18.7	0.00	0.00
33.0	36	24	1	128	5	30.0	33.0	1.817	1.224	0.92	0.93	1.00	1.00	26.9	62	0.0	26.9	1.01	0.318	0.453	0.70	0.0	26.9	1.08	0.52
38.0		90	1	120	8	35.0	38.0	2.129	1.380	0.89	0.88	1.00	1.30	124	100	1.9	125.8	0.95	1.200	0.471	2.55	1.9	125.8	0.00	0.00
42.0	90	57	1	127	5	40.0	43.0	2.436	1.531	0.85	0.83	1.00	1.00	57.0	90	0.0	57.0	0.91	1.200	0.460	2.50	0.0	57.0	0.00	0.00
47.0		18	1	120	5	45.0	48.0	2.743	1.682	0.80	0.79	1.00	1.21	20.9	55	0.0	20.9	0.90	0.227	0.462	0.49	0.0	20.9	1.51	0.91
52.0		45	1	120	32	50.0	53.0	3.043	1.826	0.75	0.76	1.00	1.30	53.9	88	10.0	63.9	0.84	1.200	0.470	2.55	10.0	63.9	0.00	0.00
57.0	95	60	1	122	5	55.0	58.0	3.346	1.973	0.70	0.73	1.00	1.00	53	87	0.0	53.0	0.81	1.200	0.459	2.61	0.0	53.0	0.00	0.00
62.0		85	1	120	5	60.0	63.0	3.648	2.119	0.65	0.71	1.00	1.30	94.5	100	0.0	94.5	0.79	1.200	0.446	2.68	0.0	94.5	0.00	0.00
67.0	100	53	1	119	5	65.0	68.0	3.946	2.261	0.62	0.68	1.00	1.00	52	85	0.0	52.1	0.78	1.200	0.438	2.74	0.0	52.1	0.00	0.00
72.0		90	1	120	8	70.0	73.0	4.245	2.404	0.59	0.66	1.00	1.30	93.9	100	1.5	95.4	0.74	1.200	0.431	2.79	1.5	95.4	0.00	0.00
78.0	100	63	1	120	5	75.0	78.0	4.545	2.548	0.57	0.64	1.00	1.00	49	84	0.0	49.1	0.73	1.200	0.426	2.82	0.0	49.1	0.00	0.00

Induced Subsidence (in.)
0.00
0.00
1.85
0.43
1.07
2.31
0.81
0.00
0.52
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00

p (tsf)	G_{max} (tsf)	τ_{av} (tsf)	Shear Strain γ	E_{15}	Strain Enc	Dry Sand Subsidence [in.]
0.199	693	0.096	2.9E-04			
0.404	976	0.192	3.8E-04			
0.607	610	0.285	3.8E-03			
0.708	1,016	0.331	6.4E-04			
0.811	791	0.376	2.4E-03			
0.913	589	0.421	1.3E-02			
1.013	983	0.463	1.7E-03			
1.114						
1.217	1,476	0.543	7.5E-04			
1.425	2,675	0.616	3.1E-04			
1.632	2,196	0.674	4.7E-04			
1.837	1,669	0.716	6.3E-04			
2.038	2,551	0.744	4.1E-04			
2.241	2,514	0.765	4.3E-04			
2.444	3,183	0.781	3.1E-04			
2.644	2,715	0.798	3.9E-04			
2.844	3,445	0.817	2.9E-04			
3.045	2,857	0.839	3.9E-04			





$N_{1(60)} = C_N{*}C_E{*}C_B{*}C_R{*}C_S{*}N$

C_R = 0.75 for Rod lengths < 3m, 1.0 for > 10m
= min[1,max(0.75,1.4666-2.555/(z(ft))^0.5)]

C_N = (1 atm/p'o)^0.5, max 1.7

C_S = max(1.1,min(1.3,1+$N_{1(60)}$/100)) for SPT without liners

$MSF = 10^{2.24}/M^{2.56}$

z = Depth (m)

pa = 1 atm = 101 KPa = 1.058 tsf

p = 0.67*po

τ_{av} = 0.65*PGA*po*rd

G_{max} = 447*$N_{1(60)cs}^{(1/3)}$*$p^{0.5}$

a = 0.0359*(p/1)+0.124

b = 6400*(p/1)^-0.5

γ = [1+a*EXP(b*τ_{av}/G_{max})]/[(1+a)*τ_{av}/G_{max}]

E_{15} = γ*($N_{1(60)cs}$/20)^-1.2

E_{nc} = (Nc/15)^0.45*E15

Nc = (MAG-4)^2.17

S = 2*H*E_{nc}

rd = (1-0.4113*z^0.5+0.04052*z+0.001753*z^1.5)/(1-0.4177*z^0.5+0.05729*z-0.006205*z^1.5+0.001210*z^2))

$\Delta N_{1(60)}$ = min(10.5*(FC<35,exp(1.76-(190/FC^2)),5)+IF(FC<=5,1,IF(FC<35,0.99+(FC^1.5/1000),1.2))*N1(60) - N1(60)

$N_{1(60)cs}$ = $N_{1(60)cs}$ + $\Delta N_{1(60)}$

Kσ = min of 1.0 or (p'o/1.058)^(IF(Dr>0.7,0.6,IF(Dr<0.5,0.8,0.7))-1)

Dr = ($N_{1(60)cs}$/70)^0.5

CSReq = 0.65*PGA*(pc/p'o)*rd

CSR* = CSReq/MSF/Kσ

$CRR_{7.5}$ = (0.048-0.004721*N+0.0006136*N^2-0.0000173*N^3)/(1-0.1248*N+0.009578*N^2-0.0003285*N^3+0.0000037*N^4))

N = $N_{1(60)cs}$

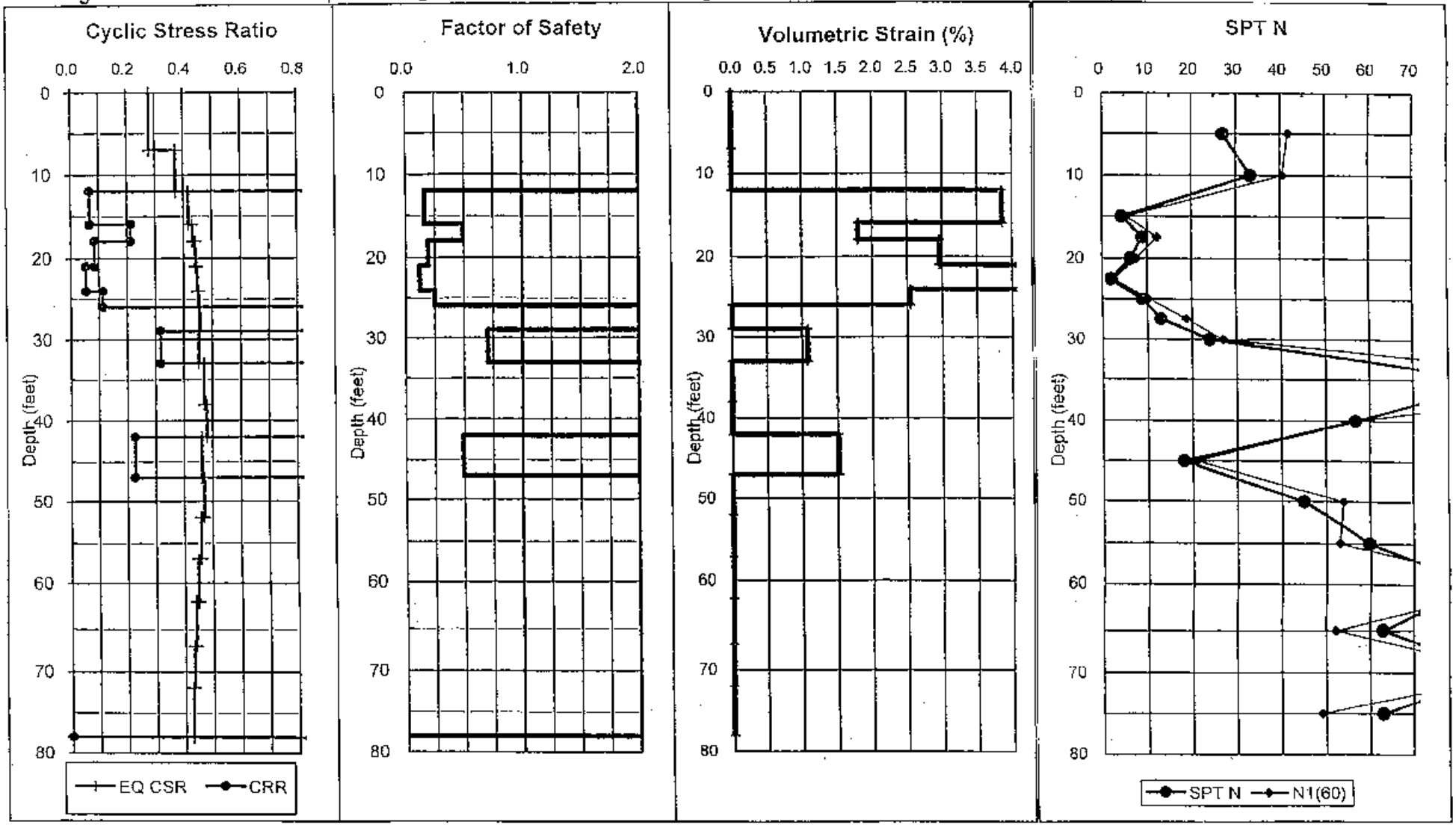
SF = $CRR_{7.5,1atm}$/CSR*

EARTH SYSTEMS - EVALUATION OF LIQUEFACTION POTENTIAL AND INDUCED SUBSIDENCE

Panay Way Parcel 21 **Project No: LA-01052-01** 1996/1998 NCEER Method

Ground Compaction Remediated to 0 foot depth

Boring: B4 Earthquake Magnitude: 7.1 PGA, g: 0.50 Calc GWT (feet): 5



Total Thickness of Liquefiable Layers: 23.0 feet

Estimated Total Ground Subsidence: 7.7 inches

LIQUEFY-v 2.26.XLS - A SPREADSHEET FOR EMPIRICAL ANALYSIS OF LIQUEFACTION POTENTIAL AND INDUCED GROUND SUBSIDENCE
Developed 2005 by Shelton L. Stringer, GE - Earth Systems Southwest

Project: Panay Way Parcel 21
Job No: LA-01052-01
Date: 8/24/2006
Boring: B5 Data Set: 4

Methods: Liquefaction Analysis using 1996 & 1998 NCEER workshop method (Youd & Idriss, editors) Journal of Geotechnical and Environmental Engineering (JGEE), October 2001, Vol 127, No. 10, ASCE
Settlement Analysis from: Tokimatsu and Seed (1987),JGEE ,Vol 113, No.8, ASCE
Modified by Pradel, JGEE, Vol 124, No. 4, ASCE

EARTHQUAKE INFORMATION:
Magnitude: 7.1 7.5
PGA, g: 0.50 0.43
MSF: 1.15
GWT: 11.0 feet
Calc GWT: 5.0 feet
Remediate to: 0.0 feet

SPT N VALUE CORRECTIONS:
Energy Correction to N60 (C_E): 1.10
Drive Rod Corr. (C_R): 1 Default
Rod Length above ground (feet): 3.0
Borehole Dia. Corr. (C_B): 1.10
Sampler Liner Correction for SPT?: 1.2 Yes
Cal Mod SPT Ratio: 0.63

Total (ft) Liquefied Thickness
13

Total (in.) Induced Subsidence
3.7

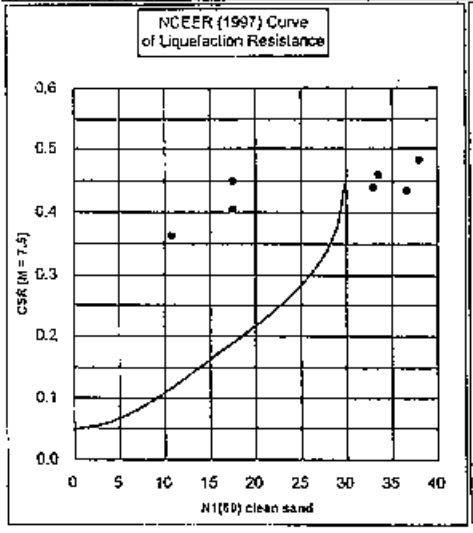
Required SF: 1.25
Threshold Acceler., g: 0.18 Minimum Calculated SF: 0.32

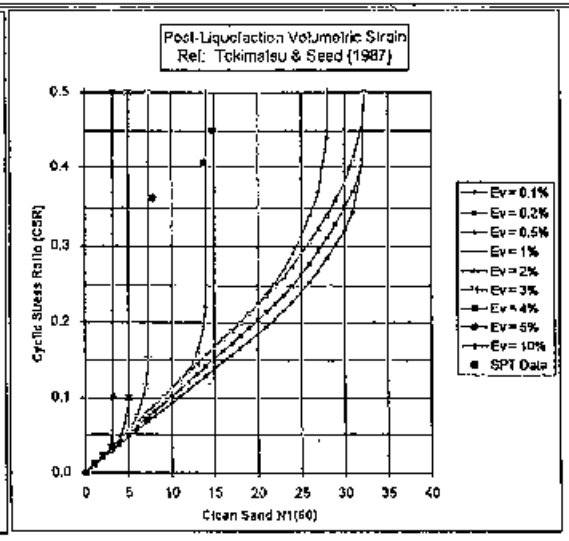
SETTLEMENT (SUBSIDENCE) OF DRY SANDS

Nc = 11.6

Base Depth (feet)	Cal Mod N	SPT N	Liquef. Suscept. (0 or 1)	Total Unit Wt. (pcf)	Fines Content (%)	Depth of SPT (feet)	Rod Length (feet)	Tot.Stress at SPT po (tsf)	Eff.Stress at SPT p'o (tsf)	rd	C_N	C_R	C_S	$N_{1(60)}$	Rel. Dens. Dr (%)	Trigger FC Adj. $\Delta N_{1(60)}$	Equiv. Sand $N_{1(60)cs}$	Kσ	M = 7.5 Available CRR	M =7.5 Induced CSR*	Liquefac. Safety Factor	Post FC Adj. $\Delta N_{1(60)}$	$N_{1(60)cs}$	Volumetric Strain (%)	Induced Subsidence (in.)
				110				0.000																	
7.0	78	49	1	141	25	5.0	8.0	0.353	0.353	0.99	1.70	0.75	1.00	75.8	100	10.0	85.8	1.00	1.200	0.280	Non-Liq.	10.0	85.8	0.00	0.00
12.0	8	5	1	113	25	10.0	13.0	0.663	0.663	0.98	1.26	0.76	1.00	5.8	29	5.0	10.8	1.00	0.117	0.362	0.32	2.0	7.8	2.92	1.75
16.0	16	10	1	124	25	15.0	18.0	0.962	0.837	0.97	1.12	0.86	1.00	11.8	41	5.7	17.5	1.00	0.189	0.405	0.47	2.0	13.8	2.03	0.97
18.0		20	1	127	44	17.5	20.5	1.119	0.916	0.96	1.07	0.90	1	30.5	66	10.0	40.5	1.00	1.200	0.418	2.87	10.0	40.5	0.00	0.00
21.0	52	33	1	124	25	20.0	23.0	1.275	0.994	0.96	1.03	0.93	1.00	38.2	74	8.7	46.9	1.00	1.200	0.427	2.81	8.7	46.9	0.00	0.00
24.0		48	1	111	25	22.5	25.5	1.420	1.061	0.95	1.00	0.96	1.30	72.4	100	10.0	82.4	1.00	1.200	0.436	2.75	10.0	82.4	0.00	0.00
26.0	17	11		121	84	25.0	28.0	1.564	1.127	0.94	1.00	0.98	1.00	12.7			12.7	1.00	Infin.	0.443	Non-Liq.		12.7	0.00	0.00
29.0		18	1	120	25	27.5	30.5	1.715	1.200	0.93	0.94	1.00	1.26	25.7	61	7.2	33.0	1.01	1.200	0.440	2.73	7.2	33.0	0.00	0.00
33.0	15	9	1	118	60	30.0	33.0	1.864	1.271	0.92	0.91	1.00	1.00	10.4	39	7.1	17.5	1.00	0.189	0.450	0.42	4.4	14.8	1.94	0.93
38.0		39	1	100	5	35.0	38.0	2.141	1.392	0.89	0.87	1.00	1.30	53	87	0.0	53.5	0.95	1.200	0.471	2.55	0.0	53.5	0.00	0.00
42.0	59	37	1	95	5	40.0	43.0	2.386	1.481	0.85	0.85	1.00	1.00	38.0	74	0.0	38.0	0.92	1.200	0.481	2.50	0.0	38.0	0.00	0.00
47.0		58	1	100	5	45.0	48.0	2.631	1.570	0.80	0.82	1.00	1.30	74.9	100	0.0	74.9	0.90	1.200	0.481	2.50	0.0	74.9	0.00	0.00
52.0	55	35	1	96	2	50.0	53.0	2.875	1.658	0.75	0.80	1.00	1.00	33.5	69	0.0	33.5	0.91	1.200	0.459	2.61	0.0	33.5	0.00	0.00
57.0		70	1	120	8	55.0	58.0	3.151	1.778	0.70	0.77	1.00	1.30	85	100	1.4	86.3	0.85	1.200	0.463	2.59	1.4	86.3	0.00	0.00
62.0	93	59	1	123	5	60.0	63.0	3.455	1.928	0.68	0.74	1.00	1.00	52.5	87	0.0	52.5	0.82	1.200	0.451	2.66	0.0	52.5	0.00	0.00
67.0		71	1	120	5	65.0	68.0	3.758	2.073	0.62	0.71	1.00	1.30	80	100	0.0	79.8	0.79	1.200	0.441	2.72	0.0	79.8	0.00	0.00
72.0	70	44	1	136	5	70.0	73.0	4.062	2.241	0.59	0.69	1.00	1.00	36.7	72	0.0	36.7	0.77	1.200	0.433	2.77	0.0	36.7	0.00	0.00
78.0		100	1	120	12	75.0	78.0	4.398	2.401	0.57	0.66	1.00	1.30	104	100	4.6	109.3	0.74	1.200	0.428	2.80	4.8	109.3	0.00	0.00
82.0	100	63	1	120	10	80.0	83.0	4.698	2.545	0.55	0.64	1.00	1.00	49.1	84	1.9	51.1	0.73	1.200	0.425	2.82	1.9	51.1	0.00	0.00

p (tsf)	G_{max} (tsf)	τ_{av} (tsf)	Shear Strain γ	Strain E_{15}	Strain Enc	Dry Sand Subsidence (in.)
0.235	958	0.113	1.9E-04			
0.444	658	0.211	1.4E-03			
0.645	932	0.303	9.1E-04			
0.750	1,329	0.350	4.9E-04			
0.854	1,469	0.397	4.7E-04			
0.952	1,897	0.436	3.5E-04			
1.048						
1.149	1,536	0.519	6.5E-04			
1.249	1,297	0.558	1.1E-03			
1.434	2,017	0.620	4.9E-04			
1.598	1,900	0.660	5.8E-04			
1.762	2,501	0.687	3.9E-04			
1.926	2,000	0.703	5.6E-04			
2.111	2,870	0.720	3.3E-04			
2.315	2,547	0.740	4.0E-04			
2.518	3,054	0.760	3.2E-04			
2.735	2,456	0.785	4.4E-04			
2.947	3,868	0.811	2.7E-04			
3.148	2,943	0.837	3.7E-04			





$N_{1(60)} = C_N * C_E * C_B * C_R * C_S * N$

C_R = 0.75 for Rod lengths < 3m, 1.0 for > 10m
= min(1,max(0.75,1.4666+2.556/(z(ft)))

$C_N = (1\ atm/p'o)^{0.5}$, max 1.7

C_S = max(1.1,min(1.3,1+$N_{1(60)}$/100)) for SPT without liners

$MSF = 10^{2.24}/M^{2.56}$

z = Depth (m)

p_a = 1 atm = 101 KPa = 1.058 tsf

$\rho = 0.67 * \rho o$

$\tau_{av} = 0.65 * PGA * po * rd$

$G_{max} = 447 * N_{1(60)cs}{}^{(1/3)} * p^{0.5}$

a = 0.0399*(ρ/1)+0.124

b = 6400*(ρ/1)$^{(-0.5)}$

$\gamma = [1+a*EXP(b*\tau_{av}/G_{max})]/[(1+a)*\tau_{av}/G_{max}]$

$E_{15} = \gamma * (N_{1(60)cs}/20)^{-1.2}$

$E_{nc} = (Nc/15)^{0.45} * E15$

$S = 2 * H * E_{nc}$

$Nc = (MAG-4)^{2.17}$

rd = (1-0.4113*z^0.5+0.04052*z+0.001753*z^1.5)/(1-0.4177*z^0.5+0.05729*z-0.006205*z^1.5+0.00121*z^2))

$\Delta N_{1(60)}$ = min(10,IF(FC<35,exp(1.76-(190/FC^2)),5)+IF(FC<=5,1,IF(FC<35,0.99+(FC^1.5/1000),1.2))*N1(60) - N1(60)

$N_{1(60)cs} = N_{1(60)} + \Delta N_{1(60)}$

Kσ = min of 1.0 or (p'o/1,058)$^{(IF(Dr>0.7,0.6,IF(Dr>0.5,0.6,0.7))-1)}$

$Dr = (N_{1(60)}/70)^{0.5}$

CSReq = 0.65*PGA*(po/p'o)*rd

CSR* = CSReq/MSF/Kσ

$CRR_{7.5} = (0.048-0.004721*N+0.0003138*N^2-0.0000187*N^3)/(1-0.1248*N+0.009576*N^2-0.0003285*N^3+0.0000037*N^4)$

N = $N_{1(60)cs}$

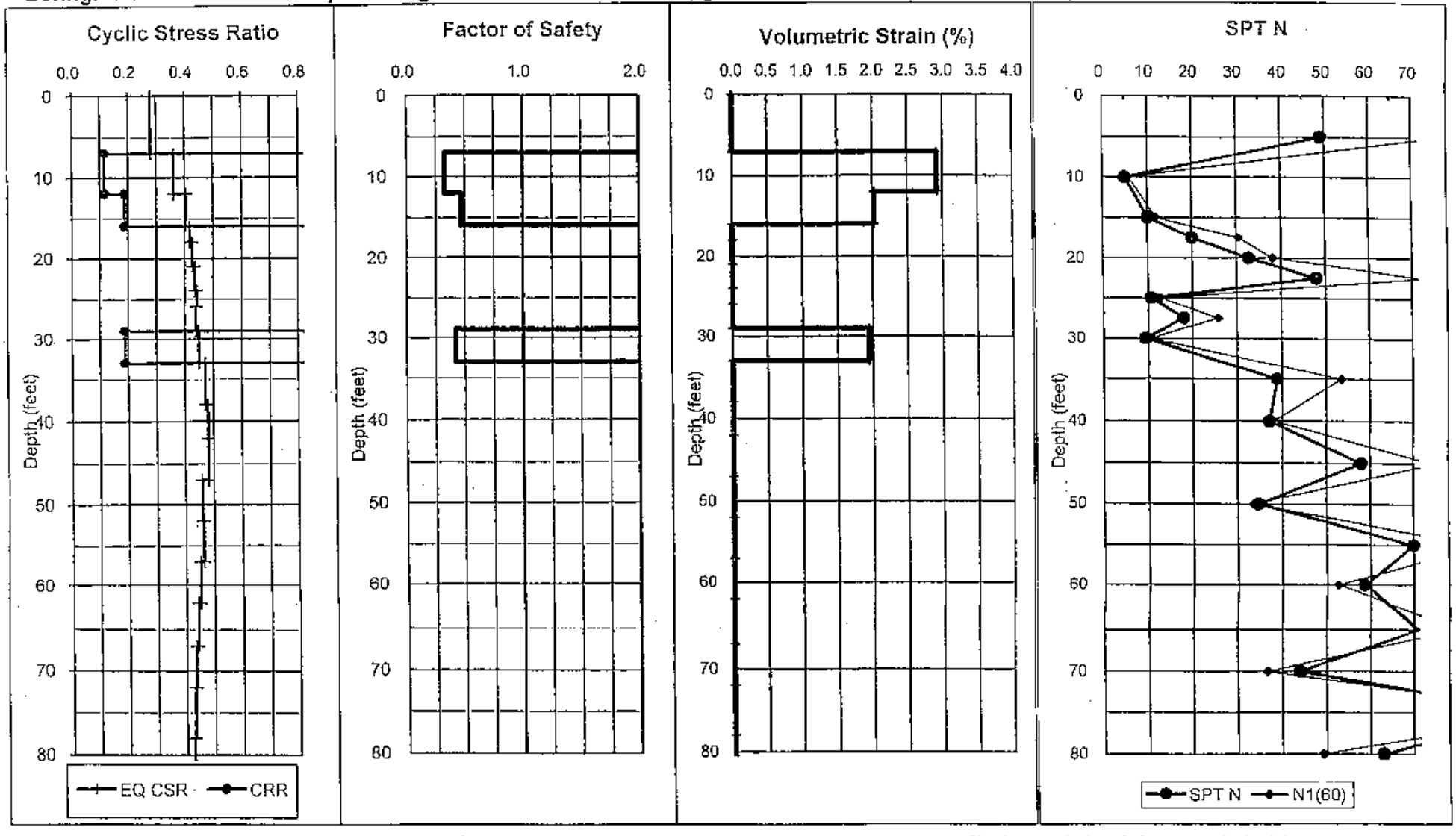
SF = $CRR_{7.5,1atm}$/CSR*

EARTH SYSTEMS - EVALUATION OF LIQUEFACTION POTENTIAL AND INDUCED SUBSIDENCE

Panay Way Parcel 21 Project No: LA-01052-01 1996/1998 NCEER Method

Ground Compaction Remediated to 0 foot depth

Boring: B5 Earthquake Magnitude: 7.1 PGA, g: 0.50 Calc GWT (feet): 5



Total Thickness of Liquefiable Layers: 13.0 feet

Estimated Total Ground Subsidence: 3.7 inches

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Panay Way Parcel 21
Job No: LA-01052-01
Date: 8/24/2005
Sounding: CPT1

Liquefaction Analysis using 1998 NCEER (Robertson & Wride) method
Settlement Analysis using Wu (2003) using clean sand Qc1n/N1(60) ratio = 5

EARTHQUAKE INFORMATION:		
Magnitude:	7.1	7.5
PGA, g:	0.60	0.43
MSF:	1.15	
GWT, feet:	8.0	
Calc GWT, feet:	5.0	

Plot: 1
Method Used: 1 1998 NCEER (Robertson & Wride)
Averaging Increment: 3 0.15 m
Induced CSR (M=7.5) = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = Cq*Kc*Ku*Qc
SF = CRR7.5*Ka/CSR

Ignore 1st/last increment into sand/silt soils: 0 m
Ignore/remediate upper: 1.2 m
Unit Weight of unsaturated soils: 100 pcf
Unit Weight of saturated soils: 120 pcf
Limiting Ic for liquefiable soils: 2.40 Limiting Ic for Kc: 2.4

Use which FC adjustment: 1 Based on Clean Sand Qc1n
Use which Apparent FC Curve: 0 Robertson Lower Bound
Use Moss @ P_L: 15%
Use Tokimatsu & Seed (1) or Ishihara & Yoshimine (2), Wu (3): 3 Wu
Required SF: 1.50 Max $\Delta N_{1(60)}$ - fines adjustment 5.0
Min SF of Liquefiable Layers: 0.25 Max $\Delta N_{1(60)}$ - apparent fines 10.0
Avg SF of Liquefiable Layers: 0.64

Total Liquefied Thickness (feet)	Total Induced Subsidence (inches)	DPI meters
9.4	2.0	0.28

SETTLEMENT OF DRY SANDS
Qc1n / N1(60) Ratio for clean sand: 5
$p = 0.67 \cdot po$
$\tau_{av} = 0.65 \cdot PGA \cdot po \cdot rd$
$G_{max} = 447 \cdot N_{1(60)cs}^{1/3} \cdot p^{0.5}$
$a = 0.0389 \cdot (p/1) + 0.124$
$b = 6400 \cdot (p/1)^{-0.6}$
$\gamma = [1 + a \cdot EXP(b \cdot \tau_{av}/G_{max})]/(1+a) \cdot \tau_{av}/G_{max}$
$E_{15} = \gamma \cdot (N_{1(60)cs}/20)^{-1.2}$
$Nc = (MAG-4)^{2.17}$
$E_{sc} = (Nc/15)^{0.45} \cdot E15$
$S = 2 \cdot H \cdot E_{sc}$
Nc = 11.6

Depth (feet)	(m)	Tip Qc (tsf)	Friction fs (tsf)	Friction Ratio Rf %	qc MPa	Total Unit Wt. (pcf)	Total Stress po (tsf)	Eff. Stress p'o (tsf)	rd	F %	n	Max 1.70 Cq	Q	Moss qc1 MPa	Moss Δqc MPa	Moss Δqc-mod MPa	Moss eff Kc	Qc1n	Ic	Liquef. Suscept. (0 or 1)	Rel. Dens. Dr (%)	Kσ
0.49	0.15	46.34	0.99	2.15	4.44	100	0.025	0.025	1.000	2.15	0.68	1.70	74.42	7.54	1.81	9.16		74.40	2.23	0		
0.98	0.30	62.46	0.73	1.18	5.98	100	0.049	0.049	1.000	1.18	0.59	1.70	100.28	10.17	0.66	10.83		100.36	1.96	0		
1.48	0.45	57.93	1.66	2.86	5.55	100	0.074	0.074	0.999	2.88	0.68	1.70	92.96	9.43	2.31	11.74		93.08	2.25	0		
1.97	0.60	35.99	1.49	4.13	3.45	100	0.098	0.098	0.997	4.14	0.76	1.70	57.67	5.86	3.55	9.41		57.83	2.51	0		
2.46	0.75	68.30	1.18	1.72	6.55	120	0.128	0.128	0.996	1.72	0.62	1.70	109.63	15.66	1.19	16.85		154.52	2.04	0		
2.95	0.90	60.38	1.33	2.21	5.78	120	0.157	0.157	0.995	2.21	0.66	1.70	96.78	13.83	1.67	15.50		136.48	2.18	0		
3.44	1.05	40.26	1.35	3.35	3.86	120	0.187	0.187	0.994	3.37	0.73	1.70	64.39	6.55	2.79	9.34		64.70	2.41	0		
3.94	1.20	30.72	1.18	3.84	2.94	120	0.217	0.217	0.993	3.87	0.77	1.70	49.02	5.00	3.26	8.26		49.37	2.54	0		
4.43	1.35	44.61	1.39	3.12	4.27	120	0.246	0.246	0.992	3.14	0.72	1.70	71.28	10.20	2.56	12.76	1.25	130.84	2.36	1	77	2.15
4.92	1.50	127.86	1.58	1.24	12.24	120	0.276	0.276	0.990	1.24	0.53	1.70	205.01	27.94	0.72	28.66	1.03	289.04	1.75	1	100	1.07
5.41	1.65	20.77	0.92	4.43	1.99	120	0.305	0.305	0.989	4.50	0.82	1.70	32.86	3.38	3.86	7.24		33.37	2.71	0		
5.91	1.80	22.73	0.54	2.39	2.18	120	0.335	0.335	0.988	2.42	0.70	1.70	35.98	3.70	1.89	5.59		36.52	2.50	0		
6.40	1.95	6.37	0.46	7.18	0.61	120	0.364	0.364	0.987	7.62	0.98	1.70	9.64	1.04	4.56	5.60		10.23	3.26	0		
6.89	2.10	2.30	0.12	5.38	0.22	120	0.394	0.394	0.986	6.49	1.00	1.70	3.07	0.37	4.62	5.00		3.70	3.61	0		
7.38	2.25	5.36	0.10	1.86	0.51	120	0.423	0.423	0.985	2.02	0.91	1.70	7.93	0.87	1.41	2.28		8.61	2.99	0		
7.87	2.40	5.36	0.12	2.23	0.49	120	0.453	0.453	0.984	2.45	0.93	1.70	7.56	0.84	1.82	2.66		8.29	3.05	0		
8.37	2.55	5.47	0.21	3.91	0.52	120	0.462	0.479	0.983	4.29	0.97	1.70	8.01	0.89	3.61	4.50		8.78	3.16	0		
8.86	2.70	3.71	0.25	6.72	0.36	120	0.512	0.493	0.982	7.75	1.00	1.70	5.17	0.60	4.80	5.41		5.87	3.47	0		
9.35	2.85	3.60	0.14	3.76	0.34	120	0.541	0.507	0.981	4.38	1.00	1.70	4.97	0.59	3.50	4.09		5.78	3.34	0		
9.84	3.00	3.64	0.12	3.12	0.37	120	0.571	0.521	0.979	3.61	1.00	1.70	5.33	0.62	2.84	3.46		6.16	3.27	0		
10.33	3.15	4.58	0.11	2.42	0.44	120	0.600	0.535	0.978	2.74	0.97	1.70	6.49	0.75	2.09	2.85		7.35	3.13	0		
10.83	3.30	4.17	0.06	1.50	0.40	120	0.630	0.549	0.977	1.71	0.95	1.70	5.82	0.68	1.10	1.78		6.70	3.07	0		
11.32	3.45	3.53	0.03	0.95	0.34	120	0.659	0.564	0.976	1.13	0.95	1.70	4.77	0.57	0.49	1.07		5.67	3.07	0		
11.81	3.60	6.67	0.04	0.54	0.66	120	0.689	0.578	0.975	0.59	0.83	1.66	9.84	1.12	0.05	1.17		10.75	2.67	0		
12.30	3.75	30.61	0.12	0.39	2.93	120	0.719	0.592	0.974	0.39	0.63	1.44	40.61	6.31	0.00	6.31	1.00	56.95	2.03	1	65	1.00
12.80	3.90	22.58	0.16	0.71	2.16	120	0.748	0.606	0.973	0.73	0.70	1.48	30.06	4.43	0.24	4.66	1.05	44.33	2.26	1	43	1.83
13.29	4.05	7.53	0.11	1.60	0.72	120	0.778	0.620	0.972	1.52	0.88	1.60	10.44	1.13	1.00	2.13		11.34	2.82	0		
13.78	4.20	4.88	0.05	1.06	0.47	120	0.807	0.634	0.971	1.22	0.92	1.60	6.43	0.78	0.63	1.41		7.39	2.97	0		
14.27	4.35	4.04	0.03	0.73	0.39	120	0.837	0.649	0.970	0.87	0.93	1.56	5.09	0.68	0.26	0.92		8.03	3.00	0		
14.76	4.50	4.44	0.07	1.54	0.43	120	0.866	0.663	0.969	1.81	0.96	1.57	5.60	0.68	1.17	1.85		6.59	3.10	0		
15.26	4.65	6.65	0.09	1.37	0.64	120	0.895	0.677	0.968	1.53	0.90	1.49	8.43	0.94	0.99	1.93		9.39	2.91	0		
15.75	4.80	7.54	0.10	1.29	0.72	120	0.925	0.691	0.967	1.42	0.88	1.46	9.42	1.03	0.90	1.93		10.38	2.85	0		
16.24	4.95	24.22	0.15	0.62	2.32	120	0.955	0.705	0.966	0.64	0.69	1.32	29.43	3.87	0.14	4.01	1.04	38.32	2.25	1	37	1.80
16.73	5.10	60.61	0.18	0.30	5.80	120	0.984	0.719	0.965	0.30	0.54	1.23	69.74	9.57	0.00	9.57	1.00	84.24	1.77	1	72	1.00
17.22	5.25	21.78	0.15	0.69	2.08	120	1.014	0.734	0.964	0.71	0.71	1.30	25.81	3.39	0.21	3.60	1.08	33.77	2.32	1	32	2.02
17.72	5.40	12.26	0.13	1.04	1.17	120	1.043	0.748	0.962	1.10	0.81	1.32	14.42	1.52	0.61	2.13		15.35	2.93	0		
18.21	5.55	10.10	0.09	0.84	0.97	120	1.073	0.762	0.961	0.91	0.82	1.31	11.57	1.26	0.39	1.66		12.51	2.58	0		
18.70	5.70	10.00	0.07	0.71	0.96	120	1.102	0.776	0.960	0.77	0.82	1.29	11.24	1.24	0.25	1.49		12.19	2.66	0		
19.19	5.85	8.18	0.09	1.13	0.78	120	1.132	0.790	0.959	1.26	0.87	1.29	9.02	1.00	0.73	1.73		9.98	2.84	0		
19.69	6.00	6.92	0.12	1.76	0.66	120	1.161	0.805	0.958	1.99	0.92	1.29	7.44	0.83	1.45	2.28		8.42	3.01	0		
20.18	6.15	10.18	0.15	1.43	0.98	120	1.191	0.819	0.955	1.56	0.86	1.25	11.05	1.18	1.07	2.25		12.01	2.81	0		
20.67	6.30	12.36	0.18	1.47	1.18	120	1.220	0.833	0.955	1.58	0.84	1.22	13.32	1.40	1.12	2.52		14.28	2.74	0		
21.16	6.45	11.46	0.25	2.17	1.10	120	1.250	0.847	0.954	2.34	0.88	1.22	12.18	1.27	1.93	3.20		13.15	2.87	0		
21.65	6.60	13.11	0.39	2.98	1.26	120	1.280	0.861	0.952	3.19	0.89	1.20	13.89	1.42	2.86	4.28		14.86	2.90	0		
22.15	6.75	11.42	0.43	3.75	1.09	120	1.309	0.875	0.951	4.08	0.92	1.19	11.87	1.23	3.75	4.98		12.65	3.01	0		
22.64	6.90	8.55	0.24	2.84	0.82	120	1.339	0.890	0.950	3.17	0.94	1.18	8.52	0.93	2.70	3.63		9.51	3.07	0		
23.13	7.05	15.06	0.34	2.15	1.44	120	1.368	0.904	0.948	2.28	0.84	1.14	15.93	1.65	1.91	3.56		18.91	2.76	0		
23.62	7.20	34.87	0.94	2.70	3.34	120	1.398	0.918	0.946	2.77	0.77	1.12	35.81	3.54	2.55	6.09		36.78	2.54	0		
24.11	7.35	113.05	1.13	1.00	10.83	120	1.427	0.932	0.945	1.01	0.57	1.07	113.90	11.43	0.58	12.01	1.05	115.28	1.87	1	83	1.16
24.61	7.50	149.61	0.84	0.56	14.33	120	1.457	0.946	0.943	0.57	0.50	1.08	149.58	15.08	0.07	15.16	1.00	149.52	1.62	1	94	1.00
25.10	7.65	220.00	1.55	0.70	21.07	120	1.486	0.960	0.941	0.71	0.50	1.05	217.29	21.88	0.24	22.12	1.01	218.24	1.56	1	100	1.00
25.59	7.80	166.08	1.79	1.08	15.91	120	1.516	0.975	0.940	1.09	0.54	1.05	163.14	16.37	0.67	17.05	1.04	164.11	1.78	1	87	1.09
26.08	7.95	139.49	1.00	0.72	13.35	120	1.545	0.989	0.938	0.72	0.52	1.04	135.64	13.75	0.25	14.00	1.02	136.60	1.72	1	90	1.05
26.57	8.10	159.79	0.52	0.33	15.31	120	1.575	1.003	0.936	0.33	0.50	1.03	154.15	15.76	0.00	15.76	1.00	155.12	1.48	1	85	1.00
27.07	8.25	143.29	0.39	0.27	13.72	120	1.604	1.017	0.934	0.28	0.50	1.02	137.15	14.05	0.00	14.05	1.00	138.13	1.48	1	80	1.00
27.56	8.40	130.81	0.46	0.35	12.53	120	1.634	1.031	0.932	0.35	0.50	1.01	124.28	12.71	0.00	12.71	1.00	125.25	1.57	1	86	1.00
28.05	8.55	122.59	0.59	0.48	11.74	120	1.663	1.045	0.930	0.48	0.51	1.01	115.58	11.81	0.00	11.81	1.00	116.58	1.67	1	83	1.00
28.54	8.70	204.18	0.81	0.40	19.55	120	1.693	1.060	0.928	0.40	0.50	1.00	191.83	19.54	0.00	19.54	1.00	192.83	1.44	1	100	1.00
29.04	8.85	238.72	0.88	0.37	22.86	120	1.722	1.074	0.925	0.37	0.50	0.99	222.98	22.69	0.00	22.69	1.00	223.97	1.37	1	100	1.00
29.53	9.00	207.40	0.67	0.32	19.86	120	1.752	1.088	0.923	0.33	0.50	0.99	192.30	19.57	0.00	19.57	1.00	193.31	1.39	1	100	1.00
30.02	9.15	183.63	0.50	0.27	17.58	120	1.781	1.102	0.920	0.28	0.50	0.98	169.03	17.17	0.00	17.17	1.00	170.05	1.41	1	99	1.00
30.51	9.30	217.88	0.84	0.39	20.86	120	1.811	1.116	0.918	0.39	0.50	0.97	199.45	20.32	0.00	20.32	1.00	200.48	1.42	1	100	1.00
31.00	9.45	205.67	1.55	0.75	19.70	120	1.841	1.131	0.915	0.76	0.50	0.97	187.21	19.21	0.29	19.51	1.02	188.24	1.63	1	100	1.00
31.50	9.60	225.54	2.43	1.08	21.60	120	1.870	1.145	0.913	1.09	0.52	0.96	203.57	21.04	0.67	21.72	1.03	204.61	1.71	1	100	1.04
31.99	9.75	208.47	2.62	1.27	19.97	120	1.900	1.159	0.910	1.28	0.54	0.95	184.86	19.21	0.89	20.10	1.05	185.70	1.79	1	100	1.10
32.48	9.90	113.00	1.70	1.51	10.82	120	1.929	1.173	0.907	1.52	0.62	0.94	89.18	10.44	1.17	11.61	1.11	100.22	2.03	1	77	1.35
32.97	10.05	56.55	1.45	2.56	5.42	120	1.959	1.187	0.904	2.62	0.73	0.92	48.45	5.21	2.40	7.61		49.21	2.42	0		
33.46	10.20	110.11	1.61	1.47	10.54	120	1.988	1.201	0.901	1.48	0.62	0.92	95.18	10.12	1.12	11.24	1.11	96.57	2.04	1	75	1.36
33.96	10.35	267.30	1.77	0.66	25.60	120	2.018	1.216	0.898	0.67	0.50	0.83	234.64	24.26	0.18	24.45	1.01	235.71	1.52	1	100	1.00
34.45	10.50	242.83	2.75	1.13	23.25	120	2.047	1.230	0.894	1.14	0.52	0.92	211.11	22.16	0.73	22.89	1.03	232.19	1.71	1	100	1.05

Depth (feet)	Ku	Clean Sand Qc1n	Ka	1.0 Kσ	CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Qc1n/$N_{1(60)}$ Ratio	Apparent Equiv. $N_{1(60)}$	FC %	FC Adj. $\Delta N_{1(60)}$	Equiv. $N_{1(60)cs}$	Volumetric Strain (%)	EPI (%)	DPI (m)	p (tsf)	G_{max} (tsf)	τ_{av} (tsf)	Shear Strain γ	Strain ε_{15}	Strain Esc
0.49	1.00		1.00	1.00		0.263	Non-Liq.	4.6	16.1	45			0.00	0.0	0.000	0.016					
0.98	1.00		1.00	1.00		0.262	Non-Liq.	5.2	19.4	29			0.00	0.0	0.000	0.033					
1.48	1.00		1.00	1.00		0.262	Non-Liq.	4.6	20.3	47			0.00	0.0	0.000	0.049					
1.97	1.00		1.00	1.00		0.262	Non-Liq.	4.1	14.1	69			0.00	0.0	0.000	0.066					
2.46	1.41		1.00	1.00		0.261	Non-Liq.	5.0	30.9	33			0.00	0.0	0.000	0.086					
2.95	1.41		1.00	1.00		0.261	Non-Liq.	4.8	28.6	43			0.00	0.0	0.000	0.106					
3.44	1.00		1.00	1.00		0.261	Non-Liq.	4.3	15.1	59			0.00	0.0	0.000	0.125					
3.94	1.00		1.00	1.00		0.261	Non-Liq.	4.0	12.2	79			0.00	0.0	0.000	0.145					
4.43	1.41	216.7	1.00	1.00	Infin.	0.260	Non-Liq.	4.4	23.0	55	10.0	33.0	0.03	0.0	0.000	0.165	582	0.079	3.3E-04	1.8E-04	1.6E-04
4.92	1.41	310.0	1.00	1.00	Infin.	0.260	Non-Liq.	5.8	51.9	18	10.0	61.9	0.01	0.0	0.000	0.185	760	0.089	2.1E-04	5.4E-05	4.8E-05
5.41	1.00		1.00	1.00		0.264	Non-Liq.	3.7	9.0	87			0.00	0.0	0.000	0.204					
5.91	1.00		1.00	1.00		0.297	Non-Liq.	4.1	8.9	67			0.00	0.0	0.000	0.224					
6.40	1.00		1.00	1.00		0.309	Non-Liq.	2.6	3.9	100			0.00	0.0	0.000	0.244					
6.89	1.00		1.00	1.00		0.320	Non-Liq.	1.9	1.9	100			0.00	0.0	0.000	0.264					
7.38	1.00		1.00	1.00		0.330	Non-Liq.	3.1	2.7	100			0.00	0.0	0.000	0.284					
7.87	1.00		1.00	1.00		0.339	Non-Liq.	3.0	2.7	100			0.00	0.0	0.000	0.303					
8.37	1.00		1.00	1.00		0.348	Non-Liq.	2.8	3.1	100			0.00	0.0	0.000	0.323					
8.86	1.00		1.00	1.00		0.356	Non-Liq.	2.2	2.7	100			0.00	0.0	0.000	0.343					
9.35	1.00		1.00	1.00		0.363	Non-Liq.	2.5	2.3	100			0.00	0.0	0.000	0.363					
9.84	1.00		1.00	1.00		0.370	Non-Liq.	2.6	2.4	100			0.00	0.0	0.000	0.382					
10.33	1.00		1.00	1.00		0.376	Non-Liq.	2.9	2.6	100			0.00	0.0	0.000	0.402					
10.83	1.00		1.00	1.00		0.382	Non-Liq.	3.0	2.2	100			0.00	0.0	0.000	0.422					
11.32	1.00		1.00	1.00		0.387	Non-Liq.	3.0	1.9	100			0.00	0.0	0.000	0.442					
11.81	1.00		1.00	1.00		0.392	Non-Liq.	3.8	2.8	63			0.00	0.0	0.000	0.462					
12.30	1.41	58.5	1.00	1.00	0.098	0.397	0.25	5.0	11.7	32	3.1	11.7	3.43	30.1	0.045	0.481	704	0.228	1.3E-03		
12.80	1.41	81.1	1.00	1.00	0.130	0.401	0.32	4.6	8.7	47	5.0	14.7	2.63	20.0	0.030	0.501	775	0.237	1.0E-03		
13.29	1.00		1.00	1.00		0.405	Non-Liq.	3.5	3.3	100			0.00	0.0	0.000	0.521					
13.78	1.00		1.00	1.00		0.409	Non-Liq.	3.2	2.3	100			0.00	0.0	0.000	0.541					
14.27	1.00		1.00	1.00		0.413	Non-Liq.	3.1	1.9	100			0.00	0.0	0.000	0.561					
14.76	1.00		1.00	1.00		0.417	Non-Liq.	2.9	2.2	100			0.00	0.0	0.000	0.580					
15.26	1.00		1.00	1.00		0.420	Non-Liq.	3.3	2.8	100			0.00	0.0	0.000	0.600					
15.75	1.00		1.00	1.00		0.423	Non-Liq.	3.4	3.0	100			0.00	0.0	0.000	0.620					
16.24	1.26	68.8	1.00	1.00	0.110	0.426	0.26	4.6	8.3	47	5.0	13.3	3.12	25.0	0.038	0.640	848	0.300	1.2E-03		
16.73	1.26	89.2	1.00	1.00	0.148	0.429	0.34	5.5	16.3	19	1.7	17.8	2.47	20.0	0.030	0.659	949	0.309	9.0E-04		
17.22	1.26	68.2	1.00	1.00	0.109	0.431	0.25	4.5	7.6	52	5.0	12.6	3.33	27.7	0.042	0.679	857	0.317	1.3E-03		
17.72	1.00		1.00	1.00		0.434	Non-Liq.	3.8	4.0	80			0.00	0.0	0.000	0.699					
18.21	1.00		1.00	1.00		0.436	Non-Liq.	3.8	3.3	84			0.00	0.0	0.000	0.719					
18.70	1.00		1.00	1.00		0.438	Non-Liq.	3.8	3.2	82			0.00	0.0	0.000	0.739					
19.19	1.00		1.00	1.00		0.440	Non-Liq.	3.4	2.9	100			0.00	0.0	0.000	0.758					
19.69	1.00		1.00	1.00		0.442	Non-Liq.	3.3	2.7	100			0.00	0.0	0.000	0.778					
20.18	1.00		1.00	1.00		0.444	Non-Liq.	3.5	3.4	98			0.00	0.0	0.000	0.798					
20.67	1.00		1.00	1.00		0.446	Non-Liq.	3.6	3.9	91			0.00	0.0	0.000	0.818					
21.16	1.00		1.00	1.00		0.447	Non-Liq.	3.4	3.9	100			0.00	0.0	0.000	0.838					
21.65	1.00		1.00	1.00		0.449	Non-Liq.	3.3	4.5	100			0.00	0.0	0.000	0.857					
22.15	1.00		1.00	1.00		0.450	Non-Liq.	3.1	4.1	100			0.00	0.0	0.000	0.877					
22.64	1.00		1.00	1.00		0.451	Non-Liq.	3.0	3.2	100			0.00	0.0	0.000	0.897					
23.13	1.00		1.00	1.00		0.452	Non-Liq.	3.6	4.7	93			0.00	0.0	0.000	0.917					
23.62	1.00		1.00	1.00		0.453	Non-Liq.	4.0	9.1	70			0.00	0.0	0.000	0.936					
24.11	1.00	133.9	1.00	1.00	0.303	0.454	0.67	5.3	21.8	23	5.0	26.8	1.48	4.8	0.007	0.956	1,305	0.438	7.1E-04		
24.61	1.00	149.5	1.00	1.00	0.393	0.455	0.86	5.8	25.7	12	4.2	29.9	1.11	3.7	0.006	0.976	1,377	0.447	6.6E-04		
25.10	1.00	218.2	1.00	1.00	Infin.	0.456	Non-Liq.	5.9	35.7	10	7.0	43.6	0.03	0.0	0.000	0.996	1,571	0.455	5.1E-04		
25.59	1.00	178.9	1.00	1.00	Infin.	0.457	Non-Liq.	5.5	29.7	18	6.0	35.8	0.00	0.0	0.000	1.016	1,484	0.463	5.8E-04		
26.08	1.00	143.5	1.00	1.00	0.355	0.457	0.78	5.6	24.3	18	4.4	28.7	1.25	4.1	0.006	1.035	1,393	0.471	6.9E-04		
26.57	1.00	155.1	1.00	1.00	0.427	0.458	0.93	6.1	25.4	8	5.0	30.4	1.06	3.6	0.005	1.055	1,433	0.479	6.6E-04		
27.07	1.00	138.1	1.00	1.00	0.326	0.458	0.71	6.1	22.7	8	4.9	27.6	1.37	4.5	0.007	1.075	1,401	0.487	7.1E-04		
27.56	1.00	125.2	1.00	1.00	0.263	0.459	0.57	5.9	21.2	11	3.9	25.0	1.66	5.2	0.009	1.095	1,368	0.495	7.7E-04		
28.05	1.00	116.5	1.00	1.00	0.227	0.459	0.50	5.7	20.4	14	3.0	23.3	1.86	6.3	0.013	1.114	1,348	0.503	8.2E-04		
28.54	1.00	192.8	1.00	1.00	Infin.	0.459	Non-Liq.	6.2	31.3	6	7.3	38.6	0.00	0.0	0.000	1.134	1,608	0.510	5.7E-04		
29.04	1.00	224.0	1.00	1.00	Infin.	0.459	Non-Liq.	6.3	35.5	4	9.3	44.8	0.00	0.0	0.000	1.154	1,705	0.518	5.2E-04		
29.53	1.00	193.3	0.99	1.00	Infin.	0.459	Non-Liq.	6.3	30.9	5	7.8	38.7	0.00	0.0	0.000	1.174	1,638	0.526	5.8E-04		
30.02	1.00	170.0	0.99	1.00	Infin.	0.459	Non-Liq.	6.2	27.2	5	6.8	34.0	0.00	0.0	0.000	1.194	1,582	0.533	6.3E-04		
30.51	1.00	200.5	0.99	1.00	Infin.	0.459	Non-Liq.	6.2	32.3	6	7.8	40.1	0.00	0.0	0.000	1.213	1,665	0.540	5.6E-04		
31.00	1.00	188.2	0.98	1.00	Infin.	0.458	Non-Liq.	5.8	32.4	13	5.3	37.6	0.00	0.0	0.000	1.233	1,654	0.548	5.9E-04		
31.50	1.00	213.8	0.98	1.00	Infin.	0.458	Non-Liq.	5.6	36.2	16	6.5	42.8	0.00	0.0	0.000	1.253	1,750	0.555	5.3E-04		
31.99	1.00	204.2	0.98	1.00	Infin.	0.458	Non-Liq.	5.5	33.8	20	7.0	40.8	0.00	0.0	0.000	1.273	1,737	0.562	5.6E-04		
32.48	1.00	135.0	0.99	0.99	0.309	0.458	0.67	5.0	20.0	32	5.0	25.0	1.66	5.7	0.009	1.293	1,480	0.569	7.9E-04		
32.97	1.00		0.99	0.99		0.457	Non-Liq.	4.3	11.6	60			0.00	0.0	0.000	1.312					
33.46	1.00	130.9	0.99	0.98	0.288	0.457	0.62	5.0	19.3	33	5.0	24.3	1.74	6.4	0.010	1.332	1,494	0.582	8.1E-04		
33.96	1.00	235.7	0.96	0.98	Infin.	0.458	Non-Liq.	6.0	39.1	9	8.1	47.1	0.00	0.0	0.000	1.352	1,877	0.589	5.2E-04		
34.45	1.00	222.3	0.95	0.97	Infin.	0.456	Non-Liq.	5.6	37.6	16	6.8	44.5	0.00	0.0	0.000	1.372	1,855	0.595	5.4E-04		

Depth (feet)	(m)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio Rf %	qc MPa	Total Unit Wt. (pcf)	Total Stress po (tsf)	Eff. Stress p'o (tsf)	rd	F %	n	Max 1.70 Cq	Q	Moss qc1 MPa	Moss Δqc MPa	Moss qc1,mod MPa	Moss αll Kc	Qc1n	Ic	Override	Liquef. Suscept. [0 or 1]	Rel. Dens. Dr (%)
34.94	10.65	352.48	2.69	0.79	33.75	120	2.077	1.244	0.891	0.76	0.50	0.92	306.17	31.82	0.30	32.22	1.01	307.25	1.48		1	100
35.43	10.80	264.26	1.49	0.56	25.31	120	2.106	1.258	0.888	0.57	0.50	0.92	227.96	23.57	0.07	23.64	1.00	229.05	1.48		1	100
35.93	10.95	260.57	1.02	0.39	24.55	120	2.136	1.272	0.884	0.39	0.50	0.91	223.50	22.86	0.00	22.86	1.00	224.80	1.39		1	100
36.42	11.10	320.84	1.18	0.37	30.72	120	2.165	1.286	0.880	0.37	0.50	0.91	273.91	28.04	0.00	28.04	1.00	275.02	1.30		1	100
36.91	11.25	305.42	1.52	0.50	29.25	120	2.195	1.301	0.877	0.50	0.50	0.90	259.26	26.82	0.00	26.82	1.00	260.35	1.40		1	100
37.40	11.40	340.36	2.17	0.64	32.59	120	2.224	1.315	0.873	0.64	0.50	0.90	287.47	30.06	0.16	30.21	1.01	288.59	1.44		1	100
37.89	11.55	271.40	2.20	0.81	25.99	120	2.254	1.329	0.869	0.81	0.50	0.89	227.77	23.97	0.36	24.33	1.01	228.68	1.59		1	100
38.39	11.70	280.68	2.23	0.79	26.88	120	2.283	1.343	0.865	0.80	0.50	0.89	234.33	24.69	0.34	25.03	1.01	235.48	1.57		1	100
38.88	11.85	289.04	3.04	1.05	27.58	120	2.313	1.357	0.861	1.06	0.50	0.88	239.83	25.58	0.63	26.21	1.02	240.98	1.65		1	100
39.37	12.00	287.88	3.52	1.22	27.57	120	2.343	1.371	0.857	1.23	0.52	0.87	236.63	25.51	0.83	26.34	1.03	237.76	1.71		1	100
39.86	12.15	322.47	3.61	1.12	30.88	120	2.372	1.386	0.852	1.13	0.50	0.87	265.05	28.47	0.71	29.18	1.03	266.20	1.65		1	100
40.35	12.30	292.39	3.67	1.26	28.00	120	2.402	1.400	0.848	1.26	0.52	0.86	237.64	25.78	0.87	26.65	1.03	238.76	1.72		1	100
40.85	12.45	182.00	2.92	1.61	17.43	120	2.431	1.414	0.843	1.62	0.59	0.84	143.94	15.98	1.27	17.24	1.06	145.07	1.94		1	92
41.34	12.60	340.03	1.79	0.52	32.65	120	2.461	1.428	0.839	0.53	0.50	0.86	275.19	28.93	0.03	28.96	1.00	277.35	1.39		1	100
41.83	12.75	370.48	1.31	0.35	35.48	120	2.490	1.442	0.834	0.35	0.50	0.86	298.75	30.72	0.00	30.72	1.00	299.91	1.26		1	100
42.32	12.90	383.02	1.06	0.28	36.68	120	2.520	1.456	0.830	0.28	0.50	0.85	307.38	31.17	0.00	31.17	1.00	308.55	1.18		1	100
42.81	13.05	365.32	0.88	0.24	34.98	120	2.548	1.471	0.825	0.24	0.50	0.85	291.69	29.27	0.00	29.27	1.00	292.87	1.17		1	100
43.31	13.20	354.49	0.74	0.21	33.95	120	2.579	1.485	0.820	0.21	0.50	0.84	281.65	27.94	0.00	27.94	1.00	282.83	1.18		1	100
43.80	13.35	325.38	0.75	0.23	31.16	120	2.608	1.499	0.816	0.23	0.50	0.84	257.16	25.61	0.00	25.61	1.00	258.37	1.21		1	100
44.29	13.50	342.05	1.01	0.30	32.75	120	2.638	1.513	0.811	0.30	0.50	0.84	269.14	27.34	0.00	27.34	1.00	270.33	1.25		1	100
44.78	13.65	369.83	1.07	0.29	35.42	120	2.667	1.527	0.806	0.29	0.50	0.83	289.73	29.45	0.00	29.45	1.00	290.93	1.22		1	100
45.28	13.80	407.76	1.02	0.25	39.05	120	2.697	1.542	0.801	0.25	0.50	0.83	318.06	32.06	0.00	32.06	1.00	319.29	1.15		1	100
45.77	13.95	478.28	1.36	0.29	45.80	120	2.726	1.556	0.796	0.29	0.50	0.82	371.59	38.01	0.00	38.01	1.00	372.80	1.13		1	100
46.26	14.10	514.39	2.02	0.39	49.26	120	2.756	1.570	0.791	0.39	0.50	0.82	397.91	41.75	0.00	41.75	1.00	399.13	1.19		1	100
46.75	14.25	491.33	1.99	0.41	47.05	120	2.785	1.584	0.786	0.41	0.50	0.82	378.31	39.76	0.00	39.76	1.00	379.53	1.22		1	100
47.24	14.40	505.46	1.38	0.27	48.40	120	2.815	1.598	0.781	0.27	0.50	0.81	387.48	39.58	0.00	39.59	1.00	388.71	1.10		1	100
47.74	14.55	511.46	1.44	0.28	48.98	120	2.844	1.612	0.776	0.28	0.50	0.81	390.35	40.01	0.00	40.01	1.00	391.55	1.11		1	100
48.23	14.70	446.87	1.57	0.35	42.79	120	2.874	1.627	0.771	0.35	0.50	0.81	339.40	35.27	0.00	35.27	1.00	340.64	1.21		1	100
48.72	14.85	420.05	1.35	0.32	40.22	120	2.904	1.641	0.766	0.32	0.50	0.80	317.57	32.71	0.00	32.71	1.00	316.81	1.21		1	100
49.21	15.00	329.63	1.29	0.39	31.57	120	2.933	1.655	0.761	0.39	0.50	0.80	247.48	25.78	0.00	25.78	1.00	249.11	1.35		1	100
49.70	15.15	269.01	1.44	0.54	25.76	120	2.963	1.669	0.756	0.54	0.50	0.80	201.18	21.29	0.04	21.33	1.00	202.44	1.51		1	100
50.20	15.30	238.07	1.77	0.74	22.80	120	2.992	1.683	0.751	0.75	0.50	0.79	177.13	19.13	0.27	19.40	1.01	178.39	1.64		1	100
50.69	15.45	242.53	2.38	0.99	23.22	120	3.022	1.697	0.746	0.99	0.52	0.78	177.71	19.80	0.54	20.33	1.03	178.86	1.72		1	100
51.18	15.60	257.65	2.78	1.09	24.67	120	3.051	1.712	0.741	1.09	0.53	0.78	187.72	21.14	0.64	21.78	1.03	188.97	1.73		1	100
51.67	15.75	264.73	2.79	1.06	25.35	120	3.081	1.726	0.736	1.06	0.52	0.77	192.45	21.65	0.61	22.28	1.03	193.71	1.72		1	100
52.17	15.90	283.35	2.64	0.93	27.13	120	3.110	1.740	0.731	0.94	0.51	0.76	207.03	22.98	0.48	23.49	1.02	206.28	1.66		1	100
52.66	16.05	298.82	2.07	0.69	28.62	120	3.140	1.754	0.726	0.70	0.50	0.76	218.00	23.73	0.21	23.94	1.01	219.35	1.55		1	100
53.15	16.20	309.33	1.85	0.60	29.62	120	3.169	1.768	0.721	0.60	0.50	0.77	224.65	24.25	0.11	24.35	1.00	226.15	1.50		1	100
53.64	16.35	304.73	2.17	0.71	29.18	120	3.199	1.782	0.716	0.72	0.50	0.77	220.60	24.12	0.23	24.35	1.01	221.90	1.55		1	100
54.13	16.50	267.48	2.25	0.84	25.61	120	3.228	1.797	0.712	0.85	0.50	0.77	192.41	21.27	0.37	21.64	1.02	193.71	1.69		1	100
54.63	16.65	179.78	2.47	1.37	17.22	120	3.258	1.811	0.707	1.39	0.59	0.73	122.79	14.51	0.95	15.46	1.07	124.04	1.94		1	86
55.12	16.80	174.23	2.42	1.39	16.68	120	3.287	1.825	0.702	1.40	0.59	0.72	118.14	14.01	0.97	14.98	1.07	119.39	1.95		1	84
55.61	16.95	181.07	2.16	1.19	17.34	120	3.317	1.839	0.698	1.21	0.57	0.73	123.41	14.40	0.75	15.16	1.05	124.67	1.90		1	88
56.10	17.10	209.70	2.69	1.28	20.08	120	3.346	1.853	0.693	1.29	0.57	0.73	143.03	16.83	0.85	17.68	1.05	144.31	1.87		1	92
56.59	17.25	250.72	3.57	1.43	24.01	120	3.376	1.868	0.689	1.44	0.56	0.73	171.07	20.35	1.00	21.36	1.05	172.35	1.85		1	99
57.09	17.40	199.19	4.21	2.11	19.07	120	3.406	1.882	0.684	2.13	0.62	0.70	130.55	16.38	1.74	18.12	1.11	131.78	2.06		1	88
57.58	17.55	183.54	4.13	2.25	17.58	120	3.435	1.896	0.680	2.27	0.63	0.69	116.68	15.07	1.89	16.85	1.13	118.92	2.11		1	84
58.07	17.70	160.04	3.56	2.22	15.33	120	3.465	1.910	0.675	2.25	0.64	0.68	102.15	13.03	1.85	14.88	1.14	103.38	2.15		1	78
58.56	17.85	179.75	3.76	2.09	17.21	120	3.494	1.924	0.671	2.12	0.63	0.69	115.42	14.62	1.71	16.33	1.12	116.58	2.09		1	83
59.06	18.00	222.69	4.19	1.88	21.32	120	3.524	1.938	0.667	1.90	0.60	0.70	145.13	18.12	1.48	19.60	1.08	146.40	1.99		1	93
59.55	18.15	265.84	4.03	1.52	25.46	120	3.553	1.953	0.663	1.53	0.56	0.71	176.62	21.44	1.09	22.53	1.05	177.93	1.86		1	100
60.04	18.30	277.58	3.43	1.24	26.58	120	3.583	1.967	0.659	1.24	0.54	0.72	186.40	22.06	0.78	22.85	1.04	187.73	1.78		1	100
60.53	18.45	291.59	3.35	1.15	27.93	120	3.612	1.981	0.656	1.16	0.53	0.72	196.53	23.06	0.69	23.76	1.03	197.88	1.74		1	100
61.02	18.60	323.28	3.85	1.19	30.96	120	3.642	1.995	0.651	1.20	0.52	0.72	217.85	25.68	0.74	26.42	1.03	219.21	1.72		1	100
61.52	18.75	297.32	4.00	1.35	28.47	120	3.671	2.009	0.647	1.36	0.54	0.71	197.01	23.70	0.93	24.60	1.04	198.36	1.79		1	100
62.01	18.90	299.14	4.11	1.37	28.65	120	3.701	2.023	0.643	1.38	0.54	0.70	197.25	23.84	0.92	24.76	1.04	198.59	1.80		1	100
62.50	19.05	304.43	4.45	1.46	29.15	120	3.730	2.038	0.640	1.47	0.55	0.70	190.32	24.34	1.02	25.36	1.04	200.66	1.82		1	100
62.99	19.20	309.68	5.25	1.70	29.66	120	3.760	2.052	0.636	1.71	0.56	0.69	199.43	24.90	1.27	26.17	1.05	200.77	1.87		1	100
63.48	19.35	324.87	5.59	1.72	31.11	120	3.789	2.066	0.633	1.73	0.56	0.69	209.53	26.24	1.29	27.52	1.05	210.87	1.88		1	100
63.98	19.50	349.00	5.84	1.67	33.42	120	3.819	2.080	0.629	1.68	0.55	0.69	225.57	28.17	1.24	29.40	1.04	226.92	1.83		1	100
64.47	19.65	346.87	6.05	1.74	33.22	120	3.848	2.094	0.626	1.76	0.56	0.68	222.56	28.02	1.31	29.32	1.05	223.92	1.86		1	100
64.96	19.80	321.45	5.43	1.69	30.78	120	3.878	2.108	0.622	1.70	0.56	0.68	204.93	25.78	1.25	27.03	1.05	206.29	1.86		1	100
65.45	19.95	327.26	4.83	1.48	31.34	120	3.907	2.123	0.619	1.49	0.55	0.68	210.04	25.97	1.02	26.98	1.04	211.41	1.80		1	100
65.94	20.10	239.07	4.63	1.94	22.86	120	3.937	2.137	0.616	1.96	0.60	0.66	146.55	19.02	1.50	20.52	1.08	147.87	2.00		1	93
66.44	20.25	243.51	3.73	1.53	23.32	120	3.967	2.151	0.613	1.55	0.58	0.66	151.56	19.05	1.08	20.13	1.05	152.91	1.91		1	94
66.93	20.40	237.25	3.17	1.33	22.72	120	3.996	2.165	0.610	1.35	0.57	0.67	146.18	18.30	0.87	19.17	1.05	148.55	1.87		1	94
67.42	20.55	263.85	3.31	1.23	25.84	120	4.026	2.179	0.607	1.24	0.55	0.67	170.47	20.76	0.78	21.52	1.04	171.85	1.80		1	99
67.91	20.70	194.05	2.76	1.42	18.59	120	4.055	2.193	0.604	1.44	0.59	0.65	117.86	14.84	0.96	15.80	1.08	119.23	1.88		1	84
68.41	20.85	215.70	3.31	1.54	20.66	120	4.085	2.208	0.601	1.55	0.59	0.65	130.68	16.65	1.07	17.73	1.06	132.23	1.95		1	88
68.90	21.00	269.45	3.97	1.47	25.80	120	4.114	2.222	0.598	1.49	0.57	0.66	165.09	20.93	1.01	21.93	1.05	167.47	1.87		1	98
69.39	21.15	257.94	3.50	1.36	24.70	120	4.144	2.236	0.595	1.37	0.56	0.66	158.82	19.81	0.88	20.70	1.04	160.21	1.86		1	96
69.88	21.30	231.67	3.59	1.55	22.18	120	4.173	2.250	0.593	1.57	0.58	0.64	139.56	17.87	1.08	18.95	1.06	140.93	1.94		1	91
70.37	21.45	243.70	4.03	1.65	23.36	120	4.203	2.264	0.590	1.67	0.59	0.64	146.12	18.91	1.19	20.09	1.06	147.49	1.95		1	93
70.87	21.60	228.20	4.46	1.95	21.85	120	4.232	2.279	0.587	1.97	0.61	0.63	133.50	17.65	1.50	19.15	1.08	135.25	2.03		1	89
71.36	21.75	247.61	5.23	2.11	23.71	120	4.262	2.293	0.585	2.13	0.61	0.62	144.73	19.53	1.66	21.19	1.08	146.09	2.03		1	93
71.85	21.90	279.12	6.87	2.46	26.73	120	4.291	2.307	0.582	2.48	0.62	0.62	161.95	22.35	2.01	24.36	1.09	163.30	2.05		1	97
72.34	22.05	254.80	7.99	3.13	24.40	120	4.321	2.321	0.580	3.16	0.65	0.60	143.41	20.63	2.70	23.33	1.13	144.73	2.16		1	92
72.83	22.20	201.61	7.81	3.87	19.31	120	4.350	2.335	0.578	3.92	0.69	0.58	109.14	16.35	3.45	19.80	1.21	110.41	2.31		1	81
73.33	22.35	176.83	6.69	3.79	16.93	120	4.380	2.349	0.575	3.84	0.70	0.57	94.51	14.21	3.36	17.57	1.24	95.79	2.34		1	75
73.82	22.50	213.35	5.72	2.68	20.43	120	4.409	2.364	0.573	2.71	0.65	0.59	118.53	16.88	2.22	19.10	1.13	119.85	2.16		1	84
74.31	22.65	261.43	6.62	2.53	25.04	120	4.439	2.378	0.571	2.55	0.62	0.60	147.86	20.77	2.07	22.84	1.10	149.01	2.08		1	93
74.80	22.80	294.17	8.20	2.79	28.17	120	4.469	2.392	0.568	2.81	0.63	0.60	165.53	23.62	2.33	25.95	1.10	168.68	2.09		1	98
75.30	22.95	276.66	8.72	3.15	26.49	120	4.498	2.406	0.566	3.18	0.64	0.59	152.74	22.32	2.70	25.01	1.12	154.08	2.15		1	95
75.79	23.10	262.58	8.11	3.09	25.15	120	4.528	2.420	0.564	3.12	0.65	0.59	144.09	21.07	2.63	23.70	1.12	145.43	2.16		1	92
76.28	23.25	284.14	8.03	2.83	27.21	120	4.557	2.434	0.562	2.85	0.63	0.59	157.42	22.72	2.36	25.08	1.10	158.78	2.10		1	96

Depth (feet)	K_c	K_α	Clean Sand Qc1n	Idriss K_σ	1.0 K_σ	CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Qc1n/$N_{1(60)}$ Ratio	Apparent Equiv. $N_{1(60)}$	FC %	FC Adj. $\Delta N_{1(60)}$	Equiv. $N_{1(60)cs}$	Volumetric Strain (%)	εK (%)	Δh (m)	p (tsf)	G_{max} (tsf)	τ_{av} (tsf)	Shear Strain γ	Strain E_{N}	Strain Exc
34.94	1.00	1.00	307.3	1.00	0.97	Infin.	0.455	Non-Liq.	6.1	50.3	8	10.0	60.3	0.00	0.0	0.000	1.391	2.068	0.601	4.5E-04		
35.43	1.00	1.00	228.1	0.95	0.96	Infin.	0.454	Non-Liq.	6.1	37.5	8	9.3	46.8	0.00	0.0	0.000	1.411	1.900	0.608	5.3E-04		
35.93	1.00	1.00	224.8	0.94	0.96	Infin.	0.453	Non-Liq.	6.3	35.7	5	9.2	44.9	0.00	0.0	0.000	1.431	1.901	0.614	5.3E-04		
36.42	1.00	1.00	275.0	0.94	0.95	Infin.	0.452	Non-Liq.	5.5	49.7	3	5.3	55.0	0.00	0.0	0.000	1.451	2.046	0.620	4.7E-04		
36.91	1.00	1.00	260.4	0.94	0.95	Infin.	0.450	Non-Liq.	6.3	41.6	5	10.0	51.6	0.00	0.0	0.000	1.471	2.016	0.625	4.9E-04		
37.40	1.00	1.00	288.6	0.93	0.94	Infin.	0.449	Non-Liq.	6.2	45.7	6	10.0	56.7	0.00	0.0	0.000	1.490	2.097	0.631	4.7E-04		
37.89	1.00	1.00	228.9	0.93	0.94	Infin.	0.448	Non-Liq.	5.9	38.8	11	8.9	45.8	0.00	0.0	0.000	1.510	1.965	0.636	5.3E-04		
38.39	1.00	1.00	235.5	0.93	0.94	Infin.	0.447	Non-Liq.	5.9	39.8	11	7.3	47.1	0.00	0.0	0.000	1.530	1.997	0.642	5.2E-04		
38.88	1.01	1.00	242.4	0.93	0.93	Infin.	0.445	Non-Liq.	5.8	41.8	14	6.6	48.5	0.00	0.0	0.000	1.550	2.028	0.647	5.1E-04		
39.37	1.04	1.00	248.0	0.92	0.93	Infin.	0.444	Non-Liq.	5.7	42.0	16	7.6	49.5	0.00	0.0	0.000	1.569	2.058	0.652	5.0E-04		
39.86	1.00	1.00	266.4	0.92	0.92	Infin.	0.442	Non-Liq.	5.8	46.1	13	7.2	53.3	0.00	0.0	0.000	1.589	2.121	0.657	4.8E-04		
40.35	1.05	1.00	250.3	0.92	0.92	Infin.	0.440	Non-Liq.	5.6	42.3	16	7.7	50.1	0.00	0.0	0.000	1.609	2.090	0.662	5.0E-04		
40.85	1.73	1.00	178.2	0.96	0.92	Infin.	0.439	Non-Liq.	5.2	27.9	27	7.8	35.6	0.00	0.0	0.000	1.628	1.878	0.666	6.0E-04		
41.34	1.00	1.00	277.4	0.91	0.91	Infin.	0.437	Non-Liq.	6.3	44.3	5	10.0	54.3	0.00	0.0	0.000	1.649	2.173	0.671	4.7E-04		
41.83	1.00	1.00	299.9	0.91	0.91	Infin.	0.435	Non-Liq.	5.5	54.2	2	5.8	60.0	0.00	0.0	0.000	1.668	2.260	0.675	4.5E-04		
42.32	1.00	1.00	308.5	1.00	0.90	Infin.	0.433	Non-Liq.	5.5	55.8	0	5.9	61.7	0.00	0.0	0.000	1.688	2.295	0.679	4.4E-04		
42.81	1.00	1.00	292.9	0.90	0.90	Infin.	0.432	Non-Liq.	5.5	52.9	0	5.6	58.5	0.00	0.0	0.000	1.708	2.269	0.684	4.5E-04		
43.31	1.00	1.00	282.8	0.90	0.90	Infin.	0.430	Non-Liq.	5.5	51.1	0	5.4	56.5	0.00	0.0	0.000	1.728	2.255	0.688	4.6E-04		
43.80	1.00	1.00	258.4	0.90	0.89	Infin.	0.428	Non-Liq.	5.5	46.7	0	5.0	51.7	0.00	0.0	0.000	1.748	2.201	0.691	4.8E-04		
44.29	1.00	1.00	270.3	0.89	0.89	Infin.	0.426	Non-Liq.	5.5	48.9	1	5.2	54.1	0.00	0.0	0.000	1.767	2.247	0.695	4.6E-04		
44.78	1.00	1.00	290.9	0.89	0.89	Infin.	0.424	Non-Liq.	5.5	52.6	1	5.6	58.2	0.00	0.0	0.000	1.787	2.316	0.699	4.4E-04		
45.28	1.00	1.00	319.3	1.00	0.88	Infin.	0.421	Non-Liq.	5.5	57.7	0	6.1	63.8	0.00	0.0	0.000	1.807	2.402	0.702	4.2E-04		
45.77	1.00	1.00	372.8	1.00	0.88	Infin.	0.419	Non-Liq.	5.5	67.4	0	7.2	74.6	0.00	0.0	0.000	1.827	2.543	0.705	3.9E-04		
46.26	1.00	1.00	399.1	1.00	0.88	Infin.	0.417	Non-Liq.	5.5	72.1	0	7.7	79.8	0.00	0.0	0.000	1.846	2.615	0.708	3.7E-04		
46.75	1.00	1.00	379.5	1.00	0.87	Infin.	0.415	Non-Liq.	5.5	68.6	1	7.3	75.9	0.00	0.0	0.000	1.866	2.566	0.711	3.8E-04		
47.24	1.00	1.00	388.7	1.00	0.87	Infin.	0.413	Non-Liq.	5.5	70.3	0	7.5	77.7	0.00	0.0	0.000	1.886	2.620	0.714	3.6E-04		
47.74	1.00	1.00	391.6	1.00	0.87	Infin.	0.411	Non-Liq.	5.5	70.8	0	7.5	78.3	0.00	0.0	0.000	1.906	2.640	0.717	3.7E-04		
48.23	1.00	1.00	340.6	1.00	0.86	Infin.	0.408	Non-Liq.	5.5	61.6	1	6.6	68.1	0.00	0.0	0.000	1.926	2.533	0.720	4.0E-04		
48.72	1.00	1.00	316.8	1.00	0.86	Infin.	0.406	Non-Liq.	5.5	57.6	1	6.1	63.6	0.00	0.0	0.000	1.945	2.491	0.723	4.1E-04		
49.21	1.00	1.00	249.1	0.87	0.86	Infin.	0.404	Non-Liq.	6.4	39.2	4	10.0	49.2	0.00	0.0	0.000	1.965	2.296	0.725	4.7E-04		
49.70	1.00	1.00	202.4	0.88	0.85	Infin.	0.402	Non-Liq.	6.1	33.5	8	7.0	40.5	0.00	0.0	0.000	1.985	2.162	0.728	5.2E-04		
50.20	1.00	1.00	177.8	0.90	0.85	Infin.	0.399	Non-Liq.	5.8	30.8	13	4.7	35.6	0.00	0.0	0.000	2.005	2.081	0.730	5.5E-04		
50.69	1.05	1.00	188.4	0.90	0.85	Infin.	0.397	Non-Liq.	5.9	31.8	17	5.9	37.7	0.00	0.0	0.000	2.025	2.132	0.732	5.3E-04		
51.18	1.06	1.00	200.6	0.89	0.84	Infin.	0.395	Non-Liq.	5.9	33.7	17	6.4	40.1	0.00	0.0	0.000	2.044	2.168	0.735	5.1E-04		
51.67	1.05	1.00	203.7	0.88	0.84	Infin.	0.392	Non-Liq.	5.9	34.4	16	6.3	40.7	0.00	0.0	0.000	2.064	2.210	0.737	5.0E-04		
52.17	1.01	1.00	210.3	0.88	0.84	Infin.	0.390	Non-Liq.	5.7	36.2	14	5.8	42.1	0.00	0.0	0.000	2.084	2.244	0.739	4.9E-04		
52.66	1.00	1.00	219.4	0.85	0.84	Infin.	0.388	Non-Liq.	6.0	36.8	13	7.1	43.9	0.00	0.0	0.000	2.104	2.287	0.741	4.8E-04		
53.15	1.00	1.00	226.2	0.85	0.83	Infin.	0.386	Non-Liq.	6.1	37.3	8	7.9	45.2	0.00	0.0	0.000	2.123	2.321	0.743	4.7E-04		
53.64	1.00	1.00	221.9	0.84	0.83	Infin.	0.383	Non-Liq.	5.9	37.3	10	7.1	44.4	0.00	0.0	0.000	2.143	2.317	0.745	4.7E-04		
54.13	1.00	1.00	194.4	0.87	0.83	Infin.	0.381	Non-Liq.	5.8	33.6	14	5.3	38.8	0.00	0.0	0.000	2.163	2.227	0.747	5.0E-04		
54.63	1.23	1.00	152.4	0.93	0.82	0.409	0.379	0.89	5.2	23.9	27	5.0	28.9	1.01	3.3	0.005	2.183	2.025	0.748	5.9E-04		
55.12	1.25	1.00	148.7	0.93	0.82	0.386	0.377	0.84	5.2	23.1	28	5.0	28.1	1.10	3.5	0.005	2.203	2.017	0.750	5.9E-04		
55.61	1.18	1.00	147.7	0.93	0.82	0.380	0.375	0.83	5.3	23.6	25	5.0	28.6	1.03	3.3	0.005	2.222	2.037	0.752	5.8E-04		
56.10	1.16	1.00	167.8	0.91	0.82	Infin.	0.372	Non-Liq.	5.3	27.1	23	6.5	33.6	0.00	0.0	0.000	2.242	2.150	0.754	5.3E-04		
56.59	1.15	1.00	197.5	0.89	0.81	Infin.	0.370	Non-Liq.	5.4	32.1	22	7.4	39.5	0.00	0.0	0.000	2.262	2.290	0.755	4.8E-04		
57.09	1.36	1.00	182.3	0.92	0.81	Infin.	0.368	Non-Liq.	5.0	26.5	34	9.9	36.5	0.00	0.0	0.000	2.282	2.239	0.757	5.0E-04		
57.58	1.46	1.00	176.7	0.93	0.81	Infin.	0.366	Non-Liq.	4.9	24.6	37	10.0	34.6	0.00	0.0	0.000	2.301	2.210	0.759	5.1E-04		
58.07	1.54	1.00	159.7	0.94	0.81	0.459	0.364	1.01	4.8	21.5	39	5.0	26.5	1.25	3.8	0.006	2.321	2.032	0.761	5.9E-04		
58.56	1.44	1.00	167.7	0.93	0.80	Infin.	0.362	Non-Liq.	4.9	23.8	36	9.8	33.5	0.00	0.0	0.000	2.341	2.208	0.762	5.2E-04		
59.06	1.29	1.00	188.3	0.91	0.80	Infin.	0.360	Non-Liq.	5.1	28.7	30	9.0	37.7	0.00	0.0	0.000	2.361	2.302	0.764	4.8E-04		
59.55	1.15	1.00	205.5	0.87	0.80	Infin.	0.358	Non-Liq.	5.4	33.2	23	7.9	41.1	0.00	0.0	0.000	2.381	2.380	0.766	4.6E-04		
60.04	1.09	1.00	205.0	0.86	0.80	Infin.	0.356	Non-Liq.	5.5	34.0	19	7.0	41.0	0.00	0.0	0.000	2.400	2.388	0.767	4.5E-04		
60.53	1.07	1.00	210.8	0.84	0.79	Infin.	0.354	Non-Liq.	5.6	35.4	17	6.8	42.2	0.00	0.0	0.000	2.420	2.421	0.769	4.5E-04		
61.02	1.06	1.00	230.9	0.81	0.79	Infin.	0.352	Non-Liq.	5.6	39.0	17	7.2	46.2	0.00	0.0	0.000	2.440	2.505	0.771	4.3E-04		
61.52	1.10	1.00	218.3	0.83	0.79	Infin.	0.350	Non-Liq.	5.5	36.1	20	7.5	43.7	0.00	0.0	0.000	2.460	2.469	0.772	4.4E-04		
62.01	1.10	1.00	218.4	0.83	0.79	Infin.	0.349	Non-Liq.	5.5	36.2	20	7.6	43.9	0.00	0.0	0.000	2.480	2.483	0.774	4.3E-04		
62.50	1.12	1.00	224.4	0.83	0.78	Infin.	0.347	Non-Liq.	5.4	36.9	25	8.0	44.9	0.00	0.0	0.000	2.499	2.511	0.776	4.3E-04		
62.99	1.16	1.00	232.8	0.82	0.78	Infin.	0.345	Non-Liq.	5.3	37.6	23	9.0	46.5	0.00	0.0	0.000	2.519	2.561	0.777	4.2E-04		
63.48	1.15	1.00	242.6	0.80	0.78	Infin.	0.343	Non-Liq.	5.4	39.3	23	9.2	48.5	0.00	0.0	0.000	2.539	2.598	0.779	4.1E-04		
63.98	1.13	1.00	255.8	0.80	0.78	Infin.	0.342	Non-Liq.	5.4	41.9	21	9.3	51.2	0.00	0.0	0.000	2.559	2.654	0.781	4.0E-04		
64.47	1.14	1.00	255.5	0.80	0.78	Infin.	0.340	Non-Liq.	5.4	41.6	22	9.5	51.1	0.00	0.0	0.000	2.578	2.664	0.783	4.0E-04		
64.96	1.15	1.00	237.3	0.80	0.77	Infin.	0.338	Non-Liq.	5.4	38.5	23	9.0	47.5	0.00	0.0	0.000	2.598	2.609	0.784	4.1E-04		
65.45	1.11	1.00	234.6	0.79	0.77	Infin.	0.337	Non-Liq.	5.5	38.7	20	8.2	46.9	0.00	0.0	0.000	2.618	2.609	0.786	4.1E-04		
65.94	1.30	1.00	191.5	0.89	0.77	Infin.	0.335	Non-Liq.	5.1	29.0	30	9.3	38.3	0.00	0.0	0.000	2.638	2.447	0.788	4.5E-04		
66.44	1.20	1.00	183.3	0.88	0.77	Infin.	0.334	Non-Liq.	5.3	29.1	25	7.5	36.7	0.00	0.0	0.000	2.658	2.421	0.790	4.5E-04		
66.93	1.18	1.00	174.2	0.89	0.78	Infin.	0.332	Non-Liq.	5.3	28.1	24	6.8	34.8	0.00	0.0	0.000	2.677	2.389	0.792	4.7E-04		
67.42	1.11	1.00	190.8	0.86	0.78	Infin.	0.331	Non-Liq.	5.5	31.4	20	6.7	38.2	0.00	0.0	0.000	2.697	2.471	0.794	4.5E-04		
67.91	1.28	1.00	149.7	0.91	0.76	0.392	0.329	0.90	5.7	23.1	26	5.0	28.1	0.94	0.0	0.000	2.717	2.241	0.796	5.2E-04		
68.41	1.25	1.00	164.7	0.90	0.76	Infin.	0.328	Non-Liq.	5.2	25.6	28	7.4	32.9	0.00	0.0	0.000	2.737	2.370	0.798	4.8E-04		
68.90	1.16	1.00	194.7	0.86	0.76	Infin.	0.327	Non-Liq.	5.3	31.4	23	7.5	38.9	0.00	0.0	0.000	2.756	2.515	0.800	4.4E-04		
69.39	1.15	1.00	184.4	0.87	0.75	Infin.	0.325	Non-Liq.	5.4	25.9	23	7.0	35.9	0.00	0.0	0.000	2.776	2.479	0.802	4.3E-04		
69.88	1.23	1.00	173.0	0.89	0.75	Infin.	0.324	Non-Liq.	5.2	27.1	27	7.5	34.6	0.00	0.0	0.000	2.796	2.436	0.804	4.6E-04		
70.37	1.23	1.00	182.1	0.88	0.75	Infin.	0.323	Non-Liq.	5.3	28.4	27	8.0	36.4	0.00	0.0	0.000	2.816	2.480	0.806	4.5E-04		
70.87	1.33	1.00	180.4	0.89	0.75	Infin.	0.321	Non-Liq.	5.0	26.8	32	9.2	36.1	0.00	0.0	0.000	2.836	2.467	0.808	4.5E-04		
71.36	1.34	1.00	195.5	0.88	0.75	Infin.	0.320	Non-Liq.	5.0	28.1	32	10.0	38.1	0.00	0.0	0.000	2.855	2.563	0.810	4.3E-04		
71.85	1.37	1.00	223.5	0.88	0.74	Infin.	0.319	Non-Liq.	5.0	32.7	33	10.0	42.7	0.00	0.0	0.000	2.875	2.650	0.812	4.1E-04		
72.34	1.58	1.00	228.2	0.88	0.74	Infin.	0.318	Non-Liq.	4.5	30.4	41	10.0	40.4	0.00	0.0	0.000	2.895	2.610	0.814	4.2E-04		
72.83	1.98	1.00	219.0	0.91	0.74	Infin.	0.317	Non-Liq.	4.5	24.7	51	10.0	34.7	0.00	0.0	0.000	2.915	2.488	0.817	4.6E-04		
73.33	2.09	1.00	200.5	0.82	0.74	Infin.	0.316	Non-Liq.	4.4	21.7	54	10.0	31.7	0.00	0.0	0.000	2.935	2.424	0.819	4.7E-04		
73.82	1.58	1.00	189.8	0.90	0.74	Infin.	0.314	Non-Liq.	4.8	25.2	41	10.0	35.2	0.00	0.0	0.000	2.954	2.517	0.821	4.5E-04		
74.31	1.43	1.00	212.4	0.87	0.74	Infin.	0.313	Non-Liq.	4.9	30.3	35	10.0	40.3	0.00	0.0	0.000	2.974	2.643	0.823	4.2E-04		
74.80	1.43	1.00	238.5	0.85	0.73	Infin.	0.312	Non-Liq.	4.9	34.0	36	10.0	44.0	0.00	0.0	0.000	2.994	2.729	0.826	4.0E-04		
75.30	1.55	1.00	239.1	0.88	0.73	Infin.	0.311	Non-Liq.	4.8	32.2	43	10.0	42.2	0.00	0.0	0.000	3.014	2.701	0.828	4.1E-04		
75.79	1.57	1.00	228.2	0.87	0.73	Infin.	0.310	Non-Liq.	4.8	30.5	40	10.0	40.5	0.00	0.0	0.000	3.033	2.673	0.830	4.2E-04		
76.28	1.46	1.00	232.1	0.88	0.73	Infin.	0.309	Non-Liq.	4.9	32.5	37	10.0	42.5	0.00	0.0	0.000	3.053	2.727	0.833	4.1E-04		

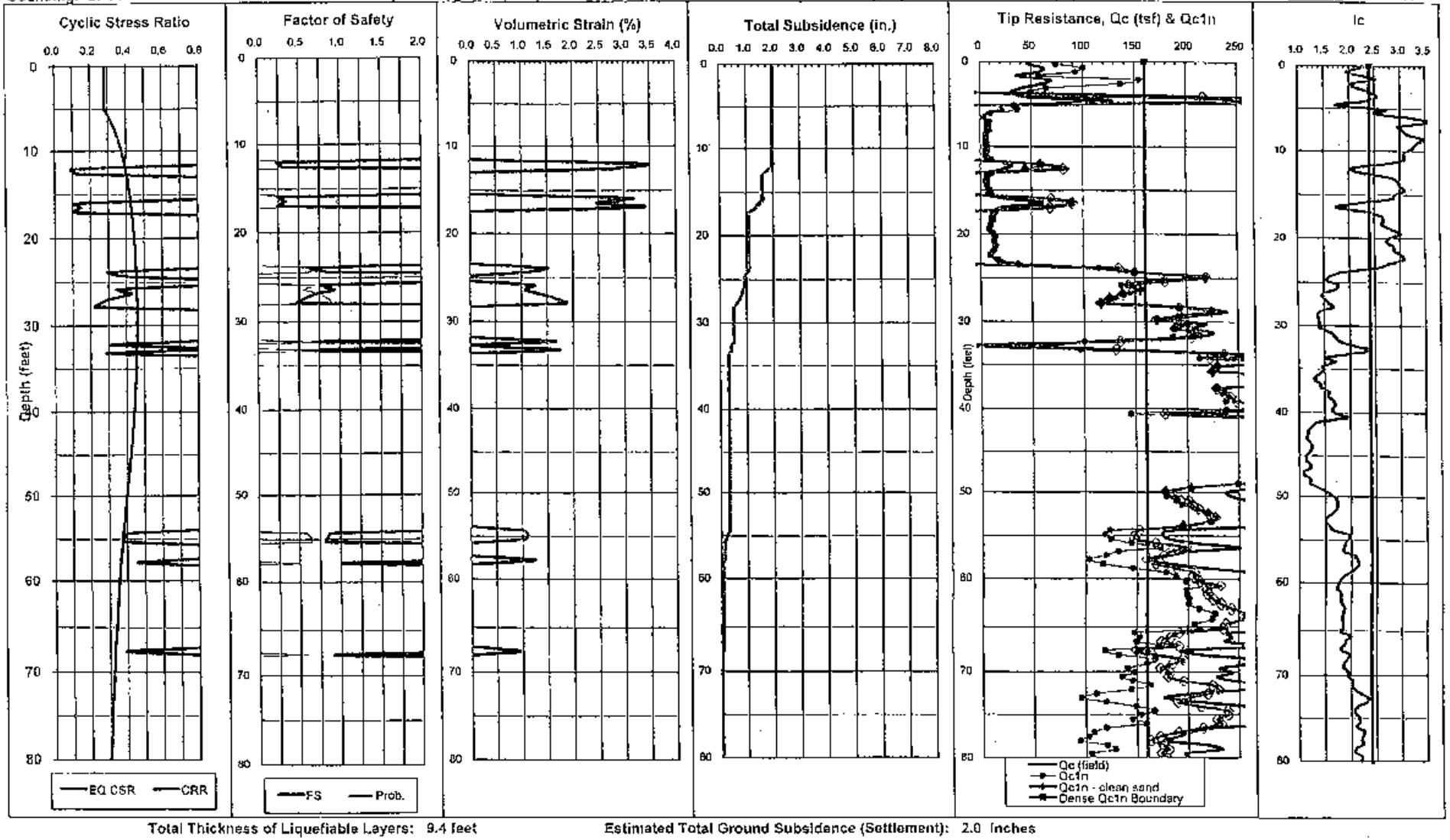
Depth (feet)	(m)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio Rf %	qc MPa	Total Unit Wt. (pcf)	Total Stress po (tsf)	Eff. Stress p'o (tsf)	rd	F %	n	Max 1.70 Cq	Q	Moss qc1 MPa	Moss Δqc MPa	Moss qc,clean MPa	Moss eff Kc	Qc1n	Ic	Override	Liquef. Suscept. (0 or 1)	Rel. Dens. Dr (%)	Kc	Kh	Clean Sand Qc1n	Idriss Kα	1.0 Kσ	CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Qc1n N1(60) Ratio	Apparent Equiv. N1(60)	FC %	FC Adj. ΔN1(60)	Equiv. N1(60)cs	Volumetric Strain (%)	SPI (%)	DPI (m)	p (tsf)	Gmax (tsf)	τav (tsf)	Shear Strain γ	Strain E15	Strain Enc
76.77	23.40	223.18	7.64	3.42	21.37	120	4.587	2.449	0.560	3.46	0.67	0.57	118.93	17.86	2.56	20.42	1.17	120.22	2.25		1	84	1.78	1.00	214.6	0.90	0.73	Infin.	0.308	Non-Liq.	4.6	26.1	45	10.0	36.1	0.00	0.0	0.000	3.073	2.590	0.835	4.4E-04		
77.26	23.55	200.94	6.12	3.05	19.24	120	4.616	2.463	0.558	3.08	0.67	0.57	106.77	15.84	2.58	18.42	1.16	109.09	2.24		1	80	1.76	1.00	190.2	0.90	0.72	Infin.	0.307	Non-Liq.	4.6	23.4	45	10.0	33.4	0.00	0.0	0.000	3.093	2.531	0.838	4.6E-04		
77.76	23.70	190.83	5.00	2.62	18.27	120	4.646	2.477	0.556	2.65	0.66	0.57	101.84	14.81	2.14	16.95	1.14	103.18	2.20		1	78	1.67	1.00	172.0	0.91	0.72	Infin.	0.306	Non-Liq.	4.7	22.0	43	10.0	32.0	0.00	0.0	0.000	3.113	2.503	0.840	4.7E-04		
78.25	23.85	176.47	4.60	2.61	16.90	120	4.675	2.491	0.555	2.65	0.66	0.57	93.58	13.61	2.13	15.74	1.16	94.52	2.22		1	74	1.73	1.00	163.5	0.91	0.72	Infin.	0.306	Non-Liq.	4.6	20.4	45	10.0	30.4	0.00	0.0	0.000	3.132	2.468	0.843	4.8E-04		
78.74	24.00	219.43	4.82	2.20	21.01	120	4.705	2.505	0.553	2.22	0.63	0.56	119.37	18.87	1.71	20.58	1.10	120.75	2.10		1	85	1.45	1.00	174.9	0.88	0.72	Infin.	0.305	Non-Liq.	4.9	24.7	36	10.0	34.7	0.00	0.0	0.000	3.152	2.588	0.845	4.5E-04		
79.23	24.15	232.84	5.00	2.15	22.28	120	4.734	2.519	0.551	2.17	0.62	0.56	126.95	17.89	1.66	19.55	1.09	128.34	2.07		1	87	1.41	1.00	180.4	0.88	0.72	Infin.	0.304	Non-Liq.	4.9	26.0	35	10.0	36.0	0.00	0.0	0.000	3.172	2.628	0.848	4.4E-04		
79.72	24.30	196.95	5.14	2.61	18.86	120	4.764	2.534	0.549	2.64	0.65	0.58	103.75	15.23	2.12	17.35	1.14	105.11	2.18		1	79	1.65	1.00	173.5	0.90	0.72	Infin.	0.303	Non-Liq.	4.7	22.3	43	10.0	32.3	0.00	0.0	0.000	3.192	2.544	0.850	4.6E-04		
80.22	24.45	203.02	5.47	2.71	19.45	120	4.793	2.548	0.547	2.75	0.66	0.56	104.76	15.50	2.22	17.72	1.14	106.11	2.20		1	79	1.67	1.00	177.8	0.90	0.71	Infin.	0.302	Non-Liq.	4.7	22.6	43	10.0	32.6	0.00	0.0	0.000	3.212	2.560	0.853	4.6E-04		
80.71	24.60	#N/A	#N/A	#N/A	#N/A	120	4.823	#N/A	0.546	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
81.20	24.75	#N/A	#N/A	#N/A	#N/A	120	4.852	#N/A	0.544	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
81.69	24.90	#N/A	#N/A	#N/A	#N/A	120	4.882	#N/A	0.542	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
82.19	25.05	#N/A	#N/A	#N/A	#N/A	120	4.911	#N/A	0.541	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
82.68	25.20	#N/A	#N/A	#N/A	#N/A	120	4.941	#N/A	0.539	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
83.17	25.35	#N/A	#N/A	#N/A	#N/A	120	4.970	#N/A	0.538	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
83.66	25.50	#N/A	#N/A	#N/A	#N/A	120	5.000	#N/A	0.536	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
84.15	25.65	#N/A	#N/A	#N/A	#N/A	120	5.030	#N/A	0.535	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
84.65	25.80	#N/A	#N/A	#N/A	#N/A	120	5.059	#N/A	0.533	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
85.14	25.95	#N/A	#N/A	#N/A	#N/A	120	5.089	#N/A	0.532	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
85.63	26.10	#N/A	#N/A	#N/A	#N/A	120	5.118	#N/A	0.531	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
86.12	26.25	#N/A	#N/A	#N/A	#N/A	120	5.148	#N/A	0.529	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
86.61	26.40	#N/A	#N/A	#N/A	#N/A	120	5.177	#N/A	0.528	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
87.11	26.55	#N/A	#N/A	#N/A	#N/A	120	5.207	#N/A	0.527	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
87.60	26.70	#N/A	#N/A	#N/A	#N/A	120	5.236	#N/A	0.525	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
88.09	26.85	#N/A	#N/A	#N/A	#N/A	120	5.266	#N/A	0.524	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
88.58	27.00	#N/A	#N/A	#N/A	#N/A	120	5.295	#N/A	0.523	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
89.07	27.15	#N/A	#N/A	#N/A	#N/A	120	5.325	#N/A	0.522	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
89.57	27.30	#N/A	#N/A	#N/A	#N/A	120	5.354	#N/A	0.520	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
90.06	27.45	#N/A	#N/A	#N/A	#N/A	120	5.384	#N/A	0.519	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
90.55	27.60	#N/A	#N/A	#N/A	#N/A	120	5.413	#N/A	0.518	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
91.04	27.75	#N/A	#N/A	#N/A	#N/A	120	5.443	#N/A	0.517	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
91.54	27.90	#N/A	#N/A	#N/A	#N/A	120	5.472	#N/A	0.516	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
92.03	28.05	#N/A	#N/A	#N/A	#N/A	120	5.502	#N/A	0.515	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
92.52	28.20	#N/A	#N/A	#N/A	#N/A	120	5.531	#N/A	0.513	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
93.01	28.35	#N/A	#N/A	#N/A	#N/A	120	5.561	#N/A	0.512	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
93.50	28.50	#N/A	#N/A	#N/A	#N/A	120	5.591	#N/A	0.511	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
94.00	28.65	#N/A	#N/A	#N/A	#N/A	120	5.620	#N/A	0.510	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
94.49	28.80	#N/A	#N/A	#N/A	#N/A	120	5.650	#N/A	0.509	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
94.98	28.95	#N/A	#N/A	#N/A	#N/A	120	5.679	#N/A	0.508	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
95.47	29.10	#N/A	#N/A	#N/A	#N/A	120	5.709	#N/A	0.507	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
95.96	29.25	#N/A	#N/A	#N/A	#N/A	120	5.738	#N/A	0.506	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
96.46	29.40	#N/A	#N/A	#N/A	#N/A	120	5.768	#N/A	0.505	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
96.95	29.55	#N/A	#N/A	#N/A	#N/A	120	5.797	#N/A	0.504	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
97.44	29.70	#N/A	#N/A	#N/A	#N/A	120	5.827	#N/A	0.503	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
97.93	29.85	#N/A	#N/A	#N/A	#N/A	120	5.856	#N/A	0.502	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
98.43	30.00	#N/A	#N/A	#N/A	#N/A	120	5.886	#N/A	0.501	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
98.92	30.15	#N/A	#N/A	#N/A	#N/A	120	5.915	#N/A	0.501	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
99.41	30.30	#N/A	#N/A	#N/A	#N/A	120	5.945	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
99.90	30.45	#N/A	#N/A	#N/A	#N/A	120	5.974	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	30.60	#N/A	#N/A	#N/A	#N/A	120	6.004	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	30.75	#N/A	#N/A	#N/A	#N/A	120	6.033	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	30.90	#N/A	#N/A	#N/A	#N/A	120	6.063	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.05	#N/A	#N/A	#N/A	#N/A	120	6.093	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.20	#N/A	#N/A	#N/A	#N/A	120	6.122	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.35	#N/A	#N/A	#N/A	#N/A	120	6.152	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.50	#N/A	#N/A	#N/A	#N/A	120	6.181	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.65	#N/A	#N/A	#N/A	#N/A	120	6.211	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.80	#N/A	#N/A	#N/A	#N/A	120	6.240	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.95	#N/A	#N/A	#N/A	#N/A	120	6.270	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.10	#N/A	#N/A	#N/A	#N/A	120	6.299	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.25	#N/A	#N/A	#N/A	#N/A	120	6.329	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.40	#N/A	#N/A	#N/A	#N/A	120	6.358	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.55	#N/A	#N/A	#N/A	#N/A	120	6.388	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.70	#N/A	#N/A	#N/A	#N/A	120	6.417	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.85	#N/A	#N/A	#N/A	#N/A	120	6.447	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.00	#N/A	#N/A	#N/A	#N/A	120	6.476	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.15	#N/A	#N/A	#N/A	#N/A	120	6.506	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.30	#N/A	#N/A	#N/A	#N/A	120	6.535	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.45	#N/A	#N/A	#N/A	#N/A	120	6.565	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.60	#N/A	#N/A	#N/A	#N/A	120	6.594	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.75	#N/A	#N/A	#N/A	#N/A	120	6.624	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.90	#N/A	#N/A	#N/A	#N/A	120	6.654	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.05	#N/A	#N/A	#N/A	#N/A	120	6.683	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.20	#N/A	#N/A	#N/A	#N/A	120	6.713	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.35	#N/A	#N/A	#N/A	#N/A	120	6.742	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.50	#N/A	#N/A	#N/A	#N/A	120	6.772	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.65	#N/A	#N/A	#N/A	#N/A	120	6.801	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.80	#N/A	#N/A	#N/A	#N/A	120	6.831	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.95	#N/A	#N/A	#N/A	#N/A	120	6.860	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.10	#N/A	#N/A	#N/A	#N/A	120	6.890	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.25	#N/A	#N/A	#N/A	#N/A	120	6.919	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.40	#N/A	#N/A	#N/A	#N/A	120	6.949	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.55	#N/A	#N/A	#N/A	#N/A	120	6.978	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.70	#N/A	#N/A	#N/A	#N/A	120	7.008	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.85	#N/A	#N/A	#N/A	#N/A	120	7.037	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	36.00	#N/A	#N/A	#N/A	#N/A	120	7.067	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

EARTH SYSTEMS - EVALUATION OF LIQUEFACTION POTENTIAL AND INDUCED GROUND SUBSIDENCE

Panay Way Parcel 21 Project No: LA-01052-01 Method Used: 1 1998 NCEER (Robertson & Wride)

Ground Compaction Remediated to depth of: 4.0 feet Settlement Analysis using Wu (2002) using clean sand Qc1n/N1(60) ratio =5 Plot 1 Limiting Ic: 2.4

Sounding: CPT1 Earthquake Magnitude: 7.1 PGA, g: 0.50 Calc GWT (feet): 5.0 Qc1n/N1(60): 5



Total Thickness of Liquefiable Layers: 9.4 feet Estimated Total Ground Subsidence (Settlement): 2.0 inches

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Poway Way Parcel 21
Job No: LA-01052-01
Date: 8/24/2006
Sounding: CPT2

Liquefaction Analysis using 1996 NCEER (Robertson & Wride) method
Settlement Analysis using Wu (2003) using clean sand Qc1n/N1(60) ratio =5

EARTHQUAKE INFORMATION:
Magnitude: 7.1 7.5
PGA, g: 0.50 0.43
MSF: 1.15
GWT, feet: 8.0
Calc GWT, feet: 5.0

Plot: 2
Method Used: 1 1996 NCEER (Robertson & Wride)
Averaging Increment: 3 0.15 m — Ignore 1st/last increment into sand/silt soils: 0 no
Induced CSR (M=7.5) = 0.65*PGA*(po/p'o)*rd/MSF — Ignore/remediate upper: 1.2 m
Clean Sand Qc1n = Cq*Kc*KH*Qc — Unit Weight of unsaturated soils: 100 pcf
SF = CRR7.5*Kσ*Kα/CSR — Unit Weight of saturated soils: 120 pcf
Limiting Ic for liquefiable soils: 2.40 — Limiting Ic for KH: 2.4

Use which FC adjustment: 1 — Based on Clean Sand Qc1n
Use which Apparent FC Curve: 0 — Robertson Lower Bound
Use Moss @ P_L: 15%
Use Tokimatsu & Seed (1) or Ishihara & Yoshimine (2), Wu (3): 3 Wu
Required SF: 1.50 — Min ΔN1(60), non-plastic: 5.0
Min SF of Liquefiable Layers: 0.19 — Max ΔN1(60), non-plastic: 10.0
Avg SF of Liquefiable Layers: 0.79

Total Liquefied Thickness (feet): 17.2
Total Induced Subsidence (inches): 3.4
DPI (inches): 0.39

SETTLEMENT OF DRY SANDS
Qc1n / N1(60) Ratio for clean sand: 5
p = 0.67*po
τav = 0.65*PGA*po*rd
Gmax = 447*N1(60)cs^(1/3)*p^0.5
a = 0.0389*(p/1)+0.124
b = 6400*(p/1)^-0.6
γ = [(1+a*EXP(b*τav/Gmax))/(1+a)]*τav/Gmax
E15 = γ*(N1(60)cs/20)^-1.2
Nc = (MAG-4)^2.17
Enc = (Nc/15)^0.45*E15
S = 2*H*Enc
Nc = 11.6

Depth (feet)	(m)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio Rf %	qc MPa	Total Unit Wt. (pcf)	Total Stress po (tsf)	Eff. Stress p'o (tsf)	rd	F %	n	Max 1.70 Cq	Q	Moss qc1 MPa	Moss Δqc MPa	Moss qc1,mod MPa	Moss eff Kc	Qc1n	Ic
0.49	0.15	117.04	0.94	0.81	11.21	100	0.025	0.025	1.000	0.81	0.50	1.70	188.02	19.05	0.30	19.35		188.08	1.64
0.98	0.30	95.51	0.68	0.71	9.15	100	0.049	0.049	1.000	0.71	0.51	1.70	153.39	15.55	0.21	15.75		153.47	1.67
1.48	0.45	128.06	1.84	1.44	12.26	100	0.074	0.074	0.999	1.44	0.55	1.70	205.64	20.85	0.92	21.76		205.76	1.80
1.97	0.60	101.83	2.29	2.25	9.75	100	0.098	0.098	0.997	2.25	0.61	1.70	163.46	16.55	1.71	18.29		163.62	2.01
2.46	0.75	92.69	2.18	2.35	8.88	120	0.128	0.128	0.996	2.35	0.62	1.70	148.73	15.09	1.81	16.90		148.94	2.05
2.95	0.90	59.33	1.77	2.98	5.58	120	0.157	0.157	0.995	2.98	0.69	1.70	95.08	9.66	2.43	12.08		95.34	2.26
3.44	1.05	57.49	1.37	2.39	5.55	120	0.187	0.187	0.994	2.40	0.67	1.70	92.08	9.36	1.85	11.21		92.38	2.20
3.94	1.20	52.31	1.15	2.19	5.03	120	0.217	0.217	0.993	2.20	0.67	1.70	83.70	8.52	1.65	10.17		84.05	2.20
4.43	1.35	47.94	0.87	1.81	4.59	120	0.246	0.246	0.992	1.82	0.66	1.70	76.64	7.80	1.28	9.09	1.16	77.04	2.17
4.92	1.50	56.31	0.80	1.42	5.39	120	0.276	0.276	0.990	1.43	0.62	1.70	90.03	9.17	0.90	10.06	1.10	90.47	2.05
5.41	1.65	71.94	0.88	1.23	6.89	120	0.305	0.305	0.989	1.23	0.59	1.70	115.51	11.60	0.71	12.31	1.06	115.60	1.92
5.91	1.80	65.31	1.00	1.54	6.25	120	0.335	0.335	0.988	1.54	0.61	1.70	104.40	9.91	1.03	10.94	1.10	104.94	2.02
6.40	1.95	43.73	0.92	2.09	4.19	120	0.364	0.364	0.987	2.11	0.68	1.70	69.66	6.49	1.62	8.11	1.25	70.27	2.24
6.89	2.10	9.57	0.51	5.34	0.92	120	0.394	0.394	0.986	5.57	0.92	1.70	14.75	1.56	4.62	6.19		15.38	3.03
7.38	2.25	5.06	0.28	5.62	0.48	120	0.423	0.423	0.985	6.13	1.00	1.70	7.45	0.82	4.68	5.50		8.13	3.28
7.87	2.40	38.15	0.85	2.25	3.65	120	0.453	0.453	0.984	2.28	0.71	1.70	60.57	6.60	1.84	8.44	1.28	77.51	2.31
8.37	2.55	59.82	1.00	1.66	5.73	120	0.462	0.479	0.983	1.68	0.64	1.67	93.44	9.95	1.23	11.18	1.12	119.11	2.08
8.86	2.70	19.54	0.52	2.69	1.87	120	0.512	0.493	0.982	2.75	0.80	1.70	30.61	2.77	2.33	5.10		31.40	2.59
9.35	2.85	9.49	0.33	3.49	0.91	120	0.541	0.507	0.981	3.69	0.90	1.70	14.43	1.48	3.22	4.70		15.24	2.92
9.84	3.00	58.57	0.60	1.02	5.61	120	0.571	0.521	0.979	1.03	0.61	1.54	84.41	9.02	0.56	9.58	1.08	98.17	1.97
10.33	3.15	79.43	1.21	1.52	7.61	120	0.600	0.535	0.978	1.53	0.61	1.52	113.28	11.35	1.11	12.48	1.10	131.45	1.99
10.83	3.30	54.41	1.11	2.04	5.21	120	0.630	0.549	0.977	2.06	0.68	1.56	79.36	7.73	1.69	9.42	1.22	92.41	2.20
11.32	3.45	61.75	0.90	1.48	5.91	120	0.659	0.564	0.976	1.48	0.64	1.49	86.39	8.64	1.06	9.90	1.12	100.49	2.07
11.81	3.60	25.74	0.87	3.38	2.47	120	0.689	0.578	0.975	3.46	0.80	1.62	38.56	3.21	3.19	6.40		39.45	2.58
12.30	3.75	7.10	0.41	5.77	0.68	120	0.719	0.592	0.974	6.29	0.98	1.70	10.46	1.03	4.99	6.02		11.41	3.17
12.80	3.90	8.64	0.15	1.66	0.83	120	0.748	0.606	0.973	1.76	0.87	1.62	12.62	1.30	1.28	2.59		13.55	2.78
13.29	4.05	5.10	0.12	2.41	0.49	120	0.778	0.620	0.972	2.74	0.97	1.67	7.09	0.80	2.13	2.93		8.07	3.10
13.78	4.20	3.59	0.05	1.49	0.34	120	0.807	0.634	0.971	1.81	0.99	1.66	4.63	0.58	1.11	1.69		5.62	3.17
14.27	4.35	3.88	0.06	1.50	0.37	120	0.837	0.649	0.970	1.80	0.96	1.61	4.93	0.63	1.12	1.75		5.92	3.14
14.76	4.50	16.76	0.07	0.42	1.60	120	0.866	0.663	0.969	0.44	0.71	1.40	21.23	3.72	0.00	3.72	1.00	34.92	2.31
15.26	4.65	11.66	0.08	0.65	1.14	120	0.896	0.677	0.968	0.69	0.74	1.42	14.98	1.64	0.17	1.81		15.89	2.53
15.75	4.80	8.77	0.08	0.93	0.84	120	0.925	0.691	0.967	1.01	0.84	1.43	10.93	1.20	0.49	1.69		11.86	2.72
16.24	4.95	26.20	0.12	0.45	2.51	120	0.955	0.705	0.966	0.47	0.66	1.31	31.55	4.26	0.00	4.26	1.00	41.05	2.18
16.73	5.10	14.76	0.23	1.56	1.41	120	0.984	0.719	0.965	1.64	0.81	1.37	18.15	1.87	1.20	3.01		19.08	2.84
17.22	5.25	24.91	0.36	1.53	2.39	120	1.014	0.734	0.964	1.57	0.75	1.32	30.09	2.91	1.17	4.08		31.03	2.44
17.72	5.40	42.84	0.57	1.34	4.10	120	1.043	0.748	0.962	1.36	0.66	1.27	50.41	6.11	0.95	7.07	1.18	64.87	2.23
18.21	5.55	70.69	0.83	1.18	6.77	120	1.073	0.762	0.961	1.19	0.62	1.23	81.03	9.84	0.78	10.52	1.08	103.58	2.03
18.70	5.70	44.30	0.83	1.87	4.24	120	1.102	0.776	0.960	1.90	0.71	1.25	51.23	6.12	1.57	7.69	1.26	65.94	2.35
19.19	5.85	20.88	0.59	2.81	2.00	120	1.132	0.790	0.959	2.92	0.82	1.27	24.14	2.31	2.66	4.97		25.09	2.56
19.69	6.00	123.04	0.95	0.77	11.78	120	1.161	0.805	0.958	0.77	0.53	1.16	133.65	15.26	0.31	15.59	1.02	155.05	1.74
20.18	6.15	143.08	1.39	0.97	13.70	120	1.191	0.819	0.956	0.97	0.54	1.15	155.16	17.52	0.54	18.06	1.03	178.48	1.76
20.67	6.30	95.45	0.94	0.99	9.14	120	1.220	0.833	0.955	1.00	0.58	1.15	102.74	11.65	0.56	12.21	1.05	118.47	1.90
21.16	6.45	57.77	0.34	0.59	5.53	120	1.250	0.847	0.954	0.60	0.60	1.14	61.45	7.22	0.11	7.33	1.01	71.89	1.96
21.65	6.60	15.86	0.25	1.56	1.53	120	1.280	0.861	0.952	1.65	0.81	1.18	16.87	1.74	1.22	2.96		17.64	2.66
22.15	6.75	10.75	0.20	1.83	1.03	120	1.309	0.875	0.951	1.99	0.87	1.18	11.02	1.18	1.53	2.71		11.93	2.86
22.64	6.90	11.98	0.09	0.77	1.15	120	1.339	0.890	0.950	0.83	0.81	1.15	12.06	1.32	0.31	1.62		13.02	2.65
23.13	7.05	15.51	0.33	2.12	1.48	120	1.368	0.904	0.948	2.25	0.84	1.14	15.76	1.63	1.88	3.51		16.74	2.76
23.62	7.20	20.16	0.69	3.40	1.93	120	1.398	0.918	0.946	3.56	0.85	1.13	20.52	2.07	3.36	5.43		21.50	2.79
24.11	7.35	19.32	0.57	2.97	1.85	120	1.427	0.932	0.945	3.12	0.85	1.11	19.34	1.97	2.88	4.84		20.33	2.78
24.61	7.50	15.52	0.40	2.58	1.49	120	1.457	0.946	0.943	2.74	0.88	1.10	15.17	1.58	2.41	3.99		16.15	2.83
25.10	7.65	57.96	0.72	1.24	5.55	120	1.486	0.960	0.941	1.28	0.66	1.07	57.41	5.81	0.86	6.67	1.15	58.60	2.18
25.59	7.80	165.92	1.19	0.72	15.89	120	1.516	0.975	0.940	0.72	0.51	1.04	162.50	16.44	0.25	16.69	1.02	163.46	1.66
26.08	7.95	213.02	1.40	0.66	20.40	120	1.545	0.989	0.938	0.66	0.50	1.03	207.30	20.97	0.18	21.15	1.01	208.27	1.55
26.57	8.10	164.82	1.68	1.02	15.78	120	1.575	1.003	0.936	1.03	0.54	1.03	159.36	16.09	0.61	16.70	1.04	160.33	1.77
27.07	8.25	161.96	1.72	1.06	15.51	120	1.604	1.017	0.934	1.07	0.54	1.02	155.42	15.73	0.65	16.38	1.04	156.40	1.79
27.56	8.40	162.16	1.41	0.87	15.53	120	1.634	1.031	0.932	0.88	0.53	1.01	154.36	15.68	0.43	16.12	1.03	155.35	1.73
28.05	8.55	140.44	1.10	0.78	13.45	120	1.663	1.045	0.930	0.79	0.53	1.01	132.59	13.51	0.33	13.85	1.02	133.56	1.75
28.54	8.70	158.55	1.11	0.70	15.18	120	1.693	1.060	0.928	0.70	0.51	1.00	149.74	15.17	0.23	15.40	1.02	149.74	1.68
29.04	8.85	153.52	0.98	0.64	14.70	120	1.722	1.074	0.925	0.64	0.51	0.99	143.01	14.61	0.16	14.77	1.01	144.01	1.67
29.53	9.00	168.36	0.62	0.37	16.12	120	1.752	1.088	0.923	0.37	0.50	0.99	155.91	15.89	0.00	15.89	1.00	156.92	1.50
30.02	9.15	143.98	0.56	0.39	13.79	120	1.781	1.102	0.920	0.39	0.50	0.98	132.31	13.49	0.00	13.49	1.00	133.33	1.57
30.51	9.30	127.56	0.61	0.48	12.21	120	1.811	1.116	0.918	0.48	0.51	0.97	115.29	11.88	0.00	11.88	1.00	117.31	1.67
31.00	9.45	123.03	0.96	0.78	11.78	120	1.841	1.131	0.915	0.78	0.55	0.96	111.09	11.45	0.32	11.77	1.03	112.52	1.81
31.50	9.60	158.39	1.24	0.85	15.17	120	1.870	1.145	0.913	0.85	0.53	0.96	142.52	14.71	0.40	15.11	1.03	143.56	1.75
31.99	9.75	196.54	1.24	0.64	18.63	120	1.900	1.159	0.910	0.64	0.50	0.96	174.64	17.93	0.16	18.09	1.01	175.68	1.60
32.48	9.90	183.05	0.91	0.50	17.53	120	1.928	1.173	0.907	0.50	0.50	0.95	163.27	16.71	0.00	16.71	1.00	164.33	1.56
32.97	10.05	233.61	1.62	0.69	22.37	120	1.959	1.187	0.904	0.70	0.50	0.94	207.38	21.39	0.23	21.62	1.01	208.44	1.57
33.46	10.20	245.66	2.25	0.91	23.52	120	1.988	1.201	0.901	0.92	0.50	0.94	216.83	22.51	0.48	22.99	1.02	217.80	1.64
33.96	10.35	194.11	1.34	0.69	18.59	120	2.018	1.216	0.898	0.69	0.50	0.93	170.09	17.57	0.22	17.79	1.01	171.17	1.63
34.45	10.50	201.83	0.73	0.36	19.33	120	2.047	1.230	0.894	0.36	0.50	0.93	175.87	17.83	0.00	17.89	1.00	178.95	1.45

Depth (feet)	Liquef. Suscept. (0 or 1)	Rel. Dens. Dr (%)	Kσ	KH	Clean Sand Qc1n	Idriss Ko	1.0 Kα	CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Qc1n/N1(60) Ratio	Apparent Equiv. N1(60)	FC %	FC Adj. ΔN1(60)	Equiv. N1(60)cs	Volumetric Strain (%)
0.49	0			1.00		1.00	1.00		0.283	Non-Liq.	5.8	32.5	13			0.00
0.98	0			1.00		1.00	1.00		0.282	Non-Liq.	5.7	26.8	14			0.00
1.48	0			1.00		1.00	1.00		0.282	Non-Liq.	5.5	37.6	20			0.00
1.97	0			1.00		1.00	1.00		0.282	Non-Liq.	5.1	32.3	31			0.00
2.46	0			1.00		1.00	1.00		0.281	Non-Liq.	5.0	29.9	34			0.00
2.95	0			1.00		1.00	1.00		0.281	Non-Liq.	4.6	20.8	47			0.00
3.44	0			1.00		1.00	1.00		0.281	Non-Liq.	4.7	19.7	43			0.00
3.94	0			1.00		1.00	1.00		0.281	Non-Liq.	4.7	17.9	43			0.00
4.43	1	66	1.60	1.00	122.9	1.00	1.00	0.253	0.280	Non-Liq.	4.8	16.2	41	8.4	24.5	0.09
4.92	1	73	1.36	1.00	123.5	1.00	1.00	0.255	0.280	Non-Liq.	5.0	18.1	33	6.6	24.7	0.06
5.41	1	83	1.21	1.00	140.1	1.00	1.00	0.336	0.284	1.18	5.2	22.1	28	5.0	27.1	0.86
5.91	1	79	1.33	1.00	139.6	1.00	1.00	0.333	0.297	1.12	5.0	20.8	32	5.0	25.8	1.08
6.40	1	82	1.78	1.00	125.0	1.00	1.00	0.262	0.309	0.85	4.6	15.3	46	5.0	20.3	1.85
6.89	0			1.00		1.00	1.00		0.320	Non-Liq.	3.1	5.0	100			0.00
7.38	0			1.00		1.00	1.00		0.330	Non-Liq.	2.6	3.2	100			0.00
7.87	1	66	1.98	1.26	153.7	1.00	1.00	0.416	0.339	1.23	4.5	17.3	51	5.0	22.3	1.69
8.37	1	84	1.42	1.26	169.5	1.00	1.00	Infin.	0.348	Non-Liq.	4.9	24.2	35	9.7	33.9	0.00
8.86	0			1.00		1.00	1.00		0.356	Non-Liq.	3.9	8.0	75			0.00
9.35	0			1.00		1.00	1.00		0.383	Non-Liq.	3.3	4.6	100			0.00
9.84	1	76	1.27	1.15	124.5	1.00	1.00	0.260	0.370	0.70	5.1	19.1	29	5.0	24.1	1.55
10.33	1	88	1.29	1.15	170.0	1.00	1.00	Infin.	0.376	Non-Liq.	5.1	29.8	30	8.2	34.0	0.00
10.83	1	74	1.56	1.15	153.1	1.00	1.00	0.413	0.382	1.08	4.7	19.7	43	5.0	24.7	1.52
11.32	1	77	1.40	1.15	140.8	1.00	1.00	0.340	0.387	0.88	4.9	20.3	35	5.0	25.3	1.45
11.81	0			1.00		1.00	1.00		0.392	Non-Liq.	4.0	10.0	74			0.00
12.30	0			1.00		1.00	1.00		0.397	Non-Liq.	2.8	4.1	100			0.00
12.80	0			1.00		1.00	1.00		0.401	Non-Liq.	3.5	3.8	96			0.00
13.29	0			1.00		1.00	1.00		0.406	Non-Liq.	2.9	2.8	100			0.00
13.78	0			1.00		1.00	1.00		0.409	Non-Liq.	2.8	2.0	100			0.00
14.27	0			1.00		1.00	1.00		0.413	Non-Liq.	2.8	2.1	100			0.00
14.76	1	33	1.00	1.58	34.9	1.00	1.00	0.079	0.417	0.19	4.5	7.8	51	0.0	7.8	5.00
15.26	0			1.00		1.00	1.00		0.420	Non-Liq.	4.1	3.9	69			0.00
15.75	0			1.00		1.00	1.00		0.423	Non-Liq.	3.7	3.2	89			0.00
16.24	1	40	1.00	1.26	41.0	1.00	1.00	0.084	0.426	0.20	4.8	8.6	40	0.0	8.6	4.43
16.73	0			1.00		1.00	1.00		0.429	Non-Liq.	3.8	5.0	80			0.00
17.22	0			1.00		1.00	1.00		0.431	Non-Liq.	4.2	7.4	62			0.00
17.72	1	59	1.73	1.28	112.4	1.00	1.00	0.212	0.434	0.41	4.6	14.0	45	5.0	19.0	2.33
18.21	1	78	1.34	1.26	138.8	1.00	1.00	0.329	0.436	0.75	5.0	20.6	32	5.0	25.5	1.54
18.70	1	60	1.39	1.26	131.2	1.00	1.00	0.290	0.438	0.66	4.5	14.7	51	5.0	19.7	2.24
19.19	0			1.00		1.00	1.00		0.440	Non-Liq.	3.7	6.7	85			0.00
19.69	1	95	1.07	1.15	165.4	1.00	1.00	Infin.	0.442	Non-Liq.	5.8	27.8	17	5.3	33.1	0.00
20.18	1	100	1.08	1.15	194.0	1.00	1.00	Infin.	0.444	Non-Liq.	5.6	32.4	18	6.4	38.8	0.00
20.67	1	84	1.19	1.15	142.0	1.00	1.00	0.346	0.448	0.76	5.3	22.6	25	5.0	27.6	1.34
21.16	1	63	1.25	1.15	89.6	1.00	1.00	0.147	0.447	0.33	5.2	13.9	28	4.0	17.9	2.50
21.65	0			1.00		1.00	1.00		0.449	Non-Liq.	3.8	4.7	83			0.00
22.15	0			1.00		1.00	1.00		0.450	Non-Liq.	3.4	3.5	100			0.00
22.64	0			1.00		1.00	1.00		0.451	Non-Liq.	3.8	3.4	81			0.00
23.13	0			1.00		1.00	1.00		0.452	Non-Liq.	3.6	4.7	93			0.00
23.62	0			1.00		1.00	1.00		0.453	Non-Liq.	3.5	6.1	96			0.00
24.11	0			1.00		1.00	1.00		0.454	Non-Liq.	3.6	5.7	85			0.00
24.61	0			1.00		1.00	1.00		0.455	Non-Liq.	3.5	4.7	100			0.00
25.10	1	55	1.58	1.00	92.3	1.00	1.00	0.153	0.456	0.34	4.8	12.3	40	5.0	17.3	2.60
25.59	1	97	1.01	1.00	164.9	1.00	1.00	Infin.	0.457	Non-Liq.	5.8	28.4	14	4.6	33.0	0.00
26.08	1	100	1.00	1.00	208.3	1.00	1.00	Infin.	0.457	Non-Liq.	6.0	35.0	10	6.7	41.7	0.00
26.57	1	96	1.00	1.00	173.8	1.00	1.00	Infin.	0.458	Non-Liq.	5.5	29.0	19	5.8	34.8	0.00
27.07	1	85	1.10	1.00	171.6	1.00	1.00	Infin.	0.458	Non-Liq.	5.5	28.4	19	5.9	34.3	0.00
27.56	1	85	1.06	1.00	164.5	1.00	1.00	Infin.	0.459	Non-Liq.	5.6	27.7	17	5.2	32.9	0.00
28.05	1	89	1.07	1.00	143.2	1.00	1.00	0.353	0.459	0.77	5.6	24.0	18	4.7	28.6	1.25
28.54	1	94	1.02	1.00	153.4	1.00	1.00	0.418	0.459	0.91	5.7	26.2	15	4.4	30.7	1.03
29.04	1	82	1.02	1.00	146.3	1.00	1.00	0.371	0.459	0.81	5.7	25.1	14	4.1	29.3	1.19
29.53	1	96	1.00	1.00	156.9	1.00	1.00	0.439	0.459	0.96	6.1	25.9	8	5.0	30.9	1.01
30.02	1	89	1.00	1.00	133.3	0.99	1.00	0.300	0.459	0.65	5.9	22.5	11	4.1	26.7	1.48
30.51	1	83	1.00	1.00	117.3	0.99	1.00	0.230	0.459	0.50	5.7	20.5	14	3.0	23.5	1.54
31.00	1	82	1.11	1.00	124.8	0.99	1.00	0.261	0.459	0.57	5.5	20.5	20	4.4	25.0	1.57
31.50	1	92	1.07	1.00	153.7	0.99	1.00	0.418	0.459	0.91	5.6	25.8	16	5.0	30.7	1.03
31.99	1	100	1.00	1.00	175.7	0.98	1.00	Infin.	0.458	Non-Liq.	5.9	30.0	12	5.2	35.1	0.00
32.48	1	97	1.00	1.00	164.3	0.98	0.99	Infin.	0.458	Non-Liq.	5.9	27.6	10	5.2	32.9	0.00
32.97	1	100	1.00	1.00	208.4	0.97	0.98	Infin.	0.457	Non-Liq.	5.9	35.2	11	6.5	41.7	0.00
33.46	1	100	1.00	1.00	217.8	0.96	0.96	Infin.	0.457	Non-Liq.	5.8	37.6	13	5.9	43.6	0.00
33.96	1	99	1.00	1.00	171.2	0.97	0.98	Infin.	0.456	Non-Liq.	5.8	29.5	13	4.7	34.2	0.00
34.45	1	100	1.00	1.00	176.9	0.97	0.97	Infin.	0.455	Non-Liq.	6.2	28.8	7	6.6	35.4	0.00

Depth (feet)	εv (%)	DPI (in)	p (tsf)	Gmax (tsf)	τav (tsf)	Shear Strain γ	Strain E15	Strain Enc
0.49	0.0	0.000	0.016					
0.98	0.0	0.000	0.033					
1.48	0.0	0.000	0.049					
1.97	0.0	0.000	0.066					
2.46	0.0	0.000	0.086					
2.95	0.0	0.000	0.106					
3.44	0.0	0.000	0.125					
3.94	0.0	0.000	0.145					
4.43	0.0	0.000	0.165	528	0.079	4.3E-04	3.3E-04	3.0E-04
4.92	0.0	0.000	0.185	559	0.089	4.4E-04	3.4E-04	3.1E-04
5.41	0.0	0.000	0.204	607	0.098	4.2E-04		
5.91	3.1	0.005	0.224	626	0.107	4.5E-04		
6.40	6.6	0.010	0.244	602	0.117	5.9E-04		
6.89	0.0	0.000	0.264					
7.38	0.0	0.000	0.284					
7.87	5.1	0.008	0.303	693	0.145	5.7E-04		
8.37	0.0	0.000	0.323	822	0.154	4.0E-04		
8.86	0.0	0.000	0.343					
9.35	0.0	0.000	0.363					
9.84	5.0	0.006	0.382	799	0.182	5.2E-04		
10.33	0.0	0.000	0.402	918	0.191	4.4E-04		
10.83	5.0	0.008	0.422	845	0.200	5.8E-04		
11.32	5.0	0.008	0.442	872	0.209	5.7E-04		
11.81	0.0	0.000	0.462					
12.30	0.0	0.000	0.481					
12.80	0.0	0.000	0.501					
13.29	0.0	0.000	0.521					
13.78	0.0	0.000	0.541					
14.27	0.0	0.000	0.561					
14.76	42.4	0.064	0.580	675	0.273	2.2E-03		
15.26	0.0	0.000	0.600					
15.75	0.0	0.000	0.620					
16.24	40.2	0.060	0.640	732	0.300	2.0E-03		
16.73	0.0	0.000	0.659					
17.22	0.0	0.000	0.679					
17.72	12.8	0.019	0.699	997	0.326	8.6E-04		
18.21	5.0	0.008	0.719	1,117	0.335	6.7E-04		
18.70	11.6	0.017	0.739	1,038	0.344	8.5E-04		
19.19	0.0	0.000	0.758					
19.69	0.0	0.000	0.778	1,266	0.361	5.7E-04		
20.18	0.0	0.000	0.798	1,352	0.370	5.1E-04		
20.67	4.4	0.007	0.818	1,222	0.379	6.6E-04		
21.16	16.2	0.024	0.838	1,071	0.387	9.6E-04		
21.65	0.0	0.000	0.857					
22.15	0.0	0.000	0.877					
22.64	0.0	0.000	0.897					
23.13	0.0	0.000	0.917					
23.62	0.0	0.000	0.936					
24.11	0.0	0.000	0.956					
24.61	0.0	0.000	0.976					
25.10	16.4	0.025	0.996	1,153	0.455	1.0E-03		
25.59	0.0	0.000	1.016	1,444	0.463	6.2E-04		
26.08	0.0	0.000	1.035	1,577	0.471	5.3E-04		
26.57	0.0	0.000	1.055	1,498	0.479	6.0E-04		
27.07	0.0	0.000	1.075	1,506	0.487	6.1E-04		
27.56	0.0	0.000	1.095	1,498	0.495	6.3E-04		
28.05	4.7	0.006	1.114	1,444	0.503	7.0E-04		
28.54	3.5	0.005	1.134	1,490	0.510	6.7E-04		
29.04	4.0	0.006	1.154	1,480	0.518	6.9E-04		
29.53	3.4	0.005	1.174	1,520	0.526	6.7E-04		
30.02	4.8	0.007	1.194	1,459	0.533	7.5E-04		
30.51	8.2	0.012	1.213	1,410	0.540	8.3E-04		
31.00	6.3	0.009	1.233	1,451	0.548	7.9E-04		
31.50	3.5	0.005	1.253	1,567	0.555	6.8E-04		
31.99	0.0	0.000	1.273	1,652	0.562	6.2E-04		
32.48	0.0	0.000	1.293	1,628	0.569	6.5E-04		
32.97	0.0	0.000	1.312	1,776	0.575	5.6E-04		
33.46	0.0	0.000	1.332	1,815	0.582	5.4E-04		
33.96	0.0	0.000	1.352	1,888	0.589	6.3E-04		
34.45	0.0	0.000	1.372	1,718	0.595	6.2E-04		

Depth (feet)	(m)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio Rf %	qc MPa	Total Unit Wt. (pcf)	Total Stress po (tsf)	Eff. Stress p'o (tsf)	rd	F %	n	Max 1.70 Cq	Q	Moss qc1 MPa	Moss Δqc MPa	Moss qc1-mod MPa	Moss Kc	Qc1n	Ic
34.94	10.65	200.85	0.82	0.41	19.23	120	2.077	1.244	0.891	0.41	0.50	0.92	174.00	17.76	0.00	17.76	1.00	175.08	1.48
35.43	10.80	180.30	0.79	0.44	17.27	120	2.106	1.258	0.888	0.44	0.50	0.92	155.19	15.87	0.00	15.87	1.00	156.26	1.54
35.93	10.95	129.85	0.61	0.47	12.43	120	2.136	1.272	0.884	0.48	0.51	0.91	110.58	11.33	0.00	11.33	1.00	111.65	1.68
36.42	11.10	149.31	0.39	0.26	14.30	120	2.165	1.286	0.880	0.27	0.50	0.91	126.88	12.70	0.00	12.70	1.00	127.93	1.51
36.91	11.25	230.18	0.68	0.30	22.04	120	2.195	1.301	0.877	0.30	0.50	0.90	195.12	19.71	0.00	19.71	1.00	196.23	1.37
37.40	11.40	237.03	0.96	0.41	22.70	120	2.224	1.315	0.873	0.41	0.50	0.90	199.80	20.47	0.00	20.47	1.00	200.97	1.43
37.89	11.55	259.12	1.31	0.50	24.81	120	2.254	1.329	0.869	0.51	0.50	0.89	217.41	22.49	0.00	22.50	1.00	218.53	1.46
38.38	11.70	350.71	3.43	0.98	33.58	120	2.283	1.343	0.865	0.98	0.50	0.89	293.08	31.17	0.55	31.72	1.02	294.23	1.57
38.88	11.85	457.34	5.73	1.25	43.85	120	2.313	1.357	0.861	1.26	0.50	0.88	381.02	41.02	0.87	41.89	1.02	382.15	1.59
39.37	12.00	561.47	5.28	0.94	53.77	120	2.343	1.371	0.857	0.94	0.50	0.88	464.98	49.90	0.51	50.40	1.01	466.12	1.44
39.86	12.15	380.08	3.35	0.88	36.43	120	2.372	1.386	0.852	0.89	0.50	0.87	312.77	33.34	0.44	33.82	1.01	313.92	1.52
40.35	12.30	438.30	3.22	0.73	41.97	120	2.402	1.400	0.848	0.74	0.50	0.87	359.04	38.22	0.27	38.48	1.01	360.18	1.42
40.85	12.45	475.86	5.01	1.06	45.55	120	2.431	1.414	0.843	1.08	0.50	0.87	387.75	41.94	0.63	42.57	1.02	388.91	1.52
41.34	12.60	529.53	4.37	0.83	50.71	120	2.461	1.428	0.839	0.83	0.50	0.86	423.63	46.24	0.37	46.61	1.01	430.79	1.41
41.83	12.75	407.71	3.39	0.83	39.04	120	2.490	1.442	0.834	0.83	0.50	0.86	328.88	35.32	0.37	35.69	1.01	330.05	1.49
42.32	12.90	403.40	3.78	0.94	38.63	120	2.520	1.456	0.830	0.94	0.50	0.85	323.79	35.00	0.50	35.50	1.01	324.98	1.53
42.81	13.05	431.66	3.52	0.82	41.34	120	2.549	1.471	0.825	0.82	0.50	0.85	344.87	37.17	0.35	37.53	1.01	346.05	1.47
43.31	13.20	358.39	2.35	0.66	34.32	120	2.578	1.485	0.820	0.66	0.50	0.84	284.73	30.32	0.18	30.50	1.01	285.91	1.45
43.80	13.35	428.00	1.45	0.34	40.99	120	2.608	1.499	0.816	0.34	0.50	0.84	338.67	34.92	0.00	34.92	1.00	339.86	1.20
44.29	13.50	419.83	1.86	0.44	40.20	120	2.638	1.513	0.811	0.44	0.50	0.84	330.61	34.66	0.00	34.66	1.00	331.81	1.29
44.78	13.65	411.30	1.70	0.41	39.39	120	2.667	1.527	0.806	0.41	0.50	0.83	322.35	33.66	0.00	33.68	1.00	323.56	1.27
45.28	13.80	290.51	1.66	0.57	27.82	120	2.697	1.542	0.801	0.57	0.50	0.83	226.27	23.92	0.08	24.00	1.00	227.48	1.48
45.77	13.95	288.59	2.00	0.69	27.64	120	2.726	1.556	0.796	0.70	0.50	0.82	223.73	23.53	0.22	24.15	1.01	224.95	1.54
46.26	14.10	373.20	1.94	0.52	35.74	120	2.755	1.570	0.791	0.52	0.50	0.82	288.36	30.55	0.02	30.57	1.00	289.58	1.38
46.75	14.25	427.96	2.15	0.50	40.98	120	2.785	1.584	0.786	0.50	0.50	0.82	329.36	34.98	0.00	34.98	1.00	330.58	1.33
47.24	14.40	493.59	2.57	0.52	47.27	120	2.815	1.598	0.781	0.52	0.50	0.81	378.35	40.47	0.02	40.49	1.00	379.58	1.29
47.74	14.55	308.16	2.38	0.77	29.51	120	2.844	1.612	0.776	0.78	0.50	0.81	234.70	25.43	0.31	25.74	1.01	235.94	1.56
48.23	14.70	220.63	1.60	0.72	21.13	120	2.874	1.627	0.771	0.73	0.50	0.81	166.69	17.88	0.25	18.13	1.01	167.93	1.65
48.72	14.85	228.34	1.47	0.64	21.87	120	2.904	1.641	0.766	0.65	0.50	0.80	172.07	18.33	0.16	18.49	1.01	173.31	1.61
49.21	15.00	206.24	1.78	0.86	19.75	120	2.933	1.655	0.761	0.87	0.53	0.79	152.78	16.76	0.41	17.18	1.02	154.03	1.73
49.70	15.15	186.73	1.91	1.03	17.88	120	2.963	1.669	0.756	1.05	0.55	0.78	136.00	15.22	0.58	15.81	1.04	137.23	1.82
50.20	15.30	188.31	2.09	1.11	18.03	120	2.992	1.683	0.751	1.12	0.56	0.77	138.11	15.39	0.68	16.07	1.04	137.34	1.84
50.69	15.45	216.77	2.22	1.03	20.76	120	3.022	1.697	0.748	1.03	0.54	0.76	157.62	17.67	0.58	18.25	1.03	158.86	1.77
51.18	15.60	204.53	2.39	1.17	19.59	120	3.051	1.712	0.741	1.18	0.56	0.77	146.70	16.72	0.74	17.47	1.04	147.84	1.84
51.67	15.75	188.27	2.78	1.49	17.84	120	3.081	1.726	0.736	1.51	0.59	0.75	130.57	15.35	1.10	16.45	1.07	132.05	1.95
52.17	15.90	263.11	2.80	1.06	25.20	120	3.110	1.740	0.731	1.07	0.52	0.77	190.28	21.47	0.62	22.08	1.03	191.55	1.73
52.66	16.05	314.94	2.45	0.78	30.16	120	3.140	1.754	0.726	0.78	0.50	0.78	229.89	25.27	0.31	25.58	1.01	231.16	1.57
53.15	16.20	283.54	2.68	0.94	27.15	120	3.169	1.768	0.721	0.95	0.51	0.77	205.23	22.90	0.49	23.38	1.02	206.51	1.67
53.64	16.35	264.28	3.05	1.15	25.31	120	3.199	1.782	0.716	1.16	0.53	0.76	187.86	21.51	0.72	22.22	1.03	189.14	1.76
54.13	16.50	251.08	3.17	1.26	24.04	120	3.228	1.797	0.712	1.27	0.55	0.75	176.41	20.46	0.83	21.29	1.04	177.68	1.80
54.63	16.65	231.55	3.27	1.41	22.17	120	3.258	1.811	0.707	1.42	0.57	0.74	160.26	18.90	1.00	19.90	1.05	161.53	1.87
55.12	16.80	220.63	3.29	1.49	21.13	120	3.287	1.825	0.702	1.50	0.57	0.73	151.17	17.99	1.08	19.07	1.08	152.43	1.90
55.61	16.95	209.37	3.24	1.55	20.05	120	3.317	1.839	0.698	1.56	0.58	0.72	142.05	17.04	1.14	18.18	1.07	143.31	1.93
56.10	17.10	207.27	3.17	1.53	19.85	120	3.346	1.853	0.693	1.54	0.58	0.72	139.97	16.61	1.12	17.83	1.07	141.23	1.93
56.59	17.25	185.12	3.04	1.64	17.73	120	3.376	1.860	0.689	1.66	0.60	0.71	123.09	14.98	1.24	16.22	1.08	124.35	1.99
57.09	17.40	171.35	3.34	1.95	16.41	120	3.406	1.882	0.684	1.97	0.62	0.70	111.77	13.94	1.57	15.51	1.11	113.02	2.08
57.58	17.55	135.64	3.61	2.66	12.99	120	3.435	1.896	0.680	2.70	0.68	0.67	85.19	11.10	2.33	13.43	1.21	86.40	2.26
58.07	17.70	193.16	3.29	1.70	18.50	120	3.465	1.910	0.675	1.72	0.60	0.70	126.68	15.59	1.30	16.89	1.08	127.95	2.00
58.56	17.85	301.39	3.25	1.07	28.86	120	3.494	1.924	0.671	1.07	0.52	0.73	207.72	23.94	0.61	24.55	1.03	209.05	1.70
59.06	18.00	357.95	3.75	1.05	34.28	120	3.524	1.938	0.667	1.05	0.50	0.74	248.48	28.53	0.59	29.12	1.02	249.83	1.64
59.55	18.15	310.15	4.22	1.36	29.70	120	3.553	1.953	0.663	1.37	0.54	0.72	209.31	24.99	0.92	25.91	1.04	210.64	1.78
60.04	18.30	293.59	4.01	1.33	28.82	120	3.583	1.967	0.659	1.34	0.54	0.72	202.22	24.13	0.89	25.02	1.04	203.55	1.78
60.53	18.45	348.06	3.88	1.11	33.33	120	3.612	1.981	0.655	1.12	0.51	0.73	237.53	27.66	0.65	28.31	1.02	238.89	1.68
61.02	18.60	317.43	3.96	1.25	30.40	120	3.642	1.995	0.651	1.25	0.53	0.71	213.07	25.24	0.78	26.08	1.03	214.42	1.74
61.52	18.75	278.05	3.72	1.34	26.63	120	3.671	2.009	0.647	1.35	0.55	0.70	183.53	22.09	0.89	22.98	1.04	184.87	1.81
62.01	18.90	287.10	3.49	1.22	27.49	120	3.701	2.023	0.643	1.23	0.54	0.71	190.27	22.64	0.70	23.40	1.03	191.62	1.77
62.50	19.05	298.10	3.36	1.13	28.55	120	3.730	2.038	0.640	1.13	0.53	0.71	196.21	23.35	0.68	24.02	1.03	198.58	1.73
62.99	19.20	293.15	3.28	1.12	28.07	120	3.760	2.052	0.636	1.13	0.53	0.71	194.02	22.89	0.65	23.54	1.03	195.38	1.74
63.48	19.35	297.63	3.28	1.10	28.50	120	3.789	2.066	0.633	1.11	0.52	0.70	196.62	23.18	0.64	23.81	1.03	197.99	1.73
63.98	19.50	321.10	3.57	1.11	30.75	120	3.819	2.080	0.629	1.12	0.52	0.70	212.26	25.05	0.64	25.69	1.03	213.67	1.71
64.47	19.65	291.47	3.78	1.29	27.91	120	3.848	2.094	0.626	1.30	0.54	0.69	188.85	22.86	0.83	23.69	1.04	190.22	1.79
64.96	19.80	315.73	3.97	1.26	30.23	120	3.878	2.108	0.622	1.27	0.53	0.69	205.22	24.76	0.79	25.55	1.03	205.60	1.76
65.45	19.95	315.67	4.19	1.33	30.23	120	3.907	2.123	0.619	1.34	0.54	0.69	203.62	24.61	0.87	25.65	1.03	205.00	1.76
65.94	20.10	339.05	4.56	1.34	32.47	120	3.937	2.137	0.616	1.35	0.53	0.69	218.71	26.71	0.88	27.59	1.03	220.10	1.76
66.44	20.25	330.40	4.88	1.47	31.64	120	3.967	2.151	0.613	1.48	0.55	0.68	210.62	26.13	1.01	27.14	1.04	212.00	1.80
66.93	20.40	318.63	4.54	1.42	30.51	120	3.996	2.165	0.610	1.43	0.55	0.68	202.30	25.05	0.96	26.01	1.04	203.69	1.80
67.42	20.55	300.86	4.32	1.44	28.81	120	4.026	2.179	0.607	1.45	0.55	0.67	189.39	23.56	0.97	24.54	1.04	190.77	1.82
67.91	20.70	265.08	4.10	1.55	25.38	120	4.055	2.193	0.604	1.56	0.57	0.66	163.91	20.72	1.08	21.81	1.05	165.28	1.89
68.41	20.85	303.12	3.78	1.25	29.03	120	4.085	2.208	0.601	1.26	0.54	0.67	191.45	23.39	0.77	24.17	1.03	192.85	1.78
68.90	21.00	234.51	4.06	1.73	22.46	120	4.114	2.222	0.598	1.75	0.59	0.64	141.40	18.33	1.28	19.60	1.07	142.75	1.97
69.39	21.15	292.06	4.18	1.43	27.97	120	4.144	2.236	0.595	1.44	0.56	0.66	180.76	22.86	0.90	23.64	1.04	182.16	1.84
69.88	21.30	299.64	4.23	1.41	28.69	120	4.173	2.250	0.593	1.42	0.55	0.66	185.30	23.23	0.94	24.17	1.04	186.70	1.83
70.37	21.45	231.00	4.24	1.83	22.12	120	4.203	2.264	0.590	1.85	0.60	0.63	136.87	18.02	1.37	19.40	1.09	138.23	2.00
70.87	21.60	211.36	3.55	1.68	20.24	120	4.232	2.279	0.587	1.70	0.60	0.63	124.67	16.27	1.21	17.49	1.07	126.03	2.00
71.36	21.75	240.45	3.23	1.34	23.03	120	4.262	2.293	0.585	1.36	0.57	0.64	145.11	18.25	0.87	18.12	1.05	146.51	1.88
71.85	21.90	277.61	3.59	1.29	26.59	120	4.291	2.307	0.582	1.30	0.55	0.65	169.30	21.12	0.81	21.94	1.04	170.72	1.82
72.34	22.05	296.34	3.76	1.27	28.38	120	4.321	2.321	0.580	1.28	0.54	0.65	181.24	22.55	0.79	23.33	1.03	182.67	1.80
72.83	22.20	242.57	3.41	1.40	23.23	120	4.350	2.335	0.578	1.42	0.57	0.64	144.36	18.49	0.83	19.32	1.05	145.76	1.90
73.33	22.35	251.32	3.39	1.35	24.07	120	4.380	2.349	0.575	1.36	0.57	0.64	149.89	18.99	0.87	19.86	1.05	151.30	1.87
73.82	22.50	206.05	3.52	1.71	19.73	120	4.409	2.364	0.573	1.73	0.61	0.61	118.28	15.70	1.23	16.93	1.08	119.65	2.02
74.31	22.65	174.54	3.96	2.27	16.71	120	4.439	2.378	0.571	2.30	0.65	0.59	96.25	13.47	1.80	15.27	1.13	97.58	2.17
74.80	22.80	166.11	4.55	2.74	15.91	120	4.469	2.392	0.569	2.78	0.67	0.58	89.48	12.95	2.28	15.23	1.18	90.78	2.25
75.30	22.95	170.74	4.49	2.63	16.35	120	4.498	2.406	0.566	2.67	0.67	0.58	92.05	13.27	2.17	15.44	1.15	93.41	2.23
75.79	23.10	200.59	4.37	2.10	18.97	120	4.524	2.420	0.564	2.12	0.63	0.60	116.10	16.08	1.62	17.70	1.10	117.46	2.09
76.28	23.25	156.59	4.17	2.66	15.00	120	4.557	2.434	0.562	2.70	0.67	0.57	83.03	12.09	2.19	14.28	1.18	84.34	2.27

Depth (feet)	Override	Liquef. Suscept. (0 or 1)	Rel. Dens. Dr (%)	Kσ	Kα	Clean Sand Qc1n	Idriss Kσ	1.0 Kσ	CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Qc1n N1(60) Ratio	Apparent Equiv. N1(60)	FC %	FC Adj. ΔN1(60)	Equiv. N1(60)cs	Volumetric Strain (%)	εv (%)	Δh (in)	p (tsf)	Gmax (tsf)	τav (tsf)	Shear Strain γ	Strain ε15	Strain Enc
34.94		1	100	1.00	1.00	175.1	0.97	0.97	Infin.	0.455	Non-Liq.	6.1	28.7	8	6.3	35.0	0.00	0.0	0.000	1.391	1.725	0.606	6.2E-04		
35.43		1	95	1.00	1.00	158.3	0.97	0.86	0.435	0.454	0.92	6.0	26.2	10	5.0	31.2	1.00	3.3	0.005	1.411	1.671	0.608	6.7E-04		
35.93		1	81	1.00	1.00	111.7	0.98	0.56	0.209	0.453	0.44	5.7	19.6	15	2.7	22.3	1.95	9.4	0.014	1.431	1.508	0.614	8.5E-04		
36.42		1	87	1.00	1.00	128.0	0.97	0.95	0.275	0.452	0.58	6.0	21.2	9	4.4	25.6	1.58	5.3	0.009	1.451	1.587	0.620	7.7E-04		
36.91		1	100	1.00	1.00	196.2	0.95	0.95	Infin.	0.450	Non-Liq.	6.3	31.1	4	8.2	38.2	0.00	0.0	0.000	1.471	1.842	0.625	5.8E-04		
37.40		1	100	1.00	1.00	201.0	0.94	0.94	Infin.	0.449	Non-Liq.	6.2	32.5	6	7.7	40.2	0.00	0.0	0.000	1.490	1.869	0.631	5.7E-04		
37.89		1	100	1.00	1.00	218.5	0.93	0.94	Infin.	0.448	Non-Liq.	6.1	35.6	7	8.1	43.7	0.00	0.0	0.000	1.510	1.935	0.636	5.4E-04		
38.38		1	100	1.00	1.00	294.2	0.93	0.94	Infin.	0.447	Non-Liq.	5.9	49.7	11	9.1	58.8	0.00	0.0	0.000	1.530	2.150	0.642	4.6E-04		
38.88		1	100	1.00	1.00	382.2	1.00	0.93	Infin.	0.445	Non-Liq.	5.9	64.9	11	10.0	74.8	0.00	0.0	0.000	1.550	2.346	0.647	4.0E-04		
39.37		1	100	1.00	1.00	466.1	1.00	0.93	Infin.	0.444	Non-Liq.	6.2	75.4	6	10.0	85.4	0.00	0.0	0.000	1.569	2.466	0.652	3.7E-04		
39.86		1	100	1.00	1.00	313.9	1.00	0.92	Infin.	0.442	Non-Liq.	6.0	52.1	9	10.0	62.1	0.00	0.0	0.000	1.589	2.232	0.657	4.4E-04		
40.35		1	100	1.00	1.00	360.2	1.00	0.92	Infin.	0.440	Non-Liq.	6.2	58.0	6	10.0	68.0	0.00	0.0	0.000	1.609	2.314	0.662	4.2E-04		
40.85		1	100	1.00	1.00	388.9	1.00	0.92	Infin.	0.439	Non-Liq.	6.0	64.7	9	10.0	74.7	0.00	0.0	0.000	1.629	2.402	0.666	4.0E-04		
41.34		1	100	1.00	1.00	430.8	1.00	0.91	Infin.	0.437	Non-Liq.	6.2	69.1	5	10.0	79.1	0.00	0.0	0.000	1.649	2.464	0.671	3.9E-04		
41.83		1	100	1.00	1.00	330.0	1.00	0.91	Infin.	0.435	Non-Liq.	6.1	54.2	8	10.0	64.2	0.00	0.0	0.000	1.668	2.312	0.675	4.3E-04		
42.32		1	100	1.00	1.00	325.0	1.00	0.90	Infin.	0.433	Non-Liq.	6.0	54.2	9	10.0	64.2	0.00	0.0	0.000	1.688	2.325	0.679	4.3E-04		
42.81		1	100	1.00	1.00	346.1	1.00	0.90	Infin.	0.432	Non-Liq.	6.1	56.5	7	10.0	66.5	0.00	0.0	0.000	1.708	2.367	0.684	4.2E-04		
43.31		1	100	1.00	1.00	285.9	0.90	0.90	Infin.	0.430	Non-Liq.	6.2	46.5	7	10.0	56.5	0.00	0.0	0.000	1.728	2.254	0.688	4.0E-04		
43.80		1	100	1.00	1.00	339.9	1.00	0.89	Infin.	0.428	Non-Liq.	5.5	61.4	0	6.5	68.0	0.00	0.0	0.000	1.748	2.412	0.691	4.1E-04		
44.29		1	100	1.00	1.00	331.8	1.00	0.89	Infin.	0.426	Non-Liq.	5.5	60.0	2	6.4	66.4	0.00	0.0	0.000	1.767	2.406	0.695	4.2E-04		
44.78		1	100	1.00	1.00	323.8	1.00	0.88	Infin.	0.424	Non-Liq.	5.5	58.5	2	6.2	64.7	0.00	0.0	0.000	1.787	2.389	0.699	4.2E-04		
45.28		1	100	1.00	1.00	227.5	0.89	0.88	Infin.	0.421	Non-Liq.	6.1	37.3	8	8.1	45.5	0.00	0.0	0.000	1.807	2.145	0.702	5.1E-04		
45.77		1	100	1.00	1.00	224.9	0.88	0.88	Infin.	0.419	Non-Liq.	6.0	37.7	10	7.3	45.0	0.00	0.0	0.000	1.827	2.149	0.705	5.1E-04		
46.26		1	100	1.00	1.00	289.6	0.88	0.88	Infin.	0.417	Non-Liq.	6.3	46.0	5	10.0	56.0	0.00	0.0	0.000	1.846	2.323	0.708	4.5E-04		
46.75		1	100	1.00	1.00	330.6	1.00	0.87	Infin.	0.415	Non-Liq.	6.4	51.6	3	10.0	61.6	0.00	0.0	0.000	1.866	2.412	0.711	4.2E-04		
47.24		1	100	1.00	1.00	379.6	1.00	0.87	Infin.	0.413	Non-Liq.	5.5	68.6	2	7.3	75.9	0.00	0.0	0.000	1.886	2.599	0.714	3.8E-04		
47.74		1	100	1.00	1.00	235.9	0.87	0.87	Infin.	0.411	Non-Liq.	5.9	39.7	10	7.5	47.2	0.00	0.0	0.000	1.906	2.230	0.717	4.6E-04		
48.23		1	98	1.00	1.00	168.7	0.92	0.86	Infin.	0.408	Non-Liq.	5.8	29.1	14	4.6	33.7	0.00	0.0	0.000	1.926	2.005	0.720	5.8E-04		
48.72		1	100	1.00	1.00	173.3	0.91	0.86	Infin.	0.406	Non-Liq.	5.8	29.6	12	5.0	34.7	0.00	0.0	0.000	1.945	2.033	0.723	5.7E-04		
49.21		1	95	1.06	1.00	163.2	0.93	0.86	Infin.	0.404	Non-Liq.	5.6	27.5	17	5.2	32.6	0.00	0.0	0.000	1.965	2.002	0.725	5.9E-04		
49.70		1	90	1.12	1.00	153.8	0.93	0.85	0.419	0.402	0.89	5.4	25.2	21	5.0	30.2	0.93	3.0	0.005	1.985	1.962	0.728	6.1E-04		
50.20		1	90	1.14	1.00	158.5	0.93	0.85	0.436	0.399	0.93	5.4	25.5	22	5.0	30.6	0.90	3.0	0.005	2.005	1.977	0.730	6.0E-04		
50.69		1	96	1.09	1.00	172.7	0.92	0.85	Infin.	0.397	Non-Liq.	5.5	28.7	18	5.8	34.5	0.00	0.0	0.000	2.025	2.071	0.732	5.6E-04		
51.18		1	93	1.13	1.00	167.7	0.92	0.84	Infin.	0.395	Non-Liq.	5.4	27.4	22	6.2	33.5	0.00	0.0	0.000	2.044	2.061	0.735	5.6E-04		
51.67		1	88	1.24	1.00	163.1	0.93	0.84	Infin.	0.392	Non-Liq.	5.2	25.5	27	7.2	32.6	0.00	0.0	0.000	2.064	2.052	0.737	5.7E-04		
52.17		1	100	1.06	1.00	202.2	0.88	0.84	Infin.	0.390	Non-Liq.	5.6	34.1	17	6.3	40.4	0.00	0.0	0.000	2.084	2.215	0.739	5.0E-04		
52.66		1	100	1.00	1.00	231.2	0.85	0.84	Infin.	0.388	Non-Liq.	5.9	39.0	11	7.2	46.2	0.00	0.0	0.000	2.104	2.327	0.741	4.6E-04		
53.15		1	100	1.01	1.00	209.5	0.85	0.83	Infin.	0.385	Non-Liq.	5.7	36.0	14	5.9	41.9	0.00	0.0	0.000	2.123	2.262	0.743	4.9E-04		
53.64		1	100	1.08	1.00	203.4	0.85	0.83	Infin.	0.383	Non-Liq.	5.6	34.6	18	6.7	40.7	0.00	0.0	0.000	2.143	2.251	0.745	4.9E-04		
54.13		1	100	1.11	1.00	197.0	0.89	0.83	Infin.	0.381	Non-Liq.	5.5	32.5	20	6.9	39.4	0.00	0.0	0.000	2.163	2.237	0.747	5.0E-04		
54.63		1	97	1.16	1.00	187.3	0.90	0.82	Infin.	0.379	Non-Liq.	5.3	30.2	23	7.2	37.5	0.00	0.0	0.000	2.183	2.210	0.748	5.1E-04		
55.12		1	94	1.19	1.00	181.4	0.91	0.82	Infin.	0.377	Non-Liq.	5.3	28.9	25	7.4	36.3	0.00	0.0	0.000	2.203	2.196	0.750	5.1E-04		
55.61		1	92	1.22	1.00	175.0	0.92	0.82	Infin.	0.375	Non-Liq.	5.2	27.5	27	7.5	35.0	0.00	0.0	0.000	2.222	2.180	0.752	5.2E-04		
56.10		1	91	1.22	1.00	172.5	0.92	0.82	Infin.	0.372	Non-Liq.	5.2	27.1	27	7.4	34.5	0.00	0.0	0.000	2.242	2.179	0.754	5.2E-04		
56.59		1	86	1.29	1.00	160.7	0.93	0.81	Infin.	0.370	Non-Liq.	5.1	24.4	30	7.7	32.1	0.00	0.0	0.000	2.262	2.137	0.755	5.4E-04		
57.09		1	82	1.42	1.00	160.0	0.93	0.81	0.401	0.368	1.01	4.9	22.9	35	5.0	27.9	1.09	3.3	0.005	2.282	2.048	0.757	5.8E-04		
57.58		1	71	1.82	1.00	157.3	0.94	0.81	0.442	0.366	0.98	4.6	18.9	47	5.0	23.9	1.57	5.0	0.007	2.301	1.952	0.759	6.3E-04		
58.07		1	87	1.30	1.00	165.8	0.92	0.81	Infin.	0.364	Non-Liq.	5.1	25.1	30	8.0	33.2	0.00	0.0	0.000	2.321	2.188	0.761	5.2E-04		
58.56		1	100	1.04	1.00	217.1	0.82	0.80	Infin.	0.362	Non-Liq.	5.7	36.9	16	6.5	43.4	0.00	0.0	0.000	2.341	2.404	0.762	4.5E-04		
59.06		1	100	1.06	1.00	249.4	0.82	0.80	Infin.	0.360	Non-Liq.	5.8	43.2	13	6.7	49.9	0.00	0.0	0.000	2.361	2.520	0.764	4.2E-04		
59.55		1	100	1.09	1.00	229.8	0.82	0.80	Infin.	0.358	Non-Liq.	5.5	38.2	19	7.8	46.0	0.00	0.0	0.000	2.381	2.471	0.766	4.3E-04		
60.04		1	100	1.08	1.00	222.4	0.83	0.80	Infin.	0.356	Non-Liq.	5.5	36.9	19	7.6	44.5	0.00	0.0	0.000	2.400	2.454	0.767	4.4E-04		
60.53		1	100	1.02	1.00	244.0	0.81	0.79	Infin.	0.354	Non-Liq.	5.7	41.8	15	7.0	48.8	0.00	0.0	0.000	2.420	2.541	0.769	4.2E-04		
61.02		1	100	1.07	1.00	228.9	0.81	0.79	Infin.	0.352	Non-Liq.	5.6	38.4	17	7.4	45.8	0.00	0.0	0.000	2.440	2.498	0.771	4.3E-04		
61.52		1	100	1.11	1.00	206.0	0.86	0.79	Infin.	0.350	Non-Liq.	5.5	33.9	20	7.3	41.2	0.00	0.0	0.000	2.460	2.421	0.772	4.5E-04		
62.01		1	100	1.08	1.00	207.6	0.84	0.79	Infin.	0.349	Non-Liq.	5.6	34.6	19	6.9	41.6	0.00	0.0	0.000	2.480	2.430	0.774	4.5E-04		
62.50		1	100	1.08	1.00	211.5	0.83	0.78	Infin.	0.347	Non-Liq.	5.6	35.6	17	6.7	42.3	0.00	0.0	0.000	2.499	2.462	0.776	4.4E-04		
62.99		1	100	1.08	1.00	207.6	0.83	0.78	Infin.	0.345	Non-Liq.	5.6	34.9	17	6.6	41.5	0.00	0.0	0.000	2.519	2.457	0.777	4.4E-04		
63.48		1	100	1.09	1.00	209.2	0.83	0.78	Infin.	0.343	Non-Liq.	5.6	35.3	17	6.6	41.8	0.00	0.0	0.000	2.539	2.473	0.779	4.4E-04		
63.98		1	100	1.04	1.00	222.8	0.80	0.78	Infin.	0.342	Non-Liq.	5.7	37.8	16	6.8	44.6	0.00	0.0	0.000	2.559	2.535	0.781	4.2E-04		
64.47		1	100	1.10	1.00	209.1	0.84	0.78	Infin.	0.340	Non-Liq.	5.5	34.6	20	7.2	41.8	0.00	0.0	0.000	2.578	2.491	0.783	4.4E-04		
64.96		1	100	1.08	1.00	222.4	0.80	0.77	Infin.	0.338	Non-Liq.	5.6	37.2	18	7.3	44.5	0.00	0.0	0.000	2.598	2.553	0.784	4.2E-04		
65.45		1	100	1.09	1.00	223.6	0.81	0.77	Infin.	0.337	Non-Liq.	5.5	37.2	19	7.5	44.7	0.00	0.0	0.000	2.618	2.567	0.786	4.2E-04		
65.94		1	100	1.08	1.00	237.6	0.79	0.77	Infin.	0.335	Non-Liq.	5.5	39.7	18	7.9	47.5	0.00	0.0	0.000	2.638	2.630	0.788	4.1E-04		
66.44		1	100	1.11	1.00	234.9	0.79	0.77	Infin.	0.334	Non-Liq.	5.5	38.8	20	8.2	47.0	0.00	0.0	0.000	2.658	2.629	0.790	4.1E-04		
66.93		1	100	1.11	1.00	225.8	0.80	0.76	Infin.	0.332	Non-Liq.	5.5	37.2	20	7.9	45.2	0.00	0.0	0.000	2.677	2.605	0.792	4.1E-04		
67.42		1	100	1.12	1.00	214.6	0.83	0.76	Infin.	0.331	Non-Liq.	5.4	35.2	21	7.8	42.9	0.00	0.0	0.000	2.697	2.570	0.794	4.2E-04		
67.91		1	98	1.18	1.00	195.0	0.87	0.76	Infin.	0.329	Non-Liq.	5.3	31.2	24	7.8	39.0	0.00	0.0	0.000	2.717	2.490	0.796	4.4E-04		
68.41		1	100	1.09	1.00	210.0	0.82	0.76	Infin.	0.328	Non-Liq.	5.6	34.9	19	7.1	42.0	0.00	0.0	0.000	2.737	2.570	0.798	4.2E-04		
68.90		1	92	1.28	1.00	180.3	0.89	0.76	Infin.	0.327	Non-Liq.	5.1	27.8	28	8.3	36.1	0.00	0.0	0.000	2.756	2.452	0.800	4.6E-04		
69.39		1	100	1.13	1.00	206.7	0.84	0.75	Infin.	0.325	Non-Liq.	5.4	33.7	22	7.6	41.3	0.00	0.0	0.000	2.776	2.575	0.802	4.3E-04		
69.88		1	100	1.13	1.00	210.1	0.83	0.75	Infin.	0.324	Non-Liq.	5.4	34.4	21	7.6	42.0	0.00	0.0	0.000	2.796	2.589	0.804	4.2E-04		
70.37		1	90	1.30	1.00	179.3	0.89	0.76	Infin.	0.323	Non-Liq.	5.1	27.2	30	8.7	35.9	0.00	0.0	0.000	2.816	2.474	0.806	4.5E-04		
70.87		1	86	1.30	1.00	163.5	0.90	0.75	Infin.	0.321	Non-Liq.	5.1	24.8	30	7.8	32.7	0.00	0.0	0.000	2.836	2.407	0.808	4.7E-04		
71.36		1	93	1.17	1.00	171.7	0.88	0.76	Infin.	0.320	Non-Liq.	5.3	27.8	24	6.8	34.9	0.00	0.0	0.000	2.855	2.455	0.810	4.6E-04		
71.85		1	96	1.12	1.00	191.9	0.85	0.74	Infin.	0.319	Non-Liq.	5.4	31.4	21	6.8	38.4	0.00	0.0	0.000	2.875	2.557	0.812	4.4E-04		
72.34		1	100	1.10	1.00	201.8	0.83	0.74	Infin.	0.318	Non-Liq.	5.5	33.3	20	7.0	40.4	0.00	0.0	0.000	2.895	2.609	0.814	4.2E-04		
72.83		1	92	1.19	1.00	172.9	0.88	0.74	Infin.	0.317	Non-Liq.	5.3	27.6	25	7.0	34.6	0.00	0.0	0.000	2.915	2.480	0.817	4.6E-04		
73.33		1	94	1.16	1.00	178.3	0.87	0.74	Infin.	0.316	Non-Liq.	5.3	28.4	24	6.9	35.3	0.00	0.0	0.000	2.935	2.516	0.819	4.5E-04		
73.82		1	84	1.35	1.00	156.6	0.90	0.74	0.451	0.314	1.06	5.0	23.7	32	5.0	28.7	0.82	0.0	0.000	2.954	2.353	0.821	5.0E-04		
74.31		1	76	1.60	1.00	155.8	0.92	0.74	0.432	0.313	1.01	4.8	20.5	41	5.0	25.5	1.18	3.4	0.005	2.974	2.270	0.823	5.3E-04		
74.80		1	73	1.80	1.00	163.8	0.92	0.73	Infin.	0.312	Non-Liq.	4.6	19.8	47	10.0	29.8	0.00	0.0	0.000	2.994	2.397	0.826	4.9E-04		
75.30		1	74	1.75	1.00	163.1	0.92	0.73	Infin.	0.311	Non-Liq.	4.6	20.2	45	10.0	30.2	0.00	0.0	0.000	3.014	2.416	0.828	4.8E-04		
75.79		1	84	1.44	1.00	166.7	0.90	0.73	Infin.	0.310	Non-Liq.	4.9	23.9	36	9.8	33.7	0.00	0.0	0.000	3.033	2.546	0.830	4.6E-04		
76.28		1	70	1.84	1.00	155.4	0.92	0.79	0.429	0.309	1.09	4.0	16.5	48	5.0	23.5	1.43	4.1	0.006	3.053	2.237	0.833	5.5E-04		

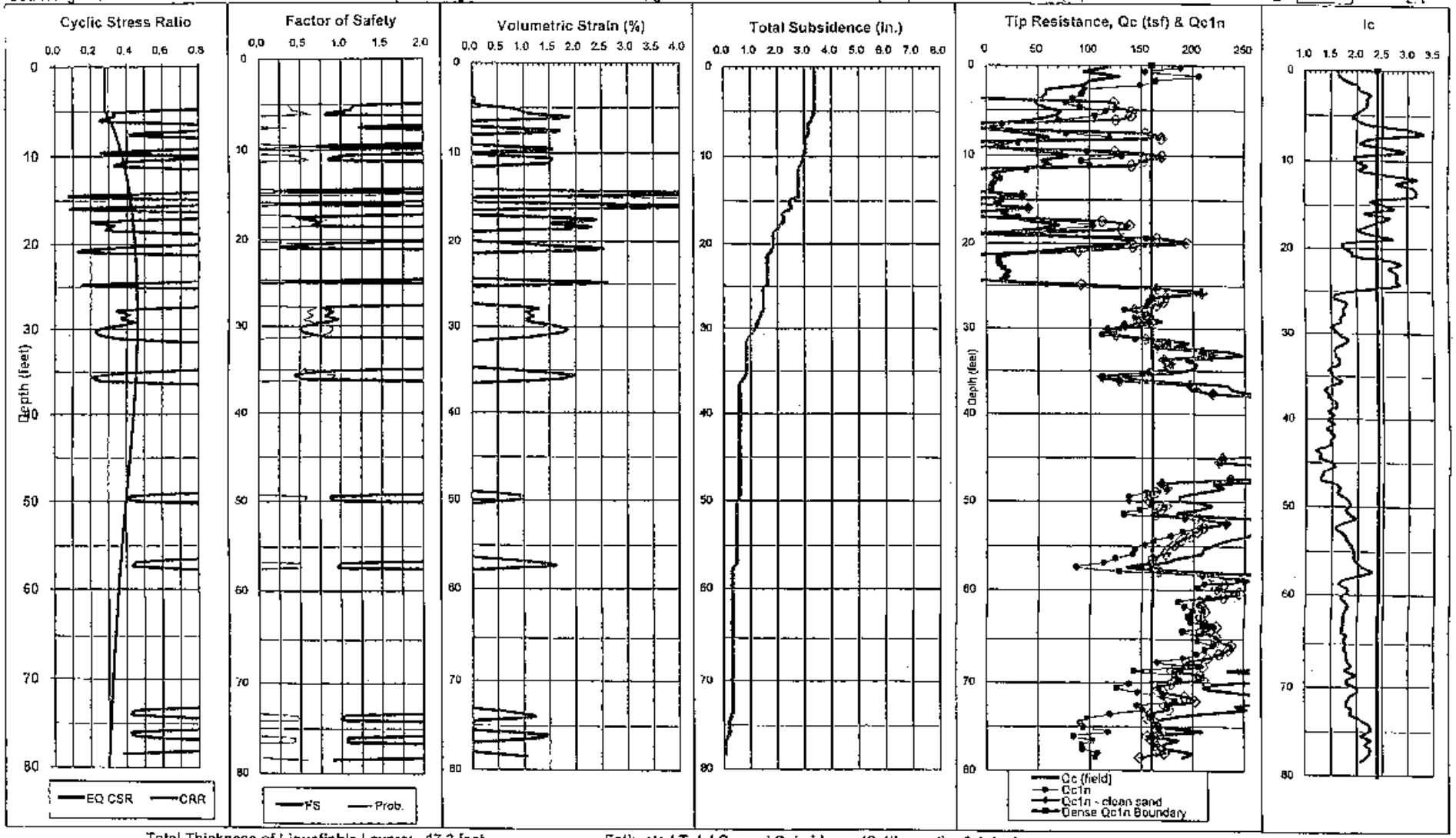
Depth (feet)	(m)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio Rf %	qc MPa	Total Unit Wt. (pcf)	Total Stress po (tsf)	Eff. Stress p'o (tsf)	rd	F %	n	Max 1.70 Cq	Q	Mod qc1 MPa	Mod Δqc MPa	Mod qc1mod MPa	Mod eff Kc	Qc1n	Ic	Override	Liquef. Suscept. (0 or 1)	Rel. Dens. Dr(%)	Kc	K_H	Clean Sand Qc1n	Idriss K_σ	1.0 K_α	CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Gain $N_{1(60)}$ Ratio	Apparent Equiv. $N_{1(60)}$	FC %	FC Adj. $\Delta N_{1(60)}$	Equiv. $N_{1(60)cs}$	Volumetric Strain (%)	SPI (%)	DPI (m)	ρ (tsf)	G_{max} (tsf)	τ_{av} (tsf)	Shear Strain γ	Strain E_v	Strain Enc
76.77	23.40	184.86	4.21	2.28	17.70	120	4.587	2.449	0.560	2.31	0.65	0.58	100.34	14.20	1.80	16.00	1.13	104.89	2.18		1	78	1.57	1.00	159.9	0.91	0.73	0.460	0.308	1.06	4.8	21.3	40	5.0	28.3	1.06	3.0	0.004	3.073	2.331	0.835	5.1E-04		
77.26	23.55	171.33	4.58	2.67	16.41	120	4.616	2.463	0.558	2.71	0.67	0.57	90.79	13.26	2.20	15.46	1.17	92.11	2.24		1	73	1.77	1.00	163.2	0.92	0.72	Infin.	0.307	Non-Liq.	4.6	20.0	46	10.0	30.0	0.00	0.0	0.000	3.093	2.442	0.838	4.8E-04		
77.76	23.70	173.99	4.77	2.74	16.68	120	4.646	2.477	0.556	2.76	0.67	0.57	91.75	13.48	2.27	15.75	1.17	93.07	2.25		1	74	1.79	1.00	166.2	0.91	0.72	Infin.	0.306	Non-Liq.	4.6	20.2	46	10.0	30.2	0.00	0.0	0.000	3.113	2.456	0.840	4.8E-04		
78.25	23.85	197.82	4.91	2.48	18.96	120	4.675	2.491	0.555	2.51	0.65	0.57	105.95	15.30	2.00	17.30	1.13	107.32	2.17		1	80	1.60	1.00	171.5	0.90	0.72	Infin.	0.306	Non-Liq.	4.7	22.6	41	10.0	32.6	0.00	0.0	0.000	3.132	2.527	0.843	4.6E-04		
78.74	24.00	168.69	3.41	1.80	16.17	120	4.705	2.505	0.553	1.82	0.62	0.59	103.58	14.21	1.31	15.52	1.09	104.95	2.08		1	79	1.41	1.00	148.2	0.90	0.72	0.383	0.305	0.90	4.9	21.3	35	5.0	26.3	1.04	3.0	0.004	3.152	2.359	0.845	5.1E-04		
79.23	24.15	#N/A	#N/A	#N/A	#N/A	120	4.734	#N/A	0.551	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
79.72	24.30	#N/A	#N/A	#N/A	#N/A	120	4.764	#N/A	0.549	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
80.22	24.45	#N/A	#N/A	#N/A	#N/A	120	4.793	#N/A	0.547	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
80.71	24.60	#N/A	#N/A	#N/A	#N/A	120	4.823	#N/A	0.546	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
81.20	24.75	#N/A	#N/A	#N/A	#N/A	120	4.852	#N/A	0.544	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
81.69	24.90	#N/A	#N/A	#N/A	#N/A	120	4.882	#N/A	0.542	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
82.19	25.05	#N/A	#N/A	#N/A	#N/A	120	4.911	#N/A	0.541	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
82.68	25.20	#N/A	#N/A	#N/A	#N/A	120	4.941	#N/A	0.539	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
83.17	25.35	#N/A	#N/A	#N/A	#N/A	120	4.970	#N/A	0.538	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
83.66	25.50	#N/A	#N/A	#N/A	#N/A	120	5.000	#N/A	0.536	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
84.15	25.65	#N/A	#N/A	#N/A	#N/A	120	5.030	#N/A	0.535	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
84.65	25.80	#N/A	#N/A	#N/A	#N/A	120	5.059	#N/A	0.533	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
85.14	25.95	#N/A	#N/A	#N/A	#N/A	120	5.089	#N/A	0.532	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
85.63	26.10	#N/A	#N/A	#N/A	#N/A	120	5.118	#N/A	0.531	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
86.12	26.25	#N/A	#N/A	#N/A	#N/A	120	5.148	#N/A	0.529	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
86.61	26.40	#N/A	#N/A	#N/A	#N/A	120	5.177	#N/A	0.528	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
87.11	26.55	#N/A	#N/A	#N/A	#N/A	120	5.207	#N/A	0.527	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
87.60	26.70	#N/A	#N/A	#N/A	#N/A	120	5.236	#N/A	0.525	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
88.09	26.85	#N/A	#N/A	#N/A	#N/A	120	5.266	#N/A	0.524	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
88.58	27.00	#N/A	#N/A	#N/A	#N/A	120	5.295	#N/A	0.523	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
89.07	27.15	#N/A	#N/A	#N/A	#N/A	120	5.325	#N/A	0.522	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
89.57	27.30	#N/A	#N/A	#N/A	#N/A	120	5.354	#N/A	0.520	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
90.06	27.45	#N/A	#N/A	#N/A	#N/A	120	5.384	#N/A	0.519	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
90.55	27.60	#N/A	#N/A	#N/A	#N/A	120	5.413	#N/A	0.518	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
91.04	27.75	#N/A	#N/A	#N/A	#N/A	120	5.443	#N/A	0.517	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
91.54	27.90	#N/A	#N/A	#N/A	#N/A	120	5.472	#N/A	0.516	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
92.03	28.05	#N/A	#N/A	#N/A	#N/A	120	5.502	#N/A	0.515	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
92.52	28.20	#N/A	#N/A	#N/A	#N/A	120	5.531	#N/A	0.513	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
93.01	28.35	#N/A	#N/A	#N/A	#N/A	120	5.561	#N/A	0.512	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
93.50	28.50	#N/A	#N/A	#N/A	#N/A	120	5.591	#N/A	0.511	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
94.00	28.65	#N/A	#N/A	#N/A	#N/A	120	5.620	#N/A	0.510	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
94.49	28.80	#N/A	#N/A	#N/A	#N/A	120	5.650	#N/A	0.509	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
94.98	28.95	#N/A	#N/A	#N/A	#N/A	120	5.679	#N/A	0.508	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
95.47	29.10	#N/A	#N/A	#N/A	#N/A	120	5.709	#N/A	0.507	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
95.96	29.25	#N/A	#N/A	#N/A	#N/A	120	5.738	#N/A	0.506	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
96.46	29.40	#N/A	#N/A	#N/A	#N/A	120	5.768	#N/A	0.505	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
96.95	29.55	#N/A	#N/A	#N/A	#N/A	120	5.797	#N/A	0.504	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
97.44	29.70	#N/A	#N/A	#N/A	#N/A	120	5.827	#N/A	0.503	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
97.93	29.85	#N/A	#N/A	#N/A	#N/A	120	5.856	#N/A	0.502	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
98.43	30.00	#N/A	#N/A	#N/A	#N/A	120	5.886	#N/A	0.501	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
98.92	30.15	#N/A	#N/A	#N/A	#N/A	120	5.915	#N/A	0.501	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
99.41	30.30	#N/A	#N/A	#N/A	#N/A	120	5.945	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
99.90	30.45	#N/A	#N/A	#N/A	#N/A	120	5.974	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	30.60	#N/A	#N/A	#N/A	#N/A	120	6.004	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	30.75	#N/A	#N/A	#N/A	#N/A	120	6.033	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	30.90	#N/A	#N/A	#N/A	#N/A	120	6.063	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.05	#N/A	#N/A	#N/A	#N/A	120	6.093	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.20	#N/A	#N/A	#N/A	#N/A	120	6.122	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.35	#N/A	#N/A	#N/A	#N/A	120	6.152	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.50	#N/A	#N/A	#N/A	#N/A	120	6.181	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.65	#N/A	#N/A	#N/A	#N/A	120	6.211	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.80	#N/A	#N/A	#N/A	#N/A	120	6.240	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.95	#N/A	#N/A	#N/A	#N/A	120	6.270	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.10	#N/A	#N/A	#N/A	#N/A	120	6.299	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.25	#N/A	#N/A	#N/A	#N/A	120	6.329	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.40	#N/A	#N/A	#N/A	#N/A	120	6.358	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.55	#N/A	#N/A	#N/A	#N/A	120	6.388	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.70	#N/A	#N/A	#N/A	#N/A	120	6.417	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.85	#N/A	#N/A	#N/A	#N/A	120	6.447	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.00	#N/A	#N/A	#N/A	#N/A	120	6.476	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.15	#N/A	#N/A	#N/A	#N/A	120	6.506	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.30	#N/A	#N/A	#N/A	#N/A	120	6.535	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.45	#N/A	#N/A	#N/A	#N/A	120	6.565	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.60	#N/A	#N/A	#N/A	#N/A	120	6.594	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.75	#N/A	#N/A	#N/A	#N/A	120	6.624	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.90	#N/A	#N/A	#N/A	#N/A	120	6.654	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.05	#N/A	#N/A	#N/A	#N/A	120	6.683	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.20	#N/A	#N/A	#N/A	#N/A	120	6.713	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.35	#N/A	#N/A	#N/A	#N/A	120	6.742	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.50	#N/A	#N/A	#N/A	#N/A	120	6.772	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.65	#N/A	#N/A	#N/A	#N/A	120	6.801	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.80	#N/A	#N/A	#N/A	#N/A	120	6.831	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.95	#N/A	#N/A	#N/A	#N/A	120	6.860	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.10	#N/A	#N/A	#N/A	#N/A	120	6.890	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.25	#N/A	#N/A	#N/A	#N/A	120	6.919	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.40	#N/A	#N/A	#N/A	#N/A	120	6.949	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.55	#N/A	#N/A	#N/A	#N/A	120	6.978	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.70	#N/A	#N/A	#N/A	#N/A	120	7.008	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.85	#N/A	#N/A	#N/A	#N/A	120	7.037	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	36.00	#N/A	#N/A	#N/A	#N/A	120	7.067	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

EARTH SYSTEMS - EVALUATION OF LIQUEFACTION POTENTIAL AND INDUCED GROUND SUBSIDENCE

Panay Way Parcel 21 Project No: LA-01052-01 Method Used: 1 1998 NCEER (Robertson & Wride)

Ground Compaction Remediated to depth of: 4.0 feet Settlement Analysis using Wu (2002) using clean sand Qc1n/N1(60) ratio =5 Plot 2 Limiting Ic: 2.4

Sounding: CPT2 Earthquake Magnitude: 7.1 PGA, g: 0.50 Calc GWT (feet): 5.0 Qc1n/N1(60): 5



Total Thickness of Liquefiable Layers: 17.2 feet Estimated Total Ground Subsidence (Settlement): 3.4 inches

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA
Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Liquefaction Analysis using 1998 NCEER (Robertson & Wride) method
Settlement Analysis using Wu (2003) using clean sand Qc1n/N1(60) ratio =5

Project: Panay Way Parcel 21
Job No: LA-03052-01
Date: 8/24/2006
Sounding: CPT7

EARTHQUAKE INFORMATION:		
Magnitude:	7.1	7.5
PGA, g:	0.60	0.43
MSF:	1.15	
GWT, feet:	0.0	
Calc GWT, feet:	5.0	

Plot: 3
Method Used: 1 1998 NCEER (Robertson & Wride)
Averaging Increment: 3 0.15 m
Induced CSR (M=7.5) = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = Cq*Kc*KH*Qc
SF = CRR7.5*Kσ/CSR

Ignore 1st/last increment into sand/silt soils: 0 no
Ignore/remediate upper: 1.2 m
Unit Weight of unsaturated soils: 100 pcf
Unit Weight of saturated soils: 120 pcf
Limiting Ic for liquefiable soils: 2.40 Limiting Ic for Kc: 2.4

Use which FC adjustment: 1 Based on Clean Sand Qc1n
Use which Apparent FC Curve: 0 Robertson Lower Bound
Use Moss @ PL: 15%
Use Tokimatsu & Seed (1) or Ishihara &Yoshimine (2), Wu (3): 3 Wu
Required SF: 1.50 Max $\Delta N_{1(60)}$ 5.0
Min SF of Liquefiable Layers: 0.58 Max $\Delta N_{1(60)}$ 10.0
Avg SF of Liquefiable Layers: 0.78

Total Liquefied Thickness (feet)	Total Induced Subsidence (inches)	DPI meters
5.4	1.2	0.13

SETTLEMENT OF DRY SANDS
Qc1n / N1(60) Ratio for clean sand: 5
p = 0.67*po
τ_{av} = 0.65*PGA*po*rd
G_{max} = 447*$N_{1(60)cs}^{1/3}$*$p^{0.5}$
a = 0.0389*(p/1)+0.124
b = 6400*(p/1)^-0.6
γ = {(1+a*EXP(b*τav/Gmax))/(1+a)}*τav/Gmax
E_{15} = γ*($N_{1(60)cs}$/20)^-1.2
Nc = (MAG-4)^2.17
E_{Nc} = (Nc/15)^0.45*E15
S = 2*H*E_{Nc}
Nc = 11.6

Depth (feet)	(m)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio Rf %	qc MPa	Total Unit Wt. (pcf)	Total Stress po (tsf)	Eff. Stress p'o (tsf)	rd	F %	n	Max 1.70 Cq	Q	Moss qc1 MPa	Moss ΔQ MPa	Moss qc1mod MPa	Moss eff Kc	Qc1n	Ic	Override	Liquef. Suscept. (0 or 1)	Rel. Dens. Dr (%)	Kc	KH	Clean Sand Qc1n	Kσ	1.0 Kα	CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Qc1n/N1(60) Ratio	Apparent Equiv. N1(60)	FC %	FC Adj. ΔN1(60)	Equiv. N1(60)cs	Volumetric Strain (%)	εh (%)	dh (in)	p (tsf)	Gmax (tsf)	τav (tsf)	Shear Strain γ	Strain E15	Strain Enc
0.49	0.15	121.09	1.87	1.53	11.67	100	0.025	0.025	1.000	1.53	0.56	1.70	195.82	19.84	1.01	20.85		195.88	1.83		0			1.00		1.00	1.00		0.283	Non-Liq.	5.4	36.2	22			0.00	0.0	0.000	0.016					
0.98	0.30	74.05	1.38	1.64	7.09	100	0.049	0.049	1.000	1.84	0.62	1.70	118.90	12.05	1.31	13.36		118.98	2.04		0			1.00		1.00	1.00		0.282	Non-Liq.	5.0	23.7	33			0.00	0.0	0.000	0.033					
1.48	0.45	81.46	3.53	4.33	7.80	100	0.074	0.074	0.999	4.34	0.70	1.70	130.77	13.25	3.75	17.01		130.89	2.30		0			1.00		1.00	1.00		0.282	Non-Liq.	4.5	29.1	50			0.00	0.0	0.000	0.049					
1.97	0.60	102.62	4.19	4.06	9.83	100	0.098	0.098	0.997	4.06	0.67	1.70	164.73	15.71	3.50	20.21		164.89	2.22		0			1.00		1.00	1.00		0.282	Non-Liq.	4.7	35.4	44			0.00	0.0	0.000	0.066					
2.46	0.75	85.53	3.69	4.31	8.19	120	0.128	0.128	0.996	4.32	0.69	1.70	137.22	13.92	3.73	17.65		137.42	2.29		0			1.00		1.00	1.00		0.281	Non-Liq.	4.5	30.4	49			0.00	0.0	0.000	0.086					
2.95	0.90	84.97	3.55	4.17	8.14	120	0.157	0.157	0.995	4.18	0.69	1.70	136.28	13.49	3.59	17.08		136.54	2.27		0			1.00		1.00	1.00		0.281	Non-Liq.	4.5	30.0	48			0.00	0.0	0.000	0.106					
3.44	1.05	85.28	3.97	4.65	8.17	120	0.187	0.187	0.994	4.66	0.70	1.70	136.73	12.71	4.06	16.77		137.03	2.31		0			1.00		1.00	1.00		0.281	Non-Liq.	4.5	30.5	51			0.00	0.0	0.000	0.125					
3.94	1.20	115.20	4.48	3.89	11.03	120	0.217	0.217	0.993	3.90	0.66	1.70	184.75	16.31	3.31	18.63		185.10	2.17		0			1.00		1.00	1.00		0.281	Non-Liq.	4.7	39.0	41			0.00	0.0	0.000	0.145					
4.43	1.35	112.03	4.68	4.18	10.73	120	0.246	0.246	0.992	4.19	0.67	1.70	179.62	15.29	3.59	18.88	1.24	180.01	2.25		1	100	1.58	1.00	303.1	1.00	1.00	Infin.	0.280	Non-Liq.	4.7	38.5	44	10.0	48.5	0.01	0.0	0.000	0.165	662	0.079	2.4E-04	6.3E-05	7.4E-05
4.92	1.50	113.62	4.20	3.70	10.88	120	0.276	0.276	0.990	3.71	0.66	1.70	182.12	15.28	3.12	18.40	1.20	182.57	2.16		1	100	1.57	1.00	287.2	1.00	1.00	Infin.	0.280	Non-Liq.	4.8	38.3	40	10.0	48.3	0.02	0.0	0.000	0.185	699	0.089	2.5E-04	6.7E-05	7.7E-05
5.41	1.65	85.01	3.27	3.84	8.14	120	0.305	0.305	0.989	3.86	0.68	1.70	136.11	11.43	3.28	14.71	1.29	138.60	2.25		1	90	1.79	1.00	244.4	1.00	1.00	Infin.	0.284	Non-Liq.	4.8	29.7	46	10.0	39.7	0.00	0.0	0.000	0.204	688	0.098	3.0E-04		
5.91	1.80	65.21	2.09	3.20	6.24	120	0.335	0.335	0.988	3.22	0.65	1.70	104.25	8.98	2.70	11.68	1.30	104.79	2.76		1	79	1.82	1.00	190.5	1.00	1.00	Infin.	0.297	Non-Liq.	4.8	22.9	47	10.0	32.9	0.00	0.0	0.000	0.224	678	0.107	3.6E-04		
6.40	1.95	21.53	1.06	4.92	2.10	120	0.364	0.364	0.987	4.90	0.82	1.70	34.85	3.31	4.38	7.69		35.24	2.72		0			1.00		1.00	1.00		0.309	Non-Liq.	3.7	9.8	88			0.00	0.0	0.000	0.244					
6.89	2.10	74.76	1.44	1.93	7.16	120	0.394	0.394	0.986	1.94	0.63	1.70	119.49	16.09	1.47	17.56	1.09	189.77	2.05		1	100	1.37	1.58	260.9	1.00	1.00	Infin.	0.320	Non-Liq.	5.0	38.1	34	10.0	48.1	0.00	0.0	0.000	0.264	835	0.126	2.9E-04		
7.38	2.25	47.35	1.84	3.89	4.53	120	0.423	0.423	0.985	3.92	0.74	1.70	75.41	8.15	3.52	9.87		76.09	2.41		0			1.00		1.00	1.00		0.330	Non-Liq.	4.3	17.8	59			0.00	0.0	0.000	0.284					
7.87	2.40	17.35	1.23	7.10	1.66	120	0.453	0.453	0.984	7.29	0.89	1.70	27.15	2.40	4.72	7.12		27.86	2.91		0			1.00		1.00	1.00		0.339	Non-Liq.	3.3	8.5	100			0.00	0.0	0.000	0.303					
8.37	2.55	10.58	0.59	5.54	1.01	120	0.482	0.479	0.983	5.80	0.92	1.70	16.74	1.61	4.76	5.38		17.01	3.01		0			1.00		1.00	1.00		0.348	Non-Liq.	3.1	5.5	100			0.00	0.0	0.000	0.323					
8.86	2.70	7.54	0.17	2.28	0.72	120	0.512	0.493	0.982	2.44	0.89	1.70	11.32	1.23	1.90	3.13		12.11	2.90		0			1.00		1.00	1.00		0.356	Non-Liq.	3.3	3.6	100			0.00	0.0	0.000	0.343					
9.35	2.85	13.21	0.12	0.93	1.26	120	0.541	0.507	0.981	0.97	0.77	1.70	20.41	2.15	0.47	2.62		21.22	2.47		0			1.00		1.00	1.00		0.363	Non-Liq.	4.2	5.1	65			0.00	0.0	0.000	0.363					
9.84	3.00	5.06	0.16	1.75	0.45	120	0.571	0.521	0.979	1.85	0.86	1.70	13.62	1.46	1.35	2.81		14.46	2.77		0			1.00		1.00	1.00		0.373	Non-Liq.	3.6	4.0	94			0.00	0.0	0.000	0.382					
10.33	3.15	6.65	0.13	1.89	0.64	120	0.600	0.535	0.978	2.05	0.90	1.70	9.63	1.08	1.50	2.55		10.69	2.93		0			1.00		1.00	1.00		0.378	Non-Liq.	3.3	3.2	100			0.00	0.0	0.000	0.402					
10.83	3.30	2.27	0.54	23.83	0.22	120	0.630	0.548	0.977	####	1.00	1.70	2.76	0.37	4.82	5.29		3.65	4.07		0			1.00		1.00	1.00		0.382	Non-Liq.	1.0	3.5	100			0.00	0.0	0.000	0.422					
11.32	3.45	43.69	0.92	2.11	4.18	120	0.659	0.564	0.976	2.13	0.70	1.58	53.48	8.56	1.77	10.33	1.21	101.59	2.23		1	77	1.67	1.56	190.4	1.00	1.00	Infin.	0.387	Non-Liq.	4.5	22.4	49	10.0	32.4	0.00	0.0	0.000	0.442	947	0.209	4.7E-04		
11.81	3.60	7.35	0.50	6.76	0.70	120	0.689	0.578	0.975	7.34	0.99	1.70	10.89	1.07	4.97	6.04		11.82	3.23		0			1.00		1.00	1.00		0.392	Non-Liq.	2.7	4.3	100			0.00	0.0	0.000	0.462					
12.30	3.75	5.43	0.20	3.69	0.52	120	0.719	0.592	0.974	4.14	0.98	1.70	7.76	0.85	3.54	4.40		8.73	3.17		0			1.00		1.00	1.00		0.397	Non-Liq.	2.8	3.1	100			0.00	0.0	0.000	0.481					
12.80	3.90	6.33	0.20	3.15	0.61	120	0.748	0.606	0.973	3.48	0.95	1.70	9.19	0.95	2.95	3.93		10.17	3.08		0			1.00		1.00	1.00		0.405	Non-Liq.	3.0	3.4	100			0.00	0.0	0.000	0.501					
13.29	4.05	4.27	0.15	3.48	0.41	120	0.778	0.620	0.972	4.07	1.00	1.70	5.86	0.68	3.32	4.02		6.86	3.20		0			1.00		1.00	1.00		0.406	Non-Liq.	2.6	2.6	100			0.00	0.0	0.000	0.521					
13.78	4.20	3.17	0.18	5.66	0.30	120	0.807	0.634	0.971	7.11	1.00	1.67	3.99	0.52	5.04	5.56		4.99	3.54		0			1.00		1.00	1.00		0.409	Non-Liq.	2.1	2.4	100			0.00	0.0	0.000	0.541					
14.27	4.35	9.37	0.21	2.26	0.90	120	0.837	0.649	0.970	2.43	0.89	1.64	12.72	1.27	1.98	3.25		13.06	2.86		0			1.00		1.00	1.00		0.413	Non-Liq.	3.4	4.0	100			0.00	0.0	0.000	0.561					
14.76	4.50	4.84	0.12	2.49	0.46	120	0.866	0.663	0.969	2.69	0.98	1.58	6.75	0.72	2.24	2.97		7.24	3.16		0			1.00		1.00	1.00		0.417	Non-Liq.	2.8	2.5	100			0.00	0.0	0.000	0.580					
15.26	4.65	4.77	0.10	2.16	0.46	120	0.896	0.677	0.968	2.52	0.97	1.55	5.97	0.70	1.86	2.56		6.96	3.14		0			1.00		1.00	1.00		0.420	Non-Liq.	2.8	2.4	100			0.00	0.0	0.000	0.600					
15.75	4.80	4.55	0.12	2.69	0.44	120	0.925	0.691	0.967	3.17	1.00	1.53	5.58	0.68	2.46	3.14		6.59	3.22		0			1.00		1.00	1.00		0.423	Non-Liq.	2.7	2.4	100			0.00	0.0	0.000	0.620					
16.24	4.95	5.31	0.16	3.02	0.51	120	0.955	0.705	0.966	3.48	0.98	1.49	6.49	0.73	2.86	3.59		7.48	3.19		0			1.00		1.00	1.00		0.426	Non-Liq.	2.8	2.7	100			0.00	0.0	0.000	0.640					
16.73	5.10	7.79	0.38	4.89	0.75	120	0.984	0.719	0.965	5.38	0.97	1.46	9.72	0.98	4.88	5.97		10.71	3.16		0			1.00		1.00	1.00		0.429	Non-Liq.	2.8	3.8	100			0.00	0.0	0.000	0.659					
17.22	5.25	32.15	0.67	2.09	3.08	120	1.014	0.734	0.964	2.14	0.75	1.31	39.05	3.64	1.81	5.45		39.98	2.44		0			1.00		1.00	1.00		0.431	Non-Liq.	4.2	9.4	61			0.00	0.0	0.000	0.678					
17.72	5.40	38.11	0.88	2.30	3.65	120	1.043	0.748	0.962	2.34	0.74	1.29	45.64	4.22	2.05	6.27		46.55	2.41		0			1.00		1.00	1.00		0.434	Non-Liq.	4.3	10.9	59			0.00	0.0	0.000	0.699					
18.21	5.55	39.29	0.94	2.40	3.76	120	1.073	0.762	0.961	2.45	0.74	1.28	46.44	4.30	2.18	6.48		47.36	2.42		0			1.00		1.00	1.00		0.436	Non-Liq.	4.3	11.1	60			0.00	0.0	0.000	0.719					
18.70	5.70	37.01	1.23	3.32	3.54	120	1.102	0.776	0.960	3.39	0.78	1.27	43.55	3.99	3.23	7.22		44.48	2.50		0			1.00		1.00	1.00		0.438	Non-Liq.	4.0	11.0	70			0.00	0.0	0.000	0.739					
19.19	5.85	93.19	2.34	2.51	8.92	120	1.132	0.790	0.959	2.53	0.66	1.21	106.00	9.96	2.31	12.27	1.23	108.11	2.17		1	80	1.60	1.02	174.9	1.00	1.00	Infin.	0.440	Non-Liq.	4.7	23.0	41	10.0	33.0	0.00	0.0	0.000	0.758	1,249	0.353	5.6E-04		
19.69	6.00	122.50	3.54	2.89	11.73	120	1.161	0.805	0.958	2.91	0.66	1.20	137.63	12.89	2.74	15.63	1.21	141.40	2.15		1	91	1.64	1.02	218.4	1.00	1.00	Infin.	0.442	Non-Liq.	4.8	29.5	39	10.0	39.5	0.00	0.0	0.000	0.778	1,343	0.361	5.0E-04		
20.18	6.15	94.76	3.52	3.72	9.07	120	1.191	0.819	0.956	3.75	0.70	1.20	106.33	9.92	3.70	13.62	1.37	109.42	2.30		1	81	1.96	1.02	214.2	1.00	1.00	Infin.	0.444	Non-Liq.	4.5	24.4	51	10.0	34.4	0.00	0.0	0.000	0.798	1,296	0.370	5.6E-04		
20.67	6.30	109.84	2.83	2.57	10.52	120	1.220	0.833	0.955	2.59	0.65	1.17	120.50	11.50	2.39	13.89	1.21	123.92	2.14		1	80	1.54	1.02	191.0	1.00	1.00	Infin.	0.446	Non-Liq.	4.6	25.8	38	10.0	35.8	0.00	0.0	0.000	0.818	1,332	0.379	5.4E-04		
21.16	6.45	106.14	2.07	1.95	10.16	120	1.250	0.847	0.954	1.95	0.63	1.15	114.52	11.14	1.67	12.82	1.18	117.82	2.07		1	84	1.40	1.02	165.1	1.00	1.00	Infin.	0.447	Non-Liq.	4.9	23.6	35	9.2	33.0	0.00	0.0	0.000	0.838	1,312	0.387	5.8E-04		
21.65	6.60	65.26	1.26	1.98	6.25	120	1.280	0.861	0.952	1.99	0.68	1.15	70.02	6.68	1.89	8.56	1.25	72.41	2.22		1	63	1.73	1.02	125.2	1.00	1.00	0.262	0.449	0.66	4.6	15.6	45	5.0	20.6	2.16	10.4	0.016	0.857	1,134	0.390	8.5E-04		
22.15	6.75	30.72	0.74	2.41	2.94	120	1.309	0.875	0.951	2.48	0.77	1.16	32.67	3.20	2.21	5.41		33.83	2.54		0			1.00		1.00	1.00		0.450	Non-Liq.	4.0	8.3	70			0.00	0.0	0.000	0.877					
22.64	6.90	11.40	0.39	3.41	1.09	120	1.339	0.890	0.950	3.70	0.91	1.17	11.64	1.21	3.37	4.59		12.62	3.00		0			1.00		1.00	1.00		0.451	Non-Liq.	3.1	4.0	100			0.00	0.0	0.000	0.897					
23.13	7.05	10.02	0.25	2.51	0.96	120	1.368	0.904	0.948	2.76	0.91	1.15	9.94	1.07	2.33	3.39		10.92	2.98		0			1.00		1.00	1.00		0.452	Non-Liq.	3.2	3.4	100			0.00	0.0	0.000	0.917					
23.62	7.20	9.65	0.21	2.21	0.92	120	1.398	0.918	0.946	2.44	0.91	1.14	9.38	1.02	1.98	3.00		10.37	2.97		0			1.00		1.00	1.00		0.453	Non-Liq.	3.2	3.3	100			0.00	0.0	0.000	0.936					
24.11	7.35	8.50	0.12	1.50	0.78	120	1.427	0.932	0.945	1.69	0.90	1.12	7.59	0.80	1.16	2.02		8.56	2.97		0			1.00		1.00	1.00		0.454	Non-Liq.	3.2	2.7	100			0.00	0.0	0.000	0.956					
24.61	7.50	8.36	0.08	0.92	0.80	120	1.457	0.946	0.943	1.04	0.87	1.10	7.72	0.88	0.49	1.37		8.71	2.88		0			1.00		1.00	1.00		0.455	Non-Liq.	3.4	2.6	100			0.00	0.0	0.000	0.976					
25.10	7.65	8.53	0.10	1.21	0.82	120	1.486	0.960	0.941	1.36	0.89	1.09	7.79	0.88	0.82	1.70		8.76	2.91		0			1.00		1.00	1.00		0.456	Non-Liq.	3.3	2.7	100			0.00	0.0	0.000	0.996					
25.59	7.80	9.38	0.17	1.83	0.90	120	1.516	0.975	0.940	2.06	0.90	1.08	8.55	0.95	1.54	2.50		9.55	2.98		0			1.00		1.00	1.00		0.457	Non-Liq.	3.2	3.0	100			0.00	0.0	0.000	1.016					
26.08	7.95	11.73	0.39	3.34	1.12	120	1.545	0.989	0.938	3.65	0.92	1.05	10.81	1.17	3.31	4.48		11.80	3.02		0			1.00		1.00	1.00		0.457	Non-Liq.	3.1	3.8	100			0.00	0.0	0.000	1.035					
26.57	8.10	14.50	0.58	4.02	1.39	120	1.575	1.003	0.936	4.32	0.91	1.05	13.39	1.43	4.10	5.52		14.39	2.99		0			1.00		1.00	1.00		0.458	Non-Liq.	3.5	4.5	100			0.00	0.0	0.000	1.055					
27.07	8.25	11.05	0.75	6.78	1.06	120	1.604	1.017	0.934	7.45	0.98	1.04	9.88	1.08	5.24	6.32		10.86	3.24		0			1.00		1.00	1.00		0.458	Non-Liq.	2.7	4.1	100			0.00	0.0	0.000	1.075					
27.56	8.40	58.46	1.40	2.39	5.60	120	1.634	1.031	0.932	2.43	0.72	1.02	55.28	8.93	2.23	11.12	1.25	88.90	2.36		1	72	2.15	1.56	191.3	1.00	1.00	Infin.	0.459	Non-Liq.	4.4	20.3	55	10.0	30.3	0.03	0.0	0.000	1.095	1,458	0.495	6.7E-04		
28.05	8.55	37.34	1.99	5.33	3.58	120	1.663	1.045	0.930	5.49	0.83	1.01	34.66	3.59	5.24	8.83		35.56	2.75		0			1.00		1.00	1.00		0.459	Non-Liq.	3.6	9.9	92			0.00	0.0	0.000	1.114					
28.54	8.70	18.85	1.45	7.59	1.81	120	1.693	1.060	0.928	8.15	0.94	1.00	16.79	1.80	5.24	7.04		17.79	3.10		0			1.00		1.00	1.00		0.459	Non-Liq.	2.9	6.0	100			0.00	0.0	0.000	1.134					
29.04	8.85	9.56	0.58	5.79	0.95	120	1.722	1.074	0.925	6.49	0.99	0.99	8.28	0.95	5.24	6.19		9.28	3.28		0			1.00		1.00	1.00		0.459	Non-Liq.	2.6	3.5	100			0.00	0.0	0.000	1.154					
29.53	9.00	12.04	0.59	4.89	1.15	120	1.752	1.088	0.923	5.37	0.95	0.97	10.08	1.14	5.11	6.25		11.08	3.14		0			1.00		1.00	1.00		0.459	Non-Liq.	2.8	3.9	100			0.00	0.0	0.000	1.174					
30.02	9.15	38.40	1.26	3.29	3.68	120	1.781	1.102	0.920	3.38	0.79	0.97	34.14	3.62	3.24	6.87		35.14	2.61		0			1.00		1.00	1.00		0.459	Non-Liq.	3.9	9.0	77			0.00	0.0	0.000	1.194					
30.51	9.30	65.26	1.59	2.44	6.25	120	1.811	1.116	0.918	2.48	0.71	0.96	58.36	7.07	2.26	9.33	1.32	68.43	2.35		1	61	2.11	1.15	144.5	1.00	1.00	0.350	0.459	0.78	4.4	15.5	54	5.0	20.5	2.19	10.9	0.016	1.213	1,349	0.540	9.2E-04		
31.00	9.45	60.50	1.56	2.57	5.79	120	1.841	1.131	0.915	2.62	0.72	0.95	53.49	6.53	2.41	8.94	1.37	62.83	2.33		1	56	2.28	1.15	143.1	0.99	1.00	0.353	0.459	0.77	4.3	14.6	58	5.0	19.6	2.31	12.6	0.019	1.233	1,337	0.548	9.6E-04		
31.50	9.60	65.45	1.93	2.95	6.27	120	1.870	1.145	0.913	3.01	0.73	0.94	57.39	6.11	2.86	8.97		58.41	2.41		0			1.00		0.99	1.00		0.459	Non-Liq.	4.3	13.6	59			0.00	0.0	0.000	1.253					
31.99	9.75	80.17	2.11	2.63	7.68	120	1.900	1.158	0.910	2.67	0.70	0.94	70.07	7.49	2.47	9.95	1.33	71.36	2.31		1	63	1.99	1.00	142.0	0.99	1.00	0.346	0.458	0.75	4.5	18.0	51	5.0	21.0	2.13	10.1	0.015	1.273	1,390	0.562	9.0E-04		
32.48	9.90	91.58	2.17	2.38	8.73	120	1.929	1.173	0.907	2.41	0.68	0.93	79.51	8.45	2.18	10.64	1.26	80.34	2.24		1	68	1.78	1.00	142.9	0.99	0.99	0.352	0.458	0.76	4.6	17.4	46	5.0	22.4	1.95	8.4	0.013	1.293	1,433	0.569	8.6E-04		
32.97	10.05	114.27	2.73	2.39	10.94	120	1.959	1.187	0.904	2.41	0.66	0.93	98.09	10.58	2.19	12.77	1.21	100.43	2.18		1	77	1.61	1.00	161.4	0.99	0.98	Infin.	0.457	Non-Liq.	4.7	21.1	42	10.0	31.0	0.00	0.0	0.000	1.312	1,611	0.575	6.0E-04		
33.46	10.20	130.72	2.65	2.03	12.52	120	1.988	1.201	0.901	2.05	0.63	0.92	112.56	12.05	1.78	13.83	1.15	114.01	2.09		1	82	1.43	1.00	163.2	0.98	0.98	Infin.	0.457	Non-Liq.	4.9	23.2	36	9.4	32.6	0.00	0.0	0.000	1.332	1,649	0.582	6.5E-04		
33.96	10.35	113.77	1.99	1.75	10.89	120	2.018	1.216	0.898	1.77	0.63	0.92	97.45	10.41	1.45	11.86	1.14	98.50	2.09		1	76	1.43	1.00	140.8	0.99	0.96	0.338	0.456	0.73	4.9	20.9	35	5.0	25.0	1.65	5.3	0.008	1.352	1,520	0.589	7.9E-04		
34.45	10.50	141.63	2.17	1.53	13.56	120	2.047	1.230	0.894	1.55	0.60	0.91	121.26	12.92	1.20	14.12	1.09	122.32	1.89		1	85	1.27	1.00	155.5	0.98	0.97	0.430	0.455	0.92	5.1	23.9	29	5.0	28.9	1.23	4.1	0.006	1.372	1,606	0.595	7.1E-04		

Depth (feet)	(m)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio Rf %	qc MPa	Total Unit Wt. (pcf)	Total Stress po (tsf)	Eff. Stress p'o (tsf)	rd	F %	n	Max 1.70 Cq	Q	Moss qc1 MPa	Moss Δqc MPa	Moss qc1,mod MPa	Moss eff Kc	Qc1n	Ic
34.94	10.65	150.62	2.98	1.98	14.42	120	2.077	1.244	0.891	1.99	0.62	0.90	127.73	13.76	1.71	15.47	1.12	128.79	2.04
35.43	10.80	136.55	3.91	2.88	13.08	120	2.106	1.258	0.888	2.89	0.66	0.89	113.98	12.50	2.74	15.23	1.22	115.04	2.20
35.93	10.95	219.11	3.98	1.82	20.98	120	2.136	1.272	0.884	1.83	0.58	0.90	185.03	19.85	1.53	21.48	1.08	186.11	1.91
36.42	11.10	219.63	4.70	2.14	21.03	120	2.155	1.286	0.880	2.15	0.60	0.89	183.67	20.00	1.90	21.90	1.09	184.76	1.87
36.91	11.25	357.05	7.15	2.00	34.19	120	2.195	1.301	0.877	2.01	0.55	0.89	300.00	32.56	1.74	34.31	1.05	301.09	1.82
37.40	11.40	388.23	8.13	2.11	36.99	120	2.224	1.315	0.873	2.51	0.55	0.89	322.62	35.22	1.86	37.07	1.05	323.72	1.62
37.89	11.55	388.32	7.34	1.89	37.19	120	2.254	1.329	0.869	1.90	0.54	0.88	323.32	35.24	1.61	36.85	1.05	324.43	1.78
38.38	11.70	328.65	5.49	1.67	31.47	120	2.283	1.343	0.865	1.68	0.54	0.88	271.83	29.80	1.35	30.95	1.05	273.05	1.78
38.88	11.85	253.46	3.62	1.43	24.27	120	2.313	1.357	0.861	1.44	0.55	0.87	208.00	22.58	1.07	23.65	1.05	209.12	1.80
39.37	12.00	191.10	2.61	1.37	18.30	120	2.343	1.371	0.857	1.38	0.57	0.85	154.81	16.87	1.00	17.86	1.06	155.93	1.87
39.86	12.15	126.87	2.41	1.87	12.34	120	2.372	1.386	0.852	1.88	0.63	0.84	101.59	11.35	1.58	12.93	1.14	102.69	2.09
40.35	12.30	200.43	4.24	2.12	19.19	120	2.402	1.400	0.848	2.13	0.61	0.84	158.75	17.83	1.86	19.68	1.10	159.67	2.00
40.85	12.45	305.15	6.47	2.12	29.22	120	2.431	1.414	0.843	2.13	0.57	0.85	243.09	27.27	1.86	29.13	1.07	244.22	1.89
41.34	12.60	254.52	5.81	2.24	24.37	120	2.461	1.428	0.839	2.22	0.59	0.84	200.39	22.65	1.95	24.60	1.09	201.42	1.95
41.83	12.75	214.56	3.54	1.65	20.55	120	2.490	1.442	0.834	1.66	0.58	0.84	168.46	18.81	1.32	20.12	1.07	169.60	1.90
42.32	12.90	137.84	2.81	2.04	13.20	120	2.520	1.456	0.830	2.06	0.64	0.82	105.18	12.01	1.76	13.77	1.16	106.29	2.11
42.81	13.05	80.98	2.28	2.82	7.75	120	2.549	1.471	0.825	2.87	0.72	0.79	59.34	7.01	2.64	9.65	1.36	60.44	2.39
43.31	13.20	62.11	2.23	3.58	5.95	120	2.579	1.485	0.820	3.67	0.77	0.77	44.21	5.35	3.61	8.67		45.29	2.55
43.80	13.35	147.27	2.61	1.77	14.10	120	2.608	1.499	0.816	1.79	0.62	0.81	111.05	12.73	1.45	14.18	1.11	112.01	2.05
44.29	13.50	207.24	3.16	1.53	19.85	120	2.638	1.513	0.811	1.54	0.57	0.81	158.32	17.85	1.17	19.02	1.07	159.49	1.90
44.78	13.65	211.14	4.62	2.19	20.22	120	2.667	1.527	0.808	2.20	0.61	0.80	158.42	18.40	1.91	20.31	1.10	159.58	2.01
45.28	13.80	243.36	5.81	2.39	23.29	120	2.697	1.542	0.801	2.41	0.61	0.80	181.73	21.27	2.14	23.41	1.10	182.89	2.01
45.77	13.95	235.85	6.51	2.75	22.68	120	2.726	1.556	0.798	2.77	0.62	0.79	174.83	20.76	2.54	23.30	1.12	175.98	2.07
46.26	14.10	273.66	6.91	2.53	26.21	120	2.756	1.570	0.791	2.54	0.60	0.79	202.60	23.95	2.26	26.21	1.10	203.77	2.00
46.75	14.25	259.53	5.25	2.41	24.85	120	2.785	1.584	0.786	2.42	0.60	0.78	191.08	22.60	2.15	24.75	1.10	192.25	2.00
47.24	14.40	232.14	5.22	2.25	22.23	120	2.815	1.598	0.781	2.26	0.61	0.78	169.72	20.06	1.96	22.02	1.10	170.89	2.00
47.74	14.55	252.39	5.17	2.05	24.17	120	2.844	1.612	0.776	2.06	0.59	0.78	184.87	21.73	1.74	23.47	1.08	186.06	1.95
48.23	14.70	257.24	5.62	2.18	24.63	120	2.874	1.627	0.771	2.20	0.60	0.77	187.02	22.17	1.89	24.05	1.08	188.21	1.97
48.72	14.85	251.57	5.24	2.08	24.09	120	2.904	1.641	0.766	2.10	0.59	0.77	182.14	21.58	1.77	23.35	1.08	183.33	1.96
49.21	15.00	243.86	4.92	2.02	23.35	120	2.933	1.655	0.761	2.03	0.59	0.77	175.85	20.82	1.69	22.51	1.08	176.85	1.96
49.70	15.15	217.17	4.87	2.24	20.80	120	2.963	1.669	0.756	2.26	0.61	0.76	154.03	18.53	1.94	20.47	1.10	155.23	2.03
50.20	15.30	241.16	4.98	2.06	23.09	120	2.992	1.683	0.751	2.08	0.60	0.76	171.62	20.52	1.74	22.26	1.08	172.82	1.97
50.69	15.45	244.14	5.03	2.06	23.38	120	3.022	1.697	0.746	2.07	0.60	0.75	172.53	20.73	1.73	22.46	1.08	174.16	1.97
51.18	15.60	236.83	4.80	2.03	22.68	120	3.051	1.712	0.741	2.04	0.60	0.75	166.80	20.06	1.69	21.72	1.08	168.02	1.97
51.67	15.75	249.69	5.00	2.00	23.91	120	3.081	1.726	0.736	2.02	0.59	0.75	175.49	21.10	1.66	22.76	1.08	176.72	1.96
52.17	15.90	258.09	5.36	2.09	24.71	120	3.110	1.740	0.731	2.10	0.59	0.74	180.39	21.83	1.75	23.58	1.08	181.62	1.96
52.66	16.05	258.23	5.33	2.05	24.73	120	3.140	1.754	0.726	2.06	0.59	0.74	179.73	21.79	1.72	23.52	1.08	180.86	1.96
53.15	16.20	217.55	4.58	2.10	20.83	120	3.169	1.768	0.721	2.12	0.61	0.73	149.19	18.24	1.76	20.00	1.10	150.41	2.02
53.64	16.35	186.43	3.68	2.00	17.66	120	3.199	1.782	0.716	2.02	0.62	0.72	125.03	15.29	1.64	16.93	1.11	126.25	2.05
54.13	16.50	191.30	3.60	1.88	18.30	120	3.228	1.797	0.712	1.90	0.61	0.72	129.56	15.78	1.51	17.29	1.10	130.79	2.02
54.63	16.65	235.70	4.63	1.97	22.58	120	3.258	1.811	0.707	1.98	0.60	0.73	160.51	19.82	1.60	21.22	1.09	161.75	1.97
55.12	16.80	256.82	5.69	2.29	24.59	120	3.287	1.825	0.702	2.31	0.61	0.72	173.28	21.57	1.95	23.52	1.09	174.52	2.01
55.61	16.95	258.43	6.25	2.42	24.75	120	3.317	1.839	0.698	2.44	0.61	0.71	173.04	21.73	2.08	23.81	1.10	174.28	2.02
56.10	17.10	266.41	6.02	2.29	25.51	120	3.346	1.853	0.693	2.28	0.60	0.71	178.49	22.30	1.81	24.21	1.09	179.74	1.99
56.59	17.25	265.89	5.77	2.17	25.46	120	3.376	1.868	0.689	2.18	0.60	0.71	177.70	22.17	1.81	23.97	1.08	178.95	1.98
57.09	17.40	260.19	5.66	2.18	24.92	120	3.406	1.882	0.684	2.19	0.60	0.71	172.83	21.64	1.81	23.45	1.08	174.09	1.98
57.58	17.55	266.38	5.60	2.10	25.51	120	3.435	1.896	0.680	2.12	0.59	0.71	176.69	22.09	1.73	23.82	1.08	177.98	1.97
58.07	17.70	264.18	5.65	2.14	25.30	120	3.465	1.910	0.675	2.16	0.60	0.70	174.14	21.88	1.77	23.65	1.08	175.41	1.98
58.56	17.85	268.90	5.68	2.13	25.56	120	3.494	1.924	0.671	2.14	0.60	0.70	175.34	22.07	1.75	23.82	1.08	176.61	1.98
59.06	18.00	260.08	5.47	2.11	24.93	120	3.524	1.938	0.667	2.12	0.60	0.70	169.87	21.43	1.72	23.15	1.08	171.15	1.98
59.55	18.15	263.45	5.55	2.11	25.23	120	3.553	1.953	0.663	2.12	0.60	0.69	171.41	21.68	1.72	23.40	1.08	172.69	1.98
60.04	18.30	271.71	5.79	2.13	26.02	120	3.583	1.967	0.659	2.15	0.60	0.69	176.18	22.36	1.74	24.11	1.08	177.46	1.98
60.53	18.45	273.93	5.80	2.12	26.23	120	3.612	1.981	0.655	2.13	0.60	0.69	176.96	22.50	1.72	24.23	1.08	178.25	1.87
61.02	18.60	271.99	5.97	2.19	26.05	120	3.642	1.995	0.651	2.21	0.60	0.68	174.46	22.35	1.80	24.15	1.08	175.74	1.99
61.52	18.75	280.15	6.35	2.27	26.83	120	3.671	2.009	0.647	2.28	0.60	0.68	178.81	23.05	1.87	24.92	1.08	180.10	1.99
62.01	18.90	272.38	6.68	2.45	26.08	120	3.701	2.023	0.643	2.47	0.61	0.67	171.87	22.45	2.07	24.52	1.08	173.15	2.03
62.50	19.05	278.59	6.81	2.46	26.68	120	3.730	2.038	0.640	2.48	0.61	0.67	175.17	22.95	2.08	25.03	1.05	176.46	2.03
62.99	19.20	289.37	7.17	2.48	27.71	120	3.760	2.052	0.636	2.50	0.61	0.67	181.47	23.85	2.09	25.93	1.05	182.77	2.02
63.48	19.35	295.11	7.32	2.48	28.26	120	3.789	2.066	0.633	2.50	0.61	0.67	184.47	24.30	2.09	26.39	1.09	185.77	2.02
63.98	19.50	273.44	6.68	2.45	26.18	120	3.819	2.080	0.629	2.46	0.61	0.66	168.55	22.40	2.05	24.44	1.09	170.85	2.03
64.47	19.65	277.29	6.27	2.26	26.55	120	3.848	2.094	0.626	2.28	0.60	0.66	172.30	22.56	1.85	24.43	1.08	173.61	2.00
64.96	19.80	290.53	6.56	2.29	27.82	120	3.878	2.108	0.622	2.31	0.60	0.66	180.08	23.68	1.89	25.56	1.08	181.39	2.00
65.45	19.95	285.88	6.59	2.31	27.38	120	3.907	2.123	0.619	2.32	0.60	0.66	176.21	23.26	1.89	25.15	1.08	177.53	2.00
65.94	20.10	283.07	6.23	2.20	27.11	120	3.937	2.137	0.616	2.22	0.60	0.66	174.22	22.92	1.78	24.69	1.08	175.55	1.99
66.44	20.25	284.56	6.36	2.24	27.26	120	3.967	2.151	0.613	2.25	0.60	0.65	174.32	23.04	1.81	24.85	1.08	175.65	2.00
66.93	20.40	288.06	6.47	2.24	27.59	120	3.996	2.165	0.610	2.26	0.60	0.65	175.75	23.30	1.82	25.11	1.08	177.08	1.99
67.42	20.55	291.14	6.45	2.22	27.88	120	4.026	2.179	0.607	2.23	0.60	0.65	177.15	23.50	1.78	25.28	1.08	178.53	1.99
67.91	20.70	299.03	6.31	2.11	28.60	120	4.055	2.193	0.604	2.13	0.59	0.65	181.94	24.02	1.66	25.68	1.07	183.29	1.97
68.41	20.85	312.42	6.62	2.12	29.92	120	4.085	2.208	0.601	2.13	0.59	0.65	190.12	25.14	1.68	26.81	1.07	191.47	1.95
68.90	21.00	347.60	7.49	2.15	33.29	120	4.114	2.222	0.598	2.17	0.58	0.65	211.86	28.05	1.71	29.79	1.06	213.23	1.93
69.39	21.15	354.03	8.02	2.27	33.90	120	4.144	2.236	0.595	2.28	0.59	0.64	214.32	28.88	1.82	30.50	1.05	215.69	1.95
69.88	21.30	345.59	7.94	2.29	33.19	120	4.173	2.250	0.593	2.31	0.59	0.64	208.53	28.03	1.85	29.88	1.07	209.89	1.96
70.37	21.45	335.94	7.17	2.13	32.17	120	4.203	2.264	0.590	2.15	0.59	0.64	202.07	26.98	1.88	28.85	1.06	203.44	1.94
70.87	21.60	334.33	6.43	1.92	32.02	120	4.232	2.279	0.587	1.94	0.57	0.64	201.52	26.59	1.46	28.06	1.08	203.30	1.80
71.36	21.75	327.82	6.23	1.90	31.39	120	4.262	2.293	0.585	1.91	0.58	0.64	197.16	25.99	1.44	27.43	1.08	198.55	1.81
71.85	21.90	330.17	6.21	1.88	31.62	120	4.291	2.307	0.582	1.89	0.57	0.64	198.10	26.12	1.42	27.54	1.05	199.49	1.80
72.34	22.05	337.14	6.43	1.91	32.28	120	4.321	2.321	0.580	1.92	0.57	0.64	201.58	26.69	1.44	28.13	1.05	202.96	1.90
72.83	22.20	354.63	6.74	1.90	33.96	120	4.350	2.335	0.578	1.91	0.57	0.64	212.06	28.09	1.43	29.52	1.05	213.47	1.89
73.33	22.35	365.77	6.76	1.85	35.03	120	4.380	2.349	0.575	1.86	0.56	0.64	218.89	28.91	1.38	30.29	1.05	220.30	1.87
73.82	22.50	382.73	7.30	1.91	36.65	120	4.409	2.364	0.573	1.92	0.56	0.64	228.33	30.34	1.44	31.77	1.05	229.75	1.87
74.31	22.65	387.30	7.99	2.05	37.09	120	4.439	2.378	0.571	2.08	0.57	0.63	228.86	30.85	1.59	32.44	1.05	230.28	1.90
74.80	22.80	400.72	7.82	1.95	38.37	120	4.469	2.392	0.569	1.96	0.56	0.63	237.63	31.79	1.48	33.27	1.05	239.05	1.87
75.30	22.95	406.11	7.43	1.83	38.89	120	4.498	2.406	0.566	1.84	0.56	0.63	241.54	32.04	1.35	33.39	1.04	242.98	1.84
75.79	23.10	412.23	7.55	1.83	39.48	120	4.528	2.420	0.564	1.84	0.56	0.63	244.57	32.50	1.35	33.85	1.04	246.01	1.84
76.28	23.25	416.04	7.87	1.89	39.84	120	4.557	2.434	0.562	1.90	0.56	0.63	245.43	32.85	1.41	34.26	1.04	246.57	1.85

Depth (feet)	Override	Liquef. Suscept. (0 or 1)	Rel. Dens. Dr (%)	Kc	Kα	Clean Sand Qc1n	Idriss Kσ	1.0 Kσ	CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Qc1n/N1,60 Ratio	Apparent Equiv. N1,60	FC %	FC Adj. ΔN1,60	Equiv. N1,60cs	Volumetric Strain (%)	sm (%)	sm (in)	p' (tsf)	Gmax (ksf)	τav (ksf)	Shear Strain γ	Strain Eis	Strain Eic
34.94		1	87	1.38	1.00	175.0	0.98	0.97	Infin.	0.455	Non-Liq.	5.0	25.8	33	9.2	35.0	0.00	0.0	0.000	1.391	1.725	0.601	6.2E-04		
35.43		1	83	1.66	1.00	190.5	0.98	0.96	Infin.	0.454	Non-Liq.	4.7	24.5	43	10.0	34.5	0.00	0.0	0.000	1.411	1.728	0.608	6.3E-04		
35.93		1	100	1.20	1.00	222.8	0.96	0.96	Infin.	0.453	Non-Liq.	5.3	35.4	25	9.2	44.0	0.00	0.0	0.000	1.431	1.896	0.614	5.4E-04		
36.42		1	100	1.26	1.00	232.4	0.90	0.95	Infin.	0.452	Non-Liq.	5.1	35.9	28	10.0	45.9	0.00	0.0	0.000	1.451	1.927	0.620	5.3E-04		
36.91		1	100	1.12	1.00	337.3	1.00	0.95	Infin.	0.450	Non-Liq.	5.4	55.4	21	10.0	65.4	0.00	0.0	0.000	1.471	2.164	0.625	4.3E-04		
37.40		1	100	1.12	1.00	362.9	1.00	0.94	Infin.	0.449	Non-Liq.	5.4	59.8	21	10.0	69.6	0.00	0.0	0.000	1.490	2.244	0.631	4.2E-04		
37.89		1	100	1.09	1.00	354.3	1.00	0.94	Infin.	0.448	Non-Liq.	5.5	58.8	19	10.0	68.8	0.00	0.0	0.000	1.510	2.251	0.636	4.2E-04		
38.38		1	100	1.09	1.00	287.8	0.93	0.94	Infin.	0.447	Non-Liq.	5.5	49.5	19	10.0	59.5	0.00	0.0	0.000	1.530	2.158	0.642	4.5E-04		
38.88		1	100	1.10	1.00	230.8	0.93	0.93	Infin.	0.445	Non-Liq.	5.5	38.1	20	8.0	46.2	0.00	0.0	0.000	1.550	1.996	0.647	5.2E-04		
39.37		1	95	1.16	1.00	180.8	0.96	0.93	Infin.	0.444	Non-Liq.	5.3	29.2	23	7.0	36.2	0.00	0.0	0.000	1.569	1.852	0.652	6.0E-04		
39.86		1	78	1.44	1.00	148.2	0.97	0.92	0.383	0.442	0.80	4.0	21.0	36	5.0	26.0	1.52	4.7	0.007	1.589	1.668	0.657	7.5E-04		
40.35		1	86	1.30	1.00	208.4	0.95	0.92	Infin.	0.440	Non-Liq.	5.1	31.5	31	10.0	41.5	0.00	0.0	0.000	1.609	1.963	0.662	5.5E-04		
40.85		1	100	1.18	1.00	288.2	0.91	0.92	Infin.	0.439	Non-Liq.	5.3	46.1	24	10.0	56.1	0.00	0.0	0.000	1.629	2.184	0.666	4.6E-04		
41.34		1	100	1.24	1.00	250.6	0.92	0.91	Infin.	0.437	Non-Liq.	5.2	38.5	28	10.0	48.9	0.00	0.0	0.000	1.649	2.099	0.671	5.0E-04		
41.83		1	99	1.19	1.00	202.1	0.94	0.91	Infin.	0.435	Non-Liq.	5.3	32.2	25	8.3	40.4	0.00	0.0	0.000	1.668	1.981	0.675	5.6E-04		
42.32		1	79	1.47	1.00	156.5	0.98	0.90	0.436	0.433	0.91	4.9	21.6	37	5.0	26.6	1.40	4.4	0.007	1.688	1.738	0.679	7.2E-04		
42.81		1	56	2.26	1.00	136.4	0.97	0.82	0.316	0.432	0.66	4.3	14.0	57	5.0	19.0	2.33	12.8	0.019	1.708	1.558	0.684	9.1E-04		
43.31		0			1.00		0.98	0.95		0.430	Non-Liq.	4.0	11.3	72			0.00	0.0	0.000	1.728					
43.80		1	82	1.37	1.00	154.3	0.96	0.89	0.421	0.428	0.88	5.0	22.6	33	5.0	27.6	1.30	4.1	0.006	1.748	1.765	0.691	6.9E-04		
44.29		1	98	1.18	1.00	189.0	0.94	0.89	Infin.	0.426	Non-Liq.	5.3	30.2	25	7.6	37.8	0.00	0.0	0.000	1.767	1.994	0.695	5.7E-04		
44.78		1	96	1.32	1.00	210.5	0.94	0.89	Infin.	0.424	Non-Liq.	5.1	31.8	31	10.0	41.8	0.00	0.0	0.000	1.787	2.070	0.699	5.3E-04		
45.28		1	100	1.31	1.00	239.8	0.82	0.88	Infin.	0.421	Non-Liq.	5.1	36.1	31	10.0	46.1	0.00	0.0	0.000	1.807	2.154	0.702	5.0E-04		
45.77		1	100	1.40	1.00	245.8	0.92	0.88	Infin.	0.419	Non-Liq.	5.0	35.5	34	10.0	45.5	0.00	0.0	0.000	1.827	2.157	0.705	5.0E-04		
46.26		1	100	1.30	1.00	264.5	0.89	0.88	Infin.	0.417	Non-Liq.	5.1	40.1	30	10.0	50.1	0.00	0.0	0.000	1.846	2.239	0.708	4.8E-04		
46.75		1	100	1.30	1.00	249.1	0.90	0.87	Infin.	0.415	Non-Liq.	5.1	37.8	30	10.0	47.8	0.00	0.0	0.000	1.866	2.216	0.711	4.9E-04		
47.24		1	99	1.31	1.00	223.2	0.92	0.87	Infin.	0.413	Non-Liq.	5.1	33.7	31	10.0	43.7	0.00	0.0	0.000	1.886	2.162	0.714	5.1E-04		
47.74		1	100	1.24	1.00	230.8	0.91	0.87	Infin.	0.411	Non-Liq.	5.2	35.8	28	10.0	45.9	0.00	0.0	0.000	1.906	2.210	0.717	4.9E-04		
48.23		1	100	1.28	1.00	237.4	0.90	0.86	Infin.	0.408	Non-Liq.	5.1	36.6	29	10.0	46.6	0.00	0.0	0.000	1.926	2.232	0.720	4.8E-04		
48.72		1	100	1.25	1.00	229.3	0.90	0.86	Infin.	0.406	Non-Liq.	5.2	35.5	28	10.0	45.5	0.00	0.0	0.000	1.945	2.226	0.723	4.9E-04		
49.21		1	100	1.28	1.00	220.9	0.91	0.86	Infin.	0.404	Non-Liq.	5.2	34.2	28	8.9	44.2	0.00	0.0	0.000	1.965	2.215	0.725	4.9E-04		
49.70		1	95	1.34	1.00	204.2	0.92	0.85	Infin.	0.402	Non-Liq.	5.0	30.9	32	10.0	40.9	0.00	0.0	0.000	1.985	2.170	0.728	5.1E-04		
50.20		1	100	1.27	1.00	218.8	0.91	0.85	Infin.	0.399	Non-Liq.	5.1	33.6	29	10.0	43.6	0.00	0.0	0.000	2.005	2.228	0.730	4.9E-04		
50.69		1	100	1.26	1.00	219.8	0.91	0.85	Infin.	0.397	Non-Liq.	5.1	33.9	29	10.0	43.0	0.00	0.0	0.000	2.025	2.243	0.732	4.9E-04		
51.18		1	98	1.27	1.00	213.0	0.91	0.84	Infin.	0.395	Non-Liq.	5.1	32.7	29	9.9	42.6	0.00	0.0	0.000	2.044	2.232	0.735	4.9E-04		
51.67		1	100	1.25	1.00	220.3	0.90	0.84	Infin.	0.392	Non-Liq.	5.2	34.2	28	9.9	44.1	0.00	0.0	0.000	2.064	2.268	0.737	4.8E-04		
52.17		1	100	1.25	1.00	227.7	0.89	0.84	Infin.	0.390	Non-Liq.	5.2	35.2	28	10.0	45.2	0.00	0.0	0.000	2.084	2.290	0.739	4.7E-04		
52.66		1	100	1.25	1.00	226.4	0.89	0.84	Infin.	0.388	Non-Liq.	5.2	35.1	28	10.0	45.1	0.00	0.0	0.000	2.104	2.307	0.741	4.7E-04		
53.15		1	94	1.32	1.00	199.2	0.92	0.83	Infin.	0.386	Non-Liq.	5.0	29.8	31	10.0	39.8	0.00	0.0	0.000	2.123	2.224	0.743	5.0E-04		
53.64		1	86	1.37	1.00	173.4	0.93	0.83	Infin.	0.383	Non-Liq.	5.0	25.3	33	9.3	34.7	0.00	0.0	0.000	2.143	2.134	0.745	5.4E-04		
54.13		1	88	1.33	1.00	173.9	0.93	0.83	Infin.	0.381	Non-Liq.	5.0	26.0	32	8.6	34.8	0.00	0.0	0.000	2.163	2.166	0.747	5.3E-04		
54.63		1	97	1.27	1.00	205.2	0.90	0.82	Infin.	0.379	Non-Liq.	5.1	31.5	29	9.5	41.0	0.00	0.0	0.000	2.183	2.278	0.748	4.8E-04		
55.12		1	100	1.31	1.00	228.3	0.89	0.82	Infin.	0.377	Non-Liq.	5.1	34.4	31	10.0	44.4	0.00	0.0	0.000	2.203	2.349	0.750	4.6E-04		
55.61		1	100	1.33	1.00	232.4	0.89	0.82	Infin.	0.375	Non-Liq.	5.0	34.6	32	10.0	44.6	0.00	0.0	0.000	2.222	2.363	0.752	4.6E-04		
56.10		1	100	1.29	1.00	232.0	0.88	0.82	Infin.	0.372	Non-Liq.	5.1	35.3	30	10.0	45.3	0.00	0.0	0.000	2.242	2.385	0.754	4.5E-04		
56.59		1	100	1.27	1.00	228.1	0.88	0.81	Infin.	0.370	Non-Liq.	5.1	34.9	29	10.0	44.9	0.00	0.0	0.000	2.262	2.390	0.755	4.5E-04		
57.09		1	100	1.28	1.00	223.8	0.88	0.81	Infin.	0.368	Non-Liq.	5.1	34.1	30	10.0	44.1	0.00	0.0	0.000	2.282	2.386	0.757	4.5E-04		
57.58		1	100	1.28	1.00	224.9	0.88	0.81	Infin.	0.366	Non-Liq.	5.1	34.8	29	10.0	44.6	0.00	0.0	0.000	2.301	2.405	0.759	4.5E-04		
58.07		1	100	1.28	1.00	223.9	0.88	0.81	Infin.	0.364	Non-Liq.	5.1	34.3	29	10.0	44.3	0.00	0.0	0.000	2.321	2.409	0.761	4.5E-04		
58.56		1	100	1.27	1.00	224.5	0.88	0.80	Infin.	0.362	Non-Liq.	5.1	34.4	29	10.0	44.4	0.00	0.0	0.000	2.341	2.423	0.762	4.5E-04		
59.06		1	99	1.28	1.00	218.8	0.88	0.80	Infin.	0.360	Non-Liq.	5.1	33.4	29	10.0	43.4	0.00	0.0	0.000	2.361	2.414	0.764	4.5E-04		
59.55		1	98	1.28	1.00	220.2	0.88	0.80	Infin.	0.358	Non-Liq.	5.1	33.7	29	10.0	43.7	0.00	0.0	0.000	2.381	2.430	0.766	4.4E-04		
60.04		1	100	1.27	1.00	225.5	0.87	0.80	Infin.	0.356	Non-Liq.	5.1	34.6	28	10.0	44.6	0.00	0.0	0.000	2.400	2.456	0.767	4.4E-04		
60.53		1	100	1.27	1.00	225.8	0.87	0.79	Infin.	0.354	Non-Liq.	5.1	34.7	29	10.0	44.7	0.00	0.0	0.000	2.420	2.468	0.769	4.4E-04		
61.02		1	100	1.29	1.00	226.0	0.87	0.79	Infin.	0.352	Non-Liq.	5.1	34.4	30	10.0	44.4	0.00	0.0	0.000	2.440	2.473	0.771	4.4E-04		
61.52		1	100	1.29	1.00	232.8	0.86	0.79	Infin.	0.350	Non-Liq.	5.1	35.3	30	10.0	45.3	0.00	0.0	0.000	2.460	2.500	0.772	4.3E-04		
62.01		1	100	1.34	1.00	232.6	0.87	0.79	Infin.	0.349	Non-Liq.	5.0	34.5	32	10.0	44.5	0.00	0.0	0.000	2.480	2.494	0.774	4.3E-04		
62.50		1	100	1.34	1.00	236.1	0.87	0.78	Infin.	0.347	Non-Liq.	5.0	35.1	32	10.0	45.1	0.00	0.0	0.000	2.499	2.515	0.776	4.3E-04		
62.99		1	100	1.33	1.00	247.7	0.86	0.78	Infin.	0.345	Non-Liq.	5.0	36.2	32	10.0	46.2	0.00	0.0	0.000	2.519	2.547	0.777	4.2E-04		
63.48		1	100	1.32	1.00	245.8	0.85	0.78	Infin.	0.343	Non-Liq.	5.1	36.9	31	10.0	46.8	0.00	0.0	0.000	2.539	2.566	0.779	4.2E-04		
63.98		1	99	1.36	1.00	230.1	0.87	0.78	Infin.	0.342	Non-Liq.	5.0	34.1	32	10.0	44.1	0.00	0.0	0.000	2.559	2.525	0.781	4.3E-04		
64.47		1	100	1.30	1.00	228.3	0.86	0.78	Infin.	0.340	Non-Liq.	5.1	34.2	31	10.0	44.2	0.00	0.0	0.000	2.578	2.538	0.783	4.2E-04		
64.96		1	100	1.29	1.00	234.8	0.85	0.77	Infin.	0.338	Non-Liq.	5.1	35.6	30	10.0	45.6	0.00	0.0	0.000	2.598	2.575	0.784	4.2E-04		
65.45		1	100	1.30	1.00	231.6	0.86	0.77	Infin.	0.337	Non-Liq.	5.1	35.0	31	10.0	45.0	0.00	0.0	0.000	2.618	2.572	0.786	4.2E-04		
65.94		1	100	1.29	1.00	226.0	0.86	0.77	Infin.	0.335	Non-Liq.	5.1	34.4	30	10.0	44.4	0.00	0.0	0.000	2.638	2.571	0.788	4.2E-04		
66.44		1	100	1.29	1.00	227.4	0.86	0.77	Infin.	0.334	Non-Liq.	5.1	34.5	30	10.0	44.5	0.00	0.0	0.000	2.658	2.582	0.790	4.2E-04		
66.93		1	100	1.29	1.00	229.0	0.85	0.76	Infin.	0.332	Non-Liq.	5.1	34.8	30	10.0	44.8	0.00	0.0	0.000	2.677	2.597	0.792	4.2E-04		
67.42		1	100	1.28	1.00	229.4	0.85	0.76	Infin.	0.331	Non-Liq.	5.1	35.0	30	10.0	45.0	0.00	0.0	0.000	2.697	2.610	0.794	4.1E-04		
67.91		1	100	1.26	1.00	230.4	0.84	0.76	Infin.	0.329	Non-Liq.	5.2	35.6	28	10.0	45.6	0.00	0.0	0.000	2.717	2.632	0.796	4.1E-04		
68.41		1	100	1.24	1.00	238.2	0.82	0.76	Infin.	0.328	Non-Liq.	5.2	37.0	26	10.0	47.3	0.00	0.0	0.000	2.737	2.669	0.798	4.0E-04		
68.90		1	100	1.22	1.00	260.1	0.78	0.76	Infin.	0.327	Non-Liq.	5.2	40.9	27	10.0	50.9	0.00	0.0	0.000	2.756	2.750	0.800	3.9E-04		
69.39		1	100	1.24	1.00	266.5	0.78	0.75	Infin.	0.325	Non-Liq.	5.2	41.6	27	10.0	51.6	0.00	0.0	0.000	2.776	2.772	0.802	3.8E-04		
69.88		1	100	1.25	1.00	261.9	0.78	0.75	Infin.	0.324	Non-Liq.	5.2	40.6	28	10.0	50.6	0.00	0.0	0.000	2.796	2.765	0.804	3.8E-04		
70.37		1	100	1.23	1.00	250.1	0.79	0.75	Infin.	0.323	Non-Liq.	5.2	39.1	27	10.0	49.1	0.00	0.0	0.000	2.816	2.747	0.806	3.9E-04		
70.87		1	100	1.19	1.00	242.8	0.79	0.75	Infin.	0.321	Non-Liq.	5.3	38.0	25	9.9	48.5	0.00	0.0	0.000	2.836	2.740	0.808	3.9E-04		
71.36		1	100	1.20	1.00	237.4	0.80	0.75	Infin.	0.320	Non-Liq.	5.3	37.7	25	9.8	47.5	0.00	0.0	0.000	2.855	2.735	0.810	3.9E-04		
71.85		1	100	1.18	1.00	237.6	0.80	0.74	Infin.	0.318	Non-Liq.	5.3	37.8	25	9.7	47.5	0.00	0.0	0.000	2.875	2.745	0.812	3.9E-04		
72.34		1	100	1.19	1.00	241.7	0.79	0.74	Infin.	0.318	Non-Liq.	5.3	38.5	25	9.9	48.3	0.00	0.0	0.000	2.895	2.771	0.814	3.9E-04		
72.83		1	100	1.16	1.00	251.3	0.76	0.74	Infin.	0.317	Non-Liq.	5.3	40.3	24	10.0	50.3	0.00	0.0	0.000	2.915	2.816	0.817	3.8E-04		
73.33		1	100	1.16	1.00	256.8	0.76	0.74	Infin.	0.316	Non-Liq.	5.3	41.3	23	9.9	51.2	0.00	0.0	0.000	2.935	2.843	0.819	3.8E-04		
73.82		1	100	1.16	1.00	266.6	0.76	0.74	Infin.	0.314	Non-Liq.	5.3	43.0	23	10.0	53.0	0.00	0.0	0.000	2.954	2.867	0.821	3.7E-04		
74.31		1	100	1.19	1.00	272.0	0.76	0.74	Infin.	0.313	Non-Liq.	5.3	43.6	25	10.0	53.6	0.00	0.0	0.000	2.974	2.906	0.823	3.7E-04		
74.80		1	100	1.16	1.00	277.1	0.76	0.73	Infin.	0.312	Non-Liq.	5.3	44.7	23	10.0	54.7	0.00	0.0	0.000	2.994	2.937	0.826	3.7E-04		
75.30		1	100	1.16	1.00	276.3	0.75	0.73	Infin.	0.311	Non-Liq.	5.4	45.0	22	10.0	55.0	0.00	0.0	0.000	3.014	2.952	0.828	3.6E-04		
75.79		1	100	1.13	1.00	279.2	0.75	0.73	Infin.	0.310	Non-Liq.	5.4	45.5	22	10.0	55.5	0.00	0.0	0.000	3.033	2.971	0.830	3.6E-04		
76.28		1	100	1.14	1.00	282.2	0.75	0.73	Infin.	0.309	Non-Liq.	5.4	45.9	22	10.0	55.9	0.00	0.0	0.000	3.053	2.988	0.833	3.6E-04		

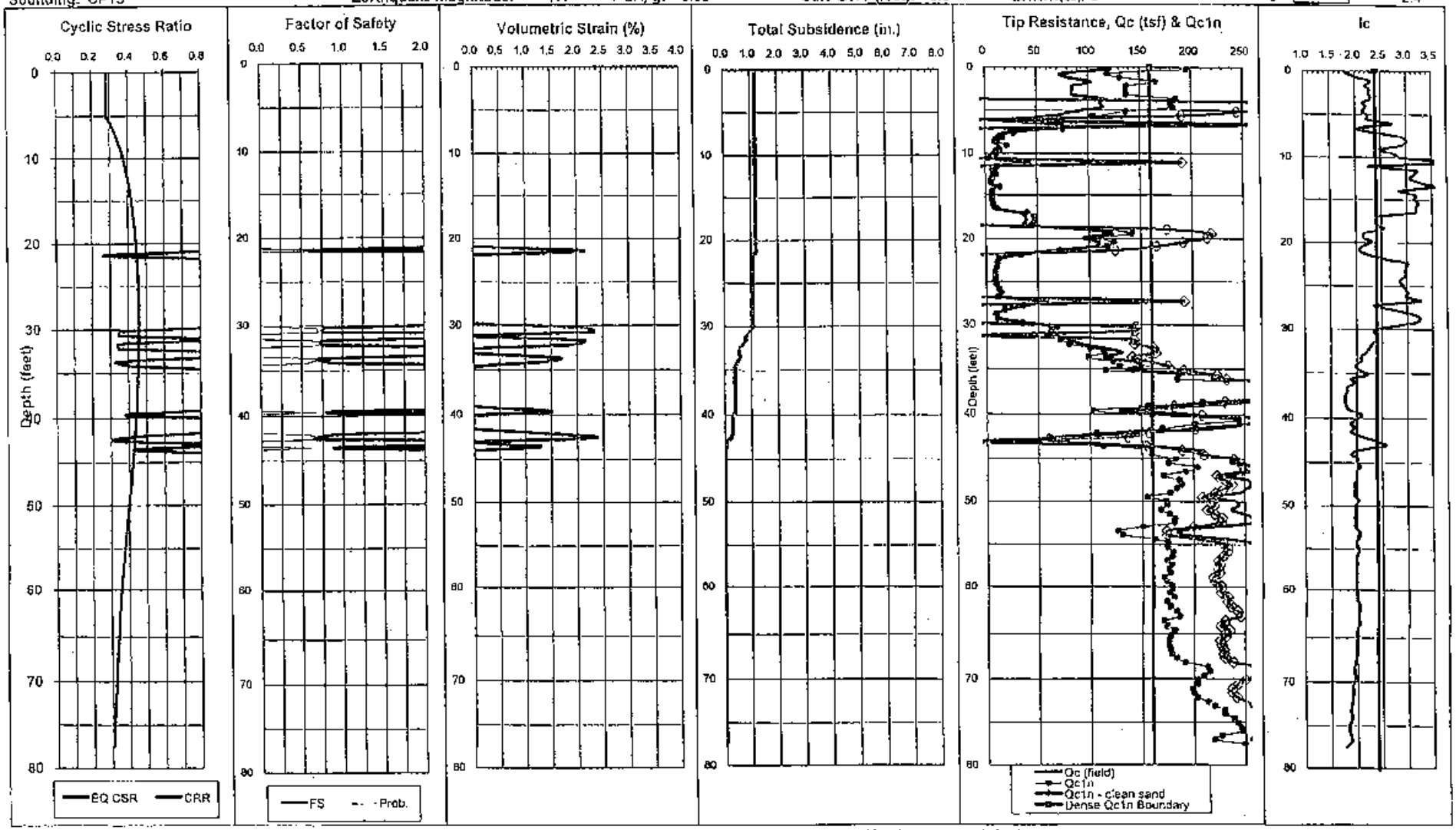
Depth (feet)	(m)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio Rf %	qc MPa	Total Unit Wt. (pcf)	Total Stress po (tsf)	Eff. Stress p'o (tsf)	rd	F %	n	Max 1.70 Cq	Q	Moss qc1 MPa	Moss Δqc MPa	Moss q_{c1mod} MPa	Moss alf K_c	Qc1n	Ic	Overide	Liquef. Suscept. (0 or 1)	Rel. Dens. Dr (%)	K_c	K_α	Clean Sand Qc1n	Idriss K_σ	1.0 K_σ	CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Qc1n $N_{1,60}$ Ratio	Apparent Equiv. $N_{1,60}$	FC %	FC Adj. $\Delta N_{1,60}$	Equiv. $N_{1,60cs}$	Volumetric Strain (%)	ϵ_v (%)	ΔH (in)	p (tsf)	G_{max} (tsf)	τ_{av} (tsf)	Shear Strain γ	Strain E_{cs}	Strain E_{nc}
76.77	23.40	386.26	7.33	1.90	36.99	120	4.587	2.449	0.560	1.91	0.56	0.62	225.82	30.36	1.42	31.78	1.05	227.26	1.87		1	100	1.16	1.00	264.1	0.75	0.73	Infin.	0.308	Non-Liq.	5.3	42.6	23	10.0	52.6	0.00	0.0	0.000	3.073	2,936	0.835	3.7E-04		
77.26	23.55	374.90	6.97	1.86	35.90	120	4.616	2.463	0.558	1.87	0.57	0.62	218.32	29.34	1.38	30.72	1.05	219.76	1.87		1	100	1.16	1.00	255.8	0.75	0.72	Infin.	0.307	Non-Liq.	5.3	41.2	24	9.9	51.2	0.00	0.0	0.000	3.093	2,918	0.838	3.7E-04		
77.76	23.70	416.55	6.47	1.55	39.89	120	4.646	2.477	0.556	1.56	0.54	0.63	247.55	32.23	1.06	33.30	1.03	249.03	1.76		1	100	1.09	1.00	271.5	0.74	0.72	Infin.	0.306	Non-Liq.	5.5	45.1	19	9.7	54.3	0.00	0.0	0.000	3.113	2,946	0.840	3.6E-04		
78.25	23.85	#N/A	#N/A	#N/A	#N/A	120	4.675	#N/A	0.555	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
78.74	24.00	#N/A	#N/A	#N/A	#N/A	120	4.705	#N/A	0.553	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
79.23	24.15	#N/A	#N/A	#N/A	#N/A	120	4.734	#N/A	0.551	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
79.72	24.30	#N/A	#N/A	#N/A	#N/A	120	4.764	#N/A	0.549	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
80.22	24.45	#N/A	#N/A	#N/A	#N/A	120	4.793	#N/A	0.547	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
80.71	24.60	#N/A	#N/A	#N/A	#N/A	120	4.823	#N/A	0.546	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
81.20	24.75	#N/A	#N/A	#N/A	#N/A	120	4.852	#N/A	0.544	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
81.69	24.90	#N/A	#N/A	#N/A	#N/A	120	4.882	#N/A	0.542	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
82.19	25.05	#N/A	#N/A	#N/A	#N/A	120	4.911	#N/A	0.541	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
82.68	25.20	#N/A	#N/A	#N/A	#N/A	120	4.941	#N/A	0.539	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
83.17	25.35	#N/A	#N/A	#N/A	#N/A	120	4.970	#N/A	0.538	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
83.66	25.50	#N/A	#N/A	#N/A	#N/A	120	5.000	#N/A	0.536	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
84.15	25.65	#N/A	#N/A	#N/A	#N/A	120	5.030	#N/A	0.535	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
84.65	25.80	#N/A	#N/A	#N/A	#N/A	120	5.059	#N/A	0.533	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
85.14	25.95	#N/A	#N/A	#N/A	#N/A	120	5.089	#N/A	0.532	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
85.63	26.10	#N/A	#N/A	#N/A	#N/A	120	5.118	#N/A	0.531	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
86.12	26.25	#N/A	#N/A	#N/A	#N/A	120	5.148	#N/A	0.529	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
86.61	26.40	#N/A	#N/A	#N/A	#N/A	120	5.177	#N/A	0.528	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
87.11	26.55	#N/A	#N/A	#N/A	#N/A	120	5.207	#N/A	0.527	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
87.60	26.70	#N/A	#N/A	#N/A	#N/A	120	5.236	#N/A	0.525	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
88.09	26.85	#N/A	#N/A	#N/A	#N/A	120	5.266	#N/A	0.524	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
88.58	27.00	#N/A	#N/A	#N/A	#N/A	120	5.295	#N/A	0.523	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
89.07	27.15	#N/A	#N/A	#N/A	#N/A	120	5.325	#N/A	0.522	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
89.57	27.30	#N/A	#N/A	#N/A	#N/A	120	5.354	#N/A	0.520	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
90.06	27.45	#N/A	#N/A	#N/A	#N/A	120	5.384	#N/A	0.519	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
90.55	27.60	#N/A	#N/A	#N/A	#N/A	120	5.413	#N/A	0.518	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
91.04	27.75	#N/A	#N/A	#N/A	#N/A	120	5.443	#N/A	0.517	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
91.54	27.90	#N/A	#N/A	#N/A	#N/A	120	5.472	#N/A	0.516	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
92.03	28.05	#N/A	#N/A	#N/A	#N/A	120	5.502	#N/A	0.515	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
92.52	28.20	#N/A	#N/A	#N/A	#N/A	120	5.531	#N/A	0.513	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
93.01	28.35	#N/A	#N/A	#N/A	#N/A	120	5.561	#N/A	0.512	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
93.50	28.50	#N/A	#N/A	#N/A	#N/A	120	5.591	#N/A	0.511	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
94.00	28.65	#N/A	#N/A	#N/A	#N/A	120	5.620	#N/A	0.510	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
94.49	28.80	#N/A	#N/A	#N/A	#N/A	120	5.650	#N/A	0.509	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
94.98	28.95	#N/A	#N/A	#N/A	#N/A	120	5.679	#N/A	0.508	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
95.47	29.10	#N/A	#N/A	#N/A	#N/A	120	5.709	#N/A	0.507	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
95.96	29.25	#N/A	#N/A	#N/A	#N/A	120	5.738	#N/A	0.506	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
96.46	29.40	#N/A	#N/A	#N/A	#N/A	120	5.768	#N/A	0.505	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
96.95	29.55	#N/A	#N/A	#N/A	#N/A	120	5.797	#N/A	0.504	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
97.44	29.70	#N/A	#N/A	#N/A	#N/A	120	5.827	#N/A	0.503	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
97.93	29.85	#N/A	#N/A	#N/A	#N/A	120	5.856	#N/A	0.502	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
98.43	30.00	#N/A	#N/A	#N/A	#N/A	120	5.886	#N/A	0.501	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
98.92	30.15	#N/A	#N/A	#N/A	#N/A	120	5.915	#N/A	0.501	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
99.41	30.30	#N/A	#N/A	#N/A	#N/A	120	5.945	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
99.90	30.45	#N/A	#N/A	#N/A	#N/A	120	5.974	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	30.60	#N/A	#N/A	#N/A	#N/A	120	6.004	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	30.75	#N/A	#N/A	#N/A	#N/A	120	6.033	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	30.90	#N/A	#N/A	#N/A	#N/A	120	6.063	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.05	#N/A	#N/A	#N/A	#N/A	120	6.093	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.20	#N/A	#N/A	#N/A	#N/A	120	6.122	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.35	#N/A	#N/A	#N/A	#N/A	120	6.152	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.50	#N/A	#N/A	#N/A	#N/A	120	6.181	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.65	#N/A	#N/A	#N/A	#N/A	120	6.211	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.80	#N/A	#N/A	#N/A	#N/A	120	6.240	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.95	#N/A	#N/A	#N/A	#N/A	120	6.270	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.10	#N/A	#N/A	#N/A	#N/A	120	6.299	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.25	#N/A	#N/A	#N/A	#N/A	120	6.329	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.40	#N/A	#N/A	#N/A	#N/A	120	6.358	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.55	#N/A	#N/A	#N/A	#N/A	120	6.388	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.70	#N/A	#N/A	#N/A	#N/A	120	6.417	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.85	#N/A	#N/A	#N/A	#N/A	120	6.447	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.00	#N/A	#N/A	#N/A	#N/A	120	6.476	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.15	#N/A	#N/A	#N/A	#N/A	120	6.506	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.30	#N/A	#N/A	#N/A	#N/A	120	6.535	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.45	#N/A	#N/A	#N/A	#N/A	120	6.565	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.60	#N/A	#N/A	#N/A	#N/A	120	6.594	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.75	#N/A	#N/A	#N/A	#N/A	120	6.624	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.90	#N/A	#N/A	#N/A	#N/A	120	6.654	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.05	#N/A	#N/A	#N/A	#N/A	120	6.683	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.20	#N/A	#N/A	#N/A	#N/A	120	6.713	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.35	#N/A	#N/A	#N/A	#N/A	120	6.742	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.50	#N/A	#N/A	#N/A	#N/A	120	6.772	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.65	#N/A	#N/A	#N/A	#N/A	120	6.801	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.80	#N/A	#N/A	#N/A	#N/A	120	6.831	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.95	#N/A	#N/A	#N/A	#N/A	120	6.860	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.10	#N/A	#N/A	#N/A	#N/A	120	6.890	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.25	#N/A	#N/A	#N/A	#N/A	120	6.919	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.40	#N/A	#N/A	#N/A	#N/A	120	6.949	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.55	#N/A	#N/A	#N/A	#N/A	120	6.978	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.70	#N/A	#N/A	#N/A	#N/A	120	7.008	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.85	#N/A	#N/A	#N/A	#N/A	120	7.037	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	36.00	#N/A	#N/A	#N/A	#N/A	120	7.067	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

EARTH SYSTEMS - EVALUATION OF LIQUEFACTION POTENTIAL AND INDUCED GROUND SUBSIDENCE

Panay Way Parcel 21 Project No: LA-01052-01 Method Used: 1 1998 NCEER (Robertson & Wride)

Ground Compaction Remediated to depth of: 4.0 feet Settlement Analysis using Wu (2002) using clean sand Qc1n/N1(60) ratio =5 Plot 3 Limiting Ic: 2.4

Sounding: CPT3 Earthquake Magnitude: 7.1 PGA, g: 0.50 Calc GWT (feet): 5.0 Qc1n/N1(60): 5



Total Thickness of Liquefiable Layers: 5.4 feet Estimated Total Ground Subsidence (Settlement): 1.2 inches

CPT-LIQUEFY.XLS - A SPREADSHEET FOR EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL USING CPT DATA

Developed 2003 by Shelton L. Stringer, GE, Earth Systems Southwest

Project: Pansy Way Parcel 21
Job No: LA-01052-01
Date: 8/24/2006
Sounding: CPT4

Liquefaction Analysis using 1998 NCEER (Robertson & Wride) method
Settlement Analysis using Wu (2003) using clean sand Qc1n/N1(60) ratio =6

EARTHQUAKE INFORMATION:		
Magnitude:	7.1	7.5
PGA, g:	0.50	0.43
MSF:	1.15	
GWT, feet:	8.0	
Calc GWT, feet:	5.0	

Plot: 4
Method Used: 1 — 1998 NCEER (Robertson & Wride)
Averaging Increment: 3 — 0.15 m
Induced CSR (M=7.5) = 0.65*PGA*(po/p'o)*rd/MSF
Clean Sand Qc1n = Cq*Kc*Kα*Qc
SF = CRR7.5*Kσ/CSR

Ignore 1st/last increment into sand/silt soils: 0 no
Ignore/remediate upper: 1.2 m
Unit Weight of unsaturated soils: 100 pcf
Unit Weight of saturated soils: 120 pcf
Limiting Ic for liquefiable soils: 2.40 Limiting Ic for Kα: 2.4

Use which FC adjustment: 1 Based on Clean Sand Qc1n
Use which Apparent FC Curve: 0 Robertson Lower Bound
Use Moss @ PL: 15%
Use Tokimatsu & Seed (1) or Ishihara &Yoshimine (2), Wu (3): 3 Wu
Required SF: 1.50 Max ΔN1(60) ... 5.0
Min SF of Liquefiable Layers: 0.24 Max ΔN1(60) ... 10.0
Avg SF of Liquefiable Layers: 0.58

Total Liquefied Thickness (feet)	
11.3	
Total Induced Subsidence (inches)	OPI meters
3.0	0.47

SETTLEMENT OF DRY SANDS
Qc1n / N1(60) Ratio for clean sand: 5
$p = 0.67 \cdot p_o$
$\tau_{av} = 0.65 \cdot PGA \cdot p_o \cdot r_d$
$G_{max} = 447 \cdot N_{1(60)cs}^{1/3} \cdot p^{0.5}$
$a = 0.0389 \cdot (p/1) + 0.124$
$b = 6400 \cdot (p/1)^{-0.6}$
$\gamma = [1 + a \cdot EXP(b \cdot \tau_{av}/G_{max})]/(1+a) \cdot \tau_{av}/G_{max}$
$E_{15} = \gamma \cdot (N_{1(60)cs}/20)^{-1.2}$
$Nc = (MAG-4)^{2.17}$
$E_{nc} = (Nc/15)^{0.45} \cdot E15$
$S = 2 \cdot H \cdot E_{nc}$ Nc = 11.6

Depth (feet)	(m)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio Rf %	qc MPa	Total Unit Wt. (pcf)	Total Stress po (tsf)	Eff. Stress p'o (tsf)	rd	F %	n	Max 1.70 Cq	Q	Moss qcl MPa	Moss Δqc MPa	Moss qc,lnew MPa	Moss eff Kc	Qc1n	Ic
0.49	0.15	74.86	0.51	0.69	7.17	100	0.025	0.025	1.000	0.69	0.53	1.70	120.25	12.19	0.18	12.37		120.33	1.75
0.98	0.30	94.81	0.51	0.54	9.08	100	0.049	0.049	1.000	0.54	0.50	1.70	152.27	15.43	0.04	15.47		152.35	1.60
1.48	0.45	168.94	1.51	0.89	16.18	100	0.074	0.074	0.990	0.89	0.50	1.70	271.36	27.50	0.38	27.89		271.46	1.56
1.97	0.60	156.24	1.91	1.22	14.96	100	0.098	0.098	0.997	1.22	0.52	1.70	250.86	25.43	0.71	26.14		251.04	1.59
2.46	0.75	107.87	1.62	1.50	10.33	120	0.128	0.128	0.996	1.50	0.57	1.70	173.12	17.56	0.98	18.54		173.32	1.86
2.95	0.90	45.50	1.18	2.59	4.36	120	0.157	0.157	0.995	2.60	0.70	1.70	72.65	7.41	2.04	9.45		73.10	2.29
3.44	1.05	40.60	0.88	2.16	3.89	120	0.187	0.187	0.994	2.19	0.69	1.70	64.93	6.61	1.64	8.25		65.23	2.28
3.94	1.20	26.03	0.74	2.84	2.49	120	0.217	0.217	0.993	2.86	0.78	1.70	41.47	4.24	2.29	6.52		41.82	2.50
4.43	1.35	31.38	0.84	2.67	3.00	120	0.246	0.246	0.992	2.70	0.75	1.70	50.02	5.11	2.12	7.23		50.42	2.42
4.92	1.50	33.99	0.77	2.27	3.26	120	0.276	0.276	0.990	2.29	0.71	1.70	54.18	7.00	1.73	8.73	1.25	69.07	2.35
5.41	1.65	57.15	1.01	1.77	5.47	120	0.305	0.305	0.989	1.78	0.64	1.70	91.34	11.34	1.25	12.59	1.11	116.11	2.15
5.91	1.80	138.46	2.53	1.83	13.26	120	0.335	0.335	0.988	1.83	0.57	1.70	221.94	23.86	1.33	25.18	1.06	281.32	1.86
6.40	1.95	37.51	2.72	7.25	3.59	120	0.364	0.364	0.987	7.32	0.81	1.70	59.69	4.96	4.56	9.53		60.27	2.89
6.89	2.10	148.43	2.57	1.73	14.21	120	0.394	0.394	0.986	1.74	0.56	1.70	237.87	27.09	1.26	28.35	1.05	335.53	1.82
7.38	2.25	60.95	2.58	4.23	5.84	120	0.423	0.421	0.985	4.26	0.72	1.70	97.25	10.77	3.86	14.64	1.36	137.78	2.37
7.87	2.40	9.99	0.59	9.59	0.96	120	0.453	0.453	0.984	####	0.98	1.70	15.92	1.92	4.72	6.24		16.05	3.20
8.37	2.55	8.25	0.20	2.38	0.79	120	0.482	0.479	0.983	2.53	0.88	1.70	12.49	1.34	1.99	3.33		13.28	2.86
8.86	2.70	5.03	0.12	2.37	0.48	120	0.512	0.493	0.982	2.62	0.95	1.70	7.29	0.82	1.99	2.81		8.09	3.08
9.35	2.85	5.65	0.12	2.13	0.54	120	0.541	0.507	0.981	2.34	0.93	1.70	8.25	0.92	1.76	2.68		9.07	3.01
9.84	3.00	4.66	0.13	2.83	0.45	120	0.571	0.521	0.979	3.58	0.97	1.70	6.65	0.76	2.52	3.28		7.48	3.16
10.33	3.15	9.20	0.13	1.43	0.88	120	0.600	0.535	0.978	1.48	0.84	1.70	13.93	1.50	0.98	2.47		14.79	2.71
10.83	3.30	10.22	0.13	1.24	0.98	120	0.630	0.549	0.977	1.31	0.82	1.70	15.53	1.61	0.81	2.42		16.42	2.64
11.32	3.45	15.21	0.11	0.75	1.46	120	0.659	0.564	0.976	0.78	0.75	1.60	22.13	2.94	0.27	3.21	1.09	29.06	2.40
11.81	3.60	18.26	0.11	0.59	1.75	120	0.689	0.578	0.975	0.61	0.71	1.54	23.70	3.47	0.10	3.57	1.03	33.55	2.29
12.30	3.75	15.89	0.12	0.75	1.52	120	0.719	0.592	0.974	0.78	0.74	1.54	22.27	2.95	0.28	3.22	1.09	28.24	2.40
12.80	3.90	7.16	0.08	1.10	0.69	120	0.748	0.606	0.973	1.21	0.87	1.62	10.05	1.12	0.67	1.79		10.99	2.79
13.29	4.05	4.37	0.02	0.43	0.42	120	0.778	0.620	0.972	0.51	0.89	1.81	5.72	0.71	0.00	0.71		6.66	2.87
13.78	4.20	6.73	0.03	0.48	0.64	120	0.807	0.634	0.971	0.53	0.84	1.59	8.64	1.07	0.00	1.07		9.76	2.70
14.27	4.35	5.70	0.04	0.75	0.55	120	0.837	0.649	0.970	0.85	0.86	1.54	7.35	0.86	0.28	1.16		8.31	2.84
14.76	4.50	5.39	0.04	0.81	0.52	120	0.866	0.663	0.969	0.92	0.90	1.52	6.79	0.82	0.35	1.17		7.75	2.89
15.26	4.65	10.95	0.08	0.81	1.05	120	0.896	0.677	0.968	0.86	0.80	1.43	13.90	1.50	0.35	1.95		14.82	2.50
15.75	4.80	17.91	0.13	0.74	1.72	120	0.925	0.691	0.967	0.77	0.74	1.37	22.28	2.68	0.27	2.95	1.10	26.71	2.39
16.24	4.95	21.65	0.14	0.66	2.07	120	0.955	0.705	0.968	0.69	0.71	1.33	26.30	3.16	0.18	3.35	1.06	31.45	2.31
16.73	5.10	17.38	0.20	1.14	1.66	120	0.984	0.719	0.965	1.19	0.77	1.35	21.20	2.14	0.73	2.87		22.12	2.50
17.22	5.25	38.60	0.54	1.38	3.71	120	1.014	0.734	0.964	1.41	0.70	1.29	48.28	5.10	1.01	6.10	1.20	54.37	2.27
17.72	5.40	112.73	1.27	1.13	10.80	120	1.043	0.748	0.962	1.14	0.57	1.22	128.97	14.21	0.72	14.93	1.05	148.85	1.80
18.21	5.55	90.68	1.68	1.68	8.55	120	1.073	0.762	0.961	1.70	0.62	1.23	114.54	12.32	1.36	13.58	1.11	133.06	2.02
18.70	5.70	96.06	1.44	1.47	9.39	120	1.102	0.776	0.960	1.48	0.61	1.21	111.01	12.15	1.11	13.22	1.09	128.98	1.99
19.19	5.85	33.18	0.87	2.62	3.18	120	1.132	0.790	0.959	2.68	0.77	1.25	38.30	3.60	2.43	6.03		39.23	2.51
19.69	6.00	7.60	0.33	4.28	0.73	120	1.161	0.805	0.958	4.79	0.97	1.31	8.39	0.88	4.35	5.23		9.39	3.18
20.18	6.15	6.61	0.12	1.87	0.63	120	1.191	0.819	0.956	2.13	0.94	1.27	6.55	0.79	1.57	2.38		7.94	3.05
20.67	6.30	6.50	0.16	2.45	0.62	120	1.220	0.833	0.955	2.81	0.96	1.26	6.73	0.76	2.24	3.00		7.72	3.12
21.16	6.45	109.95	0.48	0.44	10.53	120	1.250	0.847	0.954	0.44	0.50	1.12	115.35	11.91	0.00	11.91	1.00	116.69	1.55
21.65	6.60	173.83	1.42	0.82	16.65	120	1.280	0.861	0.952	0.82	0.51	1.11	181.43	18.04	0.37	18.40	1.02	182.34	1.66
22.15	6.75	207.19	2.39	1.16	19.84	120	1.308	0.875	0.951	1.10	0.52	1.10	215.32	21.12	0.76	21.97	1.04	216.23	1.72
22.64	6.90	203.93	2.76	1.35	19.53	120	1.339	0.890	0.950	1.36	0.54	1.10	210.78	20.61	0.99	21.60	1.05	211.70	1.77
23.13	7.05	198.54	2.72	1.37	19.01	120	1.368	0.904	0.948	1.38	0.54	1.09	203.55	19.97	1.01	20.98	1.05	204.48	1.79
23.62	7.20	198.41	2.65	1.34	19.00	120	1.398	0.918	0.946	1.34	0.54	1.08	201.63	19.87	0.97	20.84	1.05	202.57	1.78
24.11	7.35	160.84	2.23	1.39	15.40	120	1.427	0.932	0.945	1.40	0.57	1.07	162.38	16.05	1.03	17.08	1.06	163.33	1.86
24.61	7.50	79.29	1.14	1.43	7.59	120	1.457	0.946	0.943	1.45	0.64	1.07	79.50	7.93	1.08	9.01	1.14	80.46	2.09
25.10	7.65	15.72	0.38	2.42	1.51	120	1.486	0.960	0.941	2.58	0.85	1.09	15.15	1.59	2.23	3.82		16.14	2.81
25.59	7.80	11.82	0.28	2.36	1.13	120	1.516	0.975	0.940	2.57	0.89	1.08	11.02	1.19	2.16	3.35		12.01	2.92
26.08	7.95	14.97	0.35	2.31	1.43	120	1.545	0.989	0.938	2.47	0.86	1.06	14.00	1.49	2.10	3.50		14.59	2.83
26.57	8.10	36.11	0.47	1.30	3.46	120	1.575	1.003	0.938	1.34	0.72	1.04	34.47	5.00	0.93	5.93	1.19	49.68	2.30
27.07	8.25	51.37	0.53	1.03	4.92	120	1.604	1.017	0.934	1.05	0.66	1.03	48.55	7.05	0.82	7.87	1.09	70.11	2.17
27.56	8.40	34.12	0.77	2.24	3.27	120	1.634	1.031	0.932	2.31	0.77	1.02	31.90	3.30	2.03	5.34		32.89	2.53
28.05	8.55	25.91	0.73	2.83	2.48	120	1.663	1.045	0.930	2.95	0.82	1.01	23.73	2.49	2.72	5.21		24.73	2.59
28.54	8.70	11.66	0.40	3.41	1.12	120	1.693	1.060	0.928	3.75	0.92	1.00	10.00	1.12	3.39	4.51		11.01	3.05
29.04	8.85	15.35	0.40	2.58	1.47	120	1.722	1.074	0.925	2.77	0.87	0.99	13.32	1.46	2.42	3.88		14.32	2.88
29.53	9.00	27.39	0.45	1.63	2.62	120	1.752	1.088	0.923	1.69	0.77	0.98	24.33	2.59	1.31	3.90		25.34	2.54
30.02	9.15	16.98	0.57	3.33	1.63	120	1.781	1.102	0.920	3.56	0.88	0.96	14.47	1.59	3.29	4.88		15.48	2.95
30.51	9.30	14.32	0.65	4.51	1.37	120	1.811	1.116	0.918	4.89	0.92	0.95	11.87	1.33	4.67	6.00		12.89	3.06
31.00	9.45	27.07	0.70	2.57	2.59	120	1.841	1.131	0.915	2.68	0.81	0.95	23.24	2.51	2.41	4.92		24.25	2.67
31.50	9.60	75.58	1.00	1.32	7.24	120	1.870	1.145	0.913	1.35	0.64	0.95	66.87	7.04	0.56	8.00	1.14	68.15	2.13
31.99	9.75	74.32	1.20	1.61	7.12	120	1.900	1.159	0.910	1.64	0.66	0.94	65.09	6.88	1.29	8.17	1.19	66.13	2.19
32.48	9.90	102.17	1.24	1.22	9.78	120	1.929	1.173	0.907	1.23	0.61	0.94	89.65	9.40	0.83	10.24	1.09	90.69	2.00
32.97	10.05	167.61	1.04	0.62	16.05	120	1.959	1.187	0.904	0.62	0.50	0.94	148.45	15.27	0.14	15.40	1.01	149.51	1.65
33.46	10.20	155.46	1.39	0.89	14.89	120	1.988	1.201	0.901	0.90	0.54	0.93	136.11	14.57	0.46	14.03	1.03	137.17	1.78
33.95	10.35	124.44	1.94	1.56	11.92	120	2.018	1.216	0.898	1.57	0.61	0.92	106.97	11.38	1.23	12.61	1.11	108.03	2.02
34.45	10.50	118.26	2.22	1.88	11.33	120	2.047	1.230	0.894	1.90	0.64	0.91	100.55	10.80	1.60	12.40	1.15	101.80	2.30

Depth (feet)	Override	Liquef. Suscept. (0 or 1)	Rel. Dens. Dr (%)	Kc	Kα	Clean Sand Qc1n	Kσ	1.0 Kα	CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Qc1n N1(60) Ratio	Equiv. N1(60)	Apparent FC %	FC Adj. ΔN1(60)	Equiv. N1(60)cs	Volumetric Strain (%)	SPI (%)	OPI (m)	p (tsf)	Gmax (tsf)	τav (tsf)	Shear Strain γ	Strain E15	Strain Enc
0.49		0			1.00		1.00	1.00		0.283	Non-Liq.	5.6	21.5	18			0.00	0.0	0.000	0.016					
0.98		0			1.00		1.00	1.00		0.282	Non-Liq.	5.9	26.0	12			0.00	0.0	0.000	0.033					
1.48		0			1.00		1.00	1.00		0.282	Non-Liq.	5.9	45.7	10			0.00	0.0	0.000	0.049					
1.97		0			1.00		1.00	1.00		0.282	Non-Liq.	5.7	44.1	15			0.00	0.0	0.000	0.066					
2.46		0			1.00		1.00	1.00		0.281	Non-Liq.	5.4	32.4	23			0.00	0.0	0.000	0.086					
2.95		0			1.00		1.00	1.00		0.281	Non-Liq.	4.5	16.2	50			0.00	0.0	0.000	0.106					
3.44		0			1.00		1.00	1.00		0.281	Non-Liq.	4.5	14.4	49			0.00	0.0	0.000	0.125					
3.94		0			1.00		1.00	1.00		0.281	Non-Liq.	4.1	10.2	67			0.00	0.0	0.000	0.145					
4.43		0			1.00		1.00	1.00		0.280	Non-Liq.	4.3	11.8	60			0.00	0.0	0.000	0.165					
4.92		1	61	2.11	1.26	145.7	1.00	1.00	0.368	0.280	Non-Liq.	4.4	15.7	54	10.0	25.7	0.06	0.0	0.000	0.185	557	0.089	4.3E-04	3.2E-04	2.8E-04
5.41		1	83	1.47	1.26	170.4	1.00	1.00	Infin.	0.284	Non-Liq.	4.9	23.9	37	10.0	33.8	0.00	0.0	0.000	0.204	654	0.098	3.4E-04		
5.91		1	100	1.15	1.26	324.6	1.00	1.00	Infin.	0.297	Non-Liq.	5.4	52.5	23	10.0	62.5	0.00	0.0	0.000	0.224	840	0.107	2.2E-04		
6.40		0			1.00		1.00	1.00		0.309	Non-Liq.	3.7	18.1	85			0.00	0.0	0.000	0.244					
6.89		1	100	1.12	1.41	377.2	1.00	1.00	Infin.	0.320	Non-Liq.	5.4	61.8	21	10.0	71.8	0.00	0.0	0.000	0.264	956	0.126	2.2E-04		
7.38		1	90	2.19	1.41	302.3	1.00	1.00	Infin.	0.330	Non-Liq.	4.4	31.5	56	10.0	41.6	0.00	0.0	0.000	0.284	825	0.135	3.3E-04		
7.87		0			1.00		1.00	1.00		0.339	Non-Liq.	2.7	5.8	100			0.00	0.0	0.000	0.303					
8.37		0			1.00		1.00	1.00		0.348	Non-Liq.	3.4	3.9	100			0.00	0.0	0.000	0.323					
8.86		0			1.00		1.00	1.00		0.356	Non-Liq.	3.0	2.7	100			0.00	0.0	0.000	0.343					
9.35		0			1.00		1.00	1.00		0.363	Non-Liq.	3.1	2.9	100			0.00	0.0	0.000	0.363					
9.84		0			1.00		1.00	1.00		0.370	Non-Liq.	2.8	2.7	100			0.00	0.0	0.000	0.382					
10.33		0			1.00		1.00	1.00		0.376	Non-Liq.	3.7	4.0	88			0.00	0.0	0.000	0.402					
10.83		0			1.00		1.00	1.00		0.382	Non-Liq.	3.8	4.3	81			0.00	0.0	0.000	0.422					
11.32		1	28	2.30	1.26	66.9	1.00	1.00	0.108	0.387	0.28	4.3	6.7	58	5.0	11.7	3.39	28.6	0.043	0.442	675	0.209	1.2E-03		
11.81		1	32	1.93	1.28	64.7	1.00	1.00	0.105	0.392	0.27	4.5	7.4	50	5.0	12.4	3.23	26.8	0.040	0.462	704	0.218	1.2E-03		
12.30		1	26	2.29	1.28	67.1	1.00	1.00	0.108	0.397	0.27	4.3	6.8	58	5.0	11.8	3.41	29.0	0.043	0.481	706	0.228	1.3E-03		
12.80		0			1.00		1.00	1.00		0.401	Non-Liq.	3.5	3.1	98			0.00	0.0	0.000	0.501					
13.29		0			1.00		1.00	1.00		0.408	Non-Liq.	3.4	2.0	100			0.00	0.0	0.000	0.521					
13.78		0			1.00		1.00	1.00		0.409	Non-Liq.	3.7	2.8	88			0.00	0.0	0.000	0.541					
14.27		0			1.00		1.00	1.00		0.413	Non-Liq.	3.4	2.4	100			0.00	0.0	0.000	0.561					
14.76		0			1.00		1.00	1.00		0.417	Non-Liq.	3.5	2.3	100			0.00	0.0	0.000	0.580					
15.26		0			1.00		1.00	1.00		0.420	Non-Liq.	3.9	3.8	76			0.00	0.0	0.000	0.600					
15.75		1	22	2.29	1.15	61.1	1.00	1.00	0.101	0.423	0.24	4.3	6.2	58	5.0	11.2	3.65	35.0	0.053	0.620	787	0.291	1.4E-03		
16.24		1	28	1.88	1.15	61.8	1.00	1.00	0.102	0.426	0.24	4.5	7.0	51	5.0	12.0	3.45	35.0	0.053	0.640	819	0.300	1.3E-03		
16.73		0			1.00		1.00	1.00		0.428	Non-Liq.	4.1	5.4	67			0.00	0.0	0.000	0.659					
17.22		1	52	1.84	1.15	100.2	1.00	1.00	0.174	0.431	0.40	4.8	11.8	48	5.0	16.9	2.60	16.4	0.025	0.679	946	0.317	8.5E-04		
17.72		1	94	1.16	1.15	171.1	1.00	1.00	Infin.	0.434	Non-Liq.	5.3	28.0	23	8.8	34.8	0.00	0.0	0.000	0.699	1,218	0.326	5.3E-04		
18.21		1	69	1.33	1.15	177.2	1.00	1.00	Infin.	0.436	Non-Liq.	5.0	26.4	32	9.0	35.4	0.00	0.0	0.000	0.719	1,245	0.335	5.2E-04		
18.70		1	87	1.29	1.15	166.0	1.00	1.00	Infin.	0.438	Non-Liq.	5.1	25.3	30	7.9	33.2	0.00	0.0	0.000	0.739	1,215	0.344	5.5E-04		
19.19		0			1.00		1.00	1.00		0.440	Non-Liq.	4.1	9.6	68			0.00	0.0	0.000	0.758					
19.69		0			1.00		1.00	1.00		0.442	Non-Liq.	2.6	3.4	100			0.00	0.0	0.000	0.778					
20.18		0			1.00		1.00	1.00		0.444	Non-Liq.	3.0	2.6	100			0.00	0.0	0.000	0.798					
20.67		0			1.00		1.00	1.00		0.446	Non-Liq.	2.9	2.7	100			0.00	0.0	0.000	0.818					
21.16		1	83	1.00	1.00	116.7	1.00	1.00	0.228	0.447	0.51	5.8	20.3	14	3.1	23.3	1.82	8.0	0.012	0.838	1,169	0.387	7.6E-04		
21.65		1	100	1.01	1.00	184.2	1.00	1.00	Infin.	0.449	Non-Liq.	5.7	31.7	14	5.1	36.8	0.00	0.0	0.000	0.857	1,377	0.396	5.4E-04		
22.15		1	100	1.05	1.00	226.7	1.00	1.00	Infin.	0.450	Non-Liq.	5.8	38.3	16	7.0	45.3	0.00	0.0	0.000	0.877	1,493	0.405	4.8E-04		
22.64		1	100	1.09	1.00	230.3	1.00	1.00	Infin.	0.451	Non-Liq.	5.6	38.3	19	7.7	46.1	0.00	0.0	0.000	0.897	1,517	0.413	4.7E-04		
23.13		1	100	1.10	1.00	224.4	1.00	1.00	Infin.	0.452	Non-Liq.	5.5	37.2	19	7.7	44.9	0.00	0.0	0.000	0.917	1,521	0.422	4.9E-04		
23.62		1	100	1.09	1.00	221.5	1.00	1.00	Infin.	0.453	Non-Liq.	5.5	36.8	19	7.5	44.3	0.00	0.0	0.000	0.936	1,531	0.430	4.9E-04		
24.11		1	97	1.15	1.00	188.0	1.00	1.00	Infin.	0.454	Non-Liq.	5.4	30.5	23	7.1	37.6	0.00	0.0	0.000	0.956	1,484	0.438	5.5E-04		
24.61		1	68	1.44	1.00	115.8	1.00	1.00	0.224	0.455	0.49	4.9	16.4	36	5.0	21.4	2.07	9.5	0.014	0.978	1,226	0.447	8.5E-04		
25.10		0			1.00		1.00	1.00		0.456	Non-Liq.	3.5	4.6	99			0.00	0.0	0.000	0.998					
25.59		0			1.00		1.00	1.00		0.457	Non-Liq.	3.3	3.7	100			0.00	0.0	0.000	1.016					
26.08		0			1.00		1.00	1.00		0.457	Non-Liq.	3.5	4.3	100			0.00	0.0	0.000	1.035					
26.57		1	48	2.14	1.41	108.7	1.00	1.00	0.183	0.458	0.42	4.4	11.4	55	5.0	16.4	2.72	20.0	0.030	1.055	1,166	0.479	1.1E-03		
27.07		1	62	1.60	1.41	112.1	1.00	1.00	0.211	0.458	0.46	4.7	14.8	41	5.0	19.8	2.28	12.2	0.018	1.075	1,253	0.487	9.3E-04		
27.56		0			1.00		1.00	1.00		0.459	Non-Liq.	4.1	8.1	69			0.00	0.0	0.000	1.095					
28.05		0			1.00		1.00	1.00		0.459	Non-Liq.	3.7	6.6	88			0.00	0.0	0.000	1.114					
28.54		0			1.00		1.00	1.00		0.459	Non-Liq.	3.0	3.6	100			0.00	0.0	0.000	1.134					
29.04		0			1.00		1.00	1.00		0.459	Non-Liq.	3.4	4.2	100			0.00	0.0	0.000	1.154					
29.53		0			1.00		1.00	1.00		0.459	Non-Liq.	4.0	6.3	70			0.00	0.0	0.000	1.174					
30.02		0			1.00		1.00	1.00		0.459	Non-Liq.	3.3	4.7	100			0.00	0.0	0.000	1.194					
30.51		0			1.00		1.00	1.00		0.459	Non-Liq.	3.0	4.3	100			0.00	0.0	0.000	1.213					
31.00		0			1.00		1.00	1.00		0.459	Non-Liq.	3.8	6.4	84			0.00	0.0	0.000	1.233					
31.50		1	61	1.51	1.00	102.8	0.99	1.00	0.181	0.459	0.39	4.8	14.1	38	5.0	19.1	2.37	13.1	0.020	1.253	1,337	0.555	9.7E-04		
31.99		1	60	1.65	1.00	108.6	0.99	1.00	0.200	0.458	0.43	4.7	14.0	42	5.0	19.0	2.36	13.4	0.020	1.273	1,347	0.562	9.8E-04		
32.48		1	73	1.31	1.00	118.4	0.99	0.99	0.235	0.458	0.51	5.1	17.9	31	5.0	22.9	1.90	8.3	0.012	1.293	1,443	0.569	8.6E-04		
32.97		1	94	1.00	1.00	149.6	0.98	0.99	0.383	0.457	0.83	5.8	25.9	13	4.1	30.0	1.11	3.7	0.006	1.312	1,590	0.575	6.9E-04		
33.46		1	90	1.09	1.00	149.7	0.98	0.98	0.392	0.457	0.84	5.5	24.9	19	5.0	29.9	1.12	3.7	0.006	1.332	1,601	0.582	7.0E-04		
33.95		1	80	1.33	1.00	143.4	0.98	0.98	0.354	0.456	0.76	5.0	21.4	32	5.0	26.4	1.30	4.8	0.007	1.352	1,548	0.589	7.6E-04		
34.45		1	77	1.43	1.00	147.4	0.98	0.97	0.378	0.455	0.81	4.9	20.8	36	5.0	25.8	1.57	4.8	0.007	1.372	1,548	0.595	7.7E-04		

Depth (feet)	(m)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio Rf %	qc MPa	Total Unit Wt. (pcf)	Total Stress po (tsf)	Eff. Stress p'o (tsf)	rd	f %	n	Max 1.70 Cq	Q	Moss qc1 MPa	Moss Δqc MPa	Moss qc1mod MPa	Mass eff Kc	Qc1n	Ic	Override	Liquef. Suscept. (0 or 1)	Rel. Dens. Dr (%)
34.94	10.65	201.84	1.88	0.93	19.33	120	2.077	1.244	0.891	0.94	0.52	0.92	174.26	18.24	0.50	18.74	1.03	175.34	1.71		1	100
35.43	10.80	219.21	1.12	0.51	20.99	120	2.106	1.258	0.886	0.52	0.50	0.92	186.92	19.44	0.01	19.46	1.00	190.01	1.51		1	100
35.93	10.95	259.90	2.02	0.78	24.89	120	2.136	1.272	0.884	0.78	0.50	0.91	222.97	23.28	0.32	23.59	1.01	224.07	1.58		1	100
36.42	11.10	232.25	2.43	1.21	22.24	120	2.165	1.286	0.880	1.21	0.53	0.90	196.65	20.91	0.82	21.73	1.04	197.75	1.70		1	100
36.91	11.25	202.19	1.79	0.88	19.35	120	2.195	1.301	0.877	0.89	0.52	0.90	170.00	17.95	0.45	18.40	1.02	171.71	1.70		1	99
37.40	11.40	180.85	1.41	0.78	17.32	120	2.224	1.315	0.873	0.78	0.52	0.89	151.60	15.90	0.32	16.22	1.02	152.71	1.70		1	94
37.89	11.55	315.44	2.74	0.87	30.21	120	2.254	1.329	0.869	0.87	0.50	0.89	264.91	27.98	0.42	28.41	1.02	268.03	1.58		1	100
38.39	11.70	365.00	3.99	1.09	34.95	120	2.283	1.343	0.865	1.10	0.50	0.89	305.06	32.56	0.68	33.25	1.02	306.19	1.60		1	100
38.88	11.85	294.67	3.42	1.16	28.22	120	2.313	1.357	0.861	1.17	0.51	0.88	244.02	28.16	0.76	26.83	1.03	245.15	1.68		1	100
39.37	12.00	230.88	2.41	1.04	22.11	120	2.343	1.371	0.857	1.05	0.52	0.87	189.36	20.28	0.63	20.90	1.03	190.49	1.72		1	100
39.86	12.15	172.95	2.95	1.71	16.56	120	2.372	1.386	0.852	1.72	0.60	0.85	136.03	15.29	1.39	16.67	1.09	139.14	1.97		1	91
40.35	12.30	210.20	2.33	1.11	20.13	120	2.402	1.400	0.848	1.12	0.54	0.86	169.70	18.34	0.70	19.04	1.04	170.64	1.77		1	99
40.85	12.45	183.31	0.85	0.46	17.55	120	2.431	1.414	0.843	0.46	0.50	0.87	148.71	15.29	0.03	15.29	1.00	149.87	1.57		1	94
41.34	12.60	201.25	0.59	0.29	19.27	120	2.461	1.428	0.839	0.30	0.50	0.86	162.56	18.32	0.00	16.32	1.00	163.72	1.44		1	97
41.83	12.75	343.55	1.71	0.50	32.90	120	2.490	1.442	0.834	0.50	0.50	0.86	278.95	28.97	0.03	28.97	1.00	278.11	1.38		1	100
42.32	12.90	406.19	3.55	0.87	38.90	120	2.520	1.456	0.830	0.88	0.50	0.85	326.04	35.15	0.43	35.58	1.01	327.22	1.51		1	100
42.81	13.05	376.71	3.16	0.84	36.07	120	2.549	1.471	0.825	0.84	0.50	0.85	300.82	32.38	0.39	32.77	1.01	302.00	1.51		1	100
43.31	13.20	350.99	1.82	0.52	33.61	120	2.578	1.485	0.820	0.52	0.50	0.84	278.85	29.33	0.02	29.35	1.00	280.04	1.39		1	100
43.80	13.35	306.66	1.43	0.46	29.37	120	2.608	1.499	0.816	0.48	0.50	0.84	242.31	25.32	0.00	25.32	1.00	243.50	1.41		1	100
44.29	13.50	290.22	1.08	0.37	27.79	120	2.638	1.513	0.811	0.37	0.50	0.84	228.17	23.45	0.00	23.45	1.00	229.37	1.37		1	100
44.78	13.65	204.51	1.51	0.74	19.58	120	2.667	1.527	0.806	0.75	0.51	0.83	159.10	16.57	0.27	17.24	1.02	160.29	1.67		1	96
45.28	13.80	101.30	2.65	2.62	9.70	120	2.697	1.542	0.801	2.68	0.69	0.77	77.68	8.68	2.39	11.08	1.28	73.81	2.30		1	64
45.77	13.95	94.13	2.67	2.83	9.01	120	2.726	1.556	0.796	2.88	0.71	0.76	66.64	8.05	2.64	10.69	1.33	67.76	2.35		1	61
46.26	14.10	63.60	2.16	3.40	6.09	120	2.756	1.570	0.791	3.49	0.76	0.74	43.42	5.38	3.27	6.66		44.52	2.54		0	
46.75	14.25	71.69	1.74	2.43	6.87	120	2.745	1.584	0.786	2.49	0.72	0.75	49.56	6.00	2.58	8.17		50.68	2.40		0	
47.24	14.40	73.85	1.61	2.18	7.07	120	2.815	1.598	0.781	2.23	0.71	0.75	51.03	8.64	1.89	10.52	1.22	73.38	2.36		1	64
47.74	14.55	88.18	1.82	2.07	8.44	120	2.844	1.612	0.776	2.11	0.69	0.75	61.30	10.33	1.76	12.09	1.17	87.84	2.28		1	71
48.23	14.70	50.53	1.78	3.04	5.60	120	2.874	1.627	0.771	3.13	0.76	0.72	38.77	4.86	2.84	7.70		39.86	2.55		0	
48.72	14.85	35.01	1.33	3.42	3.74	120	2.904	1.641	0.766	3.57	0.81	0.70	24.71	3.17	3.26	6.44		25.80	2.73		0	
49.21	15.00	44.63	1.16	2.61	4.27	120	2.933	1.655	0.761	2.71	0.78	0.71	28.69	3.60	2.35	5.95		29.80	2.60		0	
49.70	15.15	104.50	2.33	2.23	10.01	120	2.963	1.669	0.756	2.27	0.64	0.73	71.36	10.99	1.03	12.02	1.18	81.70	2.26		1	73
50.20	15.30	192.74	4.16	2.16	18.45	120	2.992	1.683	0.751	2.17	0.62	0.75	135.45	20.64	1.84	22.48	1.09	172.78	2.05		1	100
50.69	15.45	213.47	5.32	2.49	20.44	120	3.022	1.697	0.746	2.51	0.63	0.74	146.90	23.03	2.21	25.24	1.10	158.73	2.08		1	100
51.18	15.60	85.78	4.70	5.48	8.21	120	3.051	1.712	0.741	5.59	0.78	0.69	54.52	7.31	4.98	12.30		55.63	2.62		0	
51.67	15.75	69.00	3.47	5.03	6.61	120	3.041	1.726	0.735	5.16	0.79	0.68	43.10	5.80	4.97	10.77		44.21	2.97		0	
52.17	15.90	160.63	4.05	2.52	15.38	120	3.110	1.740	0.731	2.55	0.65	0.72	108.57	14.47	2.23	16.69	1.19	117.59	2.17		1	84
52.66	16.05	124.29	4.95	3.98	11.90	120	3.140	1.754	0.726	4.04	0.72	0.69	80.48	10.55	3.83	14.37		81.63	2.40		0	
53.15	16.20	122.98	4.59	3.73	11.78	120	3.169	1.768	0.721	3.79	0.71	0.69	79.36	10.60	3.55	14.14	1.33	92.18	2.39		1	69
53.64	16.35	144.27	4.42	3.07	13.82	120	3.199	1.782	0.716	3.10	0.68	0.70	94.37	12.37	2.81	15.18	1.23	97.52	2.27		1	76
54.13	16.50	233.67	4.87	2.08	22.38	120	3.228	1.797	0.712	2.10	0.60	0.73	159.30	19.95	1.73	21.68	1.09	163.84	2.00		1	97
54.63	16.65	231.56	5.65	2.44	22.17	120	3.258	1.811	0.707	2.46	0.62	0.72	155.84	19.88	2.12	22.00	1.11	160.10	2.06		1	98
55.12	16.80	214.40	5.82	2.71	20.53	120	3.287	1.825	0.702	2.74	0.64	0.71	141.95	18.42	2.41	20.83	1.13	146.12	2.12		1	93
55.61	16.95	187.63	5.22	2.78	17.97	120	3.317	1.839	0.698	2.81	0.65	0.70	122.51	16.04	2.48	18.62	1.16	128.28	2.17		1	87
56.10	17.10	72.74	4.20	5.78	6.97	120	3.346	1.853	0.693	5.93	0.81	0.64	42.63	6.05	4.88	10.93		43.74	2.71		0	
56.59	17.25	74.22	3.33	4.48	7.11	120	3.376	1.868	0.689	4.60	0.78	0.64	43.89	6.09	4.31	10.41		45.01	2.62		0	
57.09	17.40	136.50	3.58	2.62	13.07	120	3.406	1.882	0.684	2.66	0.57	0.66	86.32	11.23	2.29	13.52	1.20	87.85	2.25		1	71
57.58	17.55	338.35	4.28	1.26	32.40	120	3.435	1.898	0.680	1.27	0.52	0.74	234.35	27.44	0.62	28.28	1.03	235.87	1.72		1	100
58.07	17.70	268.87	4.59	1.71	25.75	120	3.465	1.910	0.675	1.72	0.57	0.71	178.84	21.89	1.30	23.29	1.06	181.13	1.90		1	100
58.56	17.85	239.18	4.60	1.92	22.90	120	3.494	1.924	0.671	1.94	0.60	0.70	157.07	19.58	1.53	21.11	1.08	158.34	1.97		1	96
59.05	18.00	169.61	4.94	2.96	15.95	120	3.524	1.938	0.667	3.00	0.67	0.67	103.78	13.76	2.64	16.40	1.19	104.98	2.23		1	79
59.55	18.15	212.70	5.35	2.52	20.37	120	3.553	1.953	0.663	2.54	0.63	0.68	135.16	17.54	2.16	19.70	1.12	136.41	2.11		1	80
60.04	18.30	192.68	5.33	2.76	18.47	120	3.583	1.967	0.659	2.79	0.65	0.67	120.53	15.90	2.41	18.32	1.15	121.77	2.17		1	85
60.53	18.45	221.44	4.78	2.16	21.21	120	3.612	1.981	0.655	2.18	0.61	0.68	141.06	18.07	1.77	19.84	1.10	142.34	2.04		1	81
61.02	18.60	237.20	5.56	2.34	22.71	120	3.642	1.995	0.651	2.36	0.62	0.68	150.26	19.46	1.96	21.43	1.10	151.53	2.05		1	94
61.52	18.75	267.57	7.12	2.60	25.62	120	3.671	2.009	0.647	2.58	0.62	0.67	168.50	22.18	2.29	24.47	1.10	169.78	2.08		1	99
62.01	18.90	263.11	7.48	2.84	25.20	120	3.701	2.023	0.643	2.86	0.63	0.66	164.03	21.84	2.48	24.33	1.11	165.30	2.09		1	98
62.50	19.05	215.25	6.77	3.15	20.61	120	3.730	2.038	0.640	3.18	0.66	0.65	131.04	17.81	2.80	20.61	1.16	132.30	2.19		1	88
62.99	19.20	223.38	5.24	2.34	21.39	120	3.760	2.052	0.636	2.37	0.62	0.66	138.40	18.16	1.95	20.11	1.11	139.68	2.08		1	91
63.48	19.35	240.73	4.46	1.84	23.05	120	3.789	2.066	0.633	1.85	0.59	0.67	151.63	19.29	1.41	20.71	1.07	152.94	1.87		1	94
63.98	19.50	261.22	5.18	1.97	25.01	120	3.819	2.080	0.629	1.99	0.58	0.67	163.84	21.07	1.55	22.62	1.07	165.26	1.97		1	98
64.47	19.65	276.93	6.38	2.30	26.52	120	3.848	2.094	0.626	2.32	0.61	0.66	171.86	22.58	1.90	24.47	1.08	173.17	2.01		1	100
64.96	19.80	372.32	7.39	1.99	35.65	120	3.878	2.108	0.622	2.00	0.57	0.68	236.72	30.36	1.56	31.92	1.05	238.07	1.87		1	100
65.45	19.95	388.94	8.05	2.07	37.24	120	3.907	2.123	0.619	2.08	0.57	0.67	246.17	31.80	1.64	33.45	1.05	247.52	1.88		1	100
65.94	20.10	371.98	7.62	2.05	35.62	120	3.937	2.137	0.616	2.06	0.57	0.67	234.05	30.30	1.62	31.92	1.05	235.40	1.89		1	100
66.44	20.25	296.25	6.31	2.13	28.37	120	3.967	2.151	0.613	2.14	0.59	0.66	182.54	23.84	1.70	25.64	1.07	183.87	1.97		1	100
66.93	20.40	241.43	5.44	2.25	23.12	120	3.996	2.165	0.610	2.28	0.62	0.64	145.52	19.38	1.83	21.21	1.09	146.83	2.05		1	93
67.42	20.55	257.50	5.94	2.31	24.66	120	4.026	2.179	0.607	2.33	0.61	0.64	154.97	20.73	1.88	22.61	1.09	156.29	2.04		1	95
67.91	20.70	240.49	6.06	2.70	23.60	120	4.055	2.193	0.604	2.73	0.63	0.63	145.54	19.98	2.29	22.27	1.11	146.84	2.11		1	93
68.41	20.85	254.07	6.85	2.70	24.33	120	4.085	2.208	0.601	2.72	0.63	0.63	149.70	20.59	2.28	22.87	1.11	151.01	2.10		1	94
68.90	21.00	271.56	7.23	2.66	26.03	120	4.114	2.222	0.598	2.68	0.62	0.63	160.19	22.02	2.24	24.20	1.10	161.51	2.08		1	97
69.39	21.15	298.40	7.95	2.67	28.57	120	4.144	2.236	0.595	2.69	0.62	0.63	176.37	24.26	2.24	26.50	1.09	177.70	2.05		1	100
69.88	21.30	339.13	8.23	2.43	32.48	120	4.173	2.250	0.593	2.44	0.60	0.64	202.81	27.61	1.89	29.50	1.07	204.18	1.98		1	100
70.37	21.45	357.03	7.85	2.20	34.19	120	4.203	2.264	0.590	2.22	0.58	0.64	215.07	28.79	1.75	30.54	1.06	216.44	1.93		1	100
70.87	21.60	359.15	8.08	2.25	34.39	120	4.232	2.279	0.587	2.26	0.59	0.64	215.22	28.97	1.80	30.77	1.08	216.59	1.94		1	100
71.36	21.75	353.44	8.50	2.40	33.85	120	4.262	2.293	0.585	2.42	0.59	0.63	209.60	28.58	1.56	30.54	1.07	210.97	1.97		1	100
71.85	21.90	358.60	8.39	2.34	34.35	120	4.291	2.307	0.582	2.35	0.59	0.63	212.58	28.93	1.69	30.62	1.07	213.95	1.96		1	100
72.34	22.05	357.70	8.03	2.25	34.25	120	4.321	2.321	0.580	2.26	0.59	0.63	211.88	28.73	1.79	30.52	1.06	213.25	1.95		1	100
72.83	22.20	347.60	7.74	2.22	33.29	120	4.350	2.335	0.578	2.23	0.59	0.63	204.96	27.82	1.75	28.58	1.06	206.34	1.95		1	100
73.33	22.35	338.03	7.59	2.25	32.37	120	4.380	2.349	0.575	2.26	0.59	0.62	197.93	27.03	1.76	28.78	1.07	199.32	1.98		1	100
73.82	22.50	335.59	7.17	2.14	32.14	120	4.409	2.364	0.573	2.15	0.59	0.62	196.49	26.67	1.67	28.34	1.06	197.88	1.95		1	100
74.31	22.65	332.63	6.75	2.03	31.85	120	4.439	2.378	0.571	2.04	0.58	0.62	194.75	26.29	1.56	27.84	1.05	195.15	1.93		1	100
74.80	22.80	334.37	7.03	2.10	32.02	120	4.469	2.392	0.569	2.12	0.58	0.62	194.53	26.47	1.63	28.10	1.06	195.93	1.95		1	100
75.30	22.95	327.36	7.45	2.27	31.35	120	4.498	2.406	0.566	2.29	0.60	0.61	188.19	26.00	1.80	27.81	1.07	189.58	1.98		1	100
75.79	23.10	333.06	7.23	2.17	31.89	120	4.528	2.420	0.564	2.19	0.59	0.61	191.75	26.35	1.70	28.05	1.06	193.16	1.98		1	100
76.28	23.25	364.12	7.90	1.92	34.87	120	4.557	2.434	0.562	1.93	0.57	0.62	212.48	28.61	1.44	30.05	1.05	213.81	1.89		1	100

Depth (feet)	Kc	Kσ	Clean Sand Qc1n	Moss Kσ	1.0 Kα	CRR	Induced M=7.5 CSR	Liquefaction Safety Factor	Qc/N Ratio	Apparent Equiv. N1(60)	FC %	FC Adj. ΔN1(60)	Equiv. N1(60cs)	Volumetric Strain (%)	SPI (%)	DPI (in)	p (tsf)	Gmax (tsf)	τav (tsf)	Shear Strain γ	Strain Eq	Strain Enc
34.94	1.05	1.00	183.3	0.97	0.97	Infin.	0.455	Non-Liq.	5.8	31.0	16	5.8	36.7	0.00	0.0	0.000	1.391	1.752	0.601	6.1E-04		
35.43	1.00	1.00	190.0	0.96	0.96	Infin.	0.454	Non-Liq.	6.0	31.5	9	6.5	38.0	0.00	0.0	0.000	1.411	1.785	0.608	5.9E-04		
35.93	1.00	1.00	224.1	0.94	0.95	Infin.	0.453	Non-Liq.	5.5	37.8	11	6.9	44.8	0.00	0.0	0.000	1.431	1.899	0.614	5.3E-04		
36.42	1.04	1.00	212.7	0.95	0.95	Infin.	0.452	Non-Liq.	5.6	35.6	18	7.0	42.5	0.00	0.0	0.000	1.451	1.879	0.620	5.5E-04		
36.91	1.04	1.00	178.6	0.96	0.95	Infin.	0.450	Non-Liq.	5.7	33.3	16	5.4	35.7	0.00	0.0	0.000	1.471	1.785	0.625	6.1E-04		
37.40	1.04	1.00	158.9	0.96	0.94	0.453	0.449	0.95	5.7	27.0	18	4.8	31.8	1.00	3.1	0.005	1.490	1.728	0.631	6.6E-04		
37.89	1.00	1.00	266.0	0.93	0.94	Infin.	0.448	Non-Liq.	5.9	45.8	10	8.4	53.2	0.00	0.0	0.000	1.510	2.066	0.636	4.8E-04		
38.39	1.00	1.00	306.2	1.00	0.94	Infin.	0.447	Non-Liq.	5.9	52.2	12	9.0	61.2	0.00	0.0	0.000	1.530	2.179	0.642	4.5E-04		
38.88	1.03	1.00	251.4	0.93	0.93	Infin.	0.445	Non-Liq.	5.7	43.0	15	7.3	50.3	0.00	0.0	0.000	1.550	2.054	0.647	5.0E-04		
39.37	1.05	1.00	200.5	0.94	0.93	Infin.	0.444	Non-Liq.	5.6	33.8	16	6.2	40.1	0.00	0.0	0.000	1.569	1.917	0.652	5.7E-04		
39.86	1.28	1.00	178.0	0.98	0.92	Infin.	0.442	Non-Liq.	5.1	27.1	29	8.1	35.2	0.00	0.0	0.000	1.589	1.647	0.657	6.1E-04		
40.35	1.09	1.00	185.9	0.95	0.92	Infin.	0.440	Non-Liq.	5.5	30.8	19	6.3	37.2	0.00	0.0	0.000	1.609	1.805	0.662	5.9E-04		
40.85	1.00	1.00	149.9	0.95	0.92	0.393	0.439	0.82	5.9	25.3	15	4.7	30.0	1.06	3.5	0.005	1.629	1.772	0.668	6.7E-04		
41.34	1.00	1.00	163.7	0.95	0.91	Infin.	0.437	Non-Liq.	6.2	26.5	6	6.3	32.7	0.00	0.0	0.000	1.649	1.836	0.671	6.3E-04		
41.83	1.00	1.00	278.1	0.91	0.91	Infin.	0.435	Non-Liq.	6.3	44.2	5	10.0	54.2	0.00	0.0	0.000	1.668	2.185	0.675	4.7E-04		
42.32	1.00	1.00	327.2	1.00	0.90	Infin.	0.433	Non-Liq.	6.0	54.1	8	10.0	64.1	0.00	0.0	0.000	1.688	2.324	0.679	4.3E-04		
42.81	1.00	1.00	302.0	1.00	0.90	Infin.	0.432	Non-Liq.	6.0	50.1	9	10.0	60.1	0.00	0.0	0.000	1.706	2.268	0.684	4.4E-04		
43.31	1.00	1.00	280.0	0.90	0.90	Infin.	0.430	Non-Liq.	6.3	44.8	5	10.0	54.8	0.00	0.0	0.000	1.728	2.229	0.686	4.6E-04		
43.80	1.00	1.00	243.5	0.90	0.89	Infin.	0.428	Non-Liq.	6.2	39.1	6	9.6	48.7	0.00	0.0	0.000	1.748	2.158	0.691	4.9E-04		
44.29	1.00	1.00	229.4	0.89	0.89	Infin.	0.426	Non-Liq.	6.3	36.3	4	9.6	45.9	0.00	0.0	0.000	1.767	2.127	0.695	5.1E-04		
44.78	1.02	1.00	163.6	0.94	0.89	Infin.	0.424	Non-Liq.	5.7	28.0	15	4.7	32.7	0.00	0.0	0.000	1.787	1.911	0.699	5.2E-04		
45.28	1.95	1.00	143.9	0.97	0.81	0.357	0.421	0.77	4.5	16.4	50	5.0	21.4	2.00	8.7	0.013	1.807	1.669	0.702	8.0E-04		
45.77	2.13	1.00	144.1	0.97	0.81	0.358	0.418	0.78	4.4	15.4	54	5.0	20.4	2.13	10.0	0.015	1.827	1.651	0.705	8.3E-04		
46.26		1.00		0.97	0.84		0.417	Non-Liq.	4.0	11.5	71			0.00	0.0	0.000	1.846					
46.75		1.00		0.97	0.83		0.415	Non-Liq.	4.3	11.8	58			0.00	0.0	0.000	1.866					
47.24	2.15	1.41	157.9	0.98	0.90	0.446	0.413	0.97	4.4	16.7	55	5.0	21.7	2.00	8.1	0.012	1.886	1.713	0.714	7.7E-04		
47.74	1.90	1.41	166.8	0.98	0.87	Infin.	0.411	Non-Liq.	4.5	19.4	49	10.0	29.4	0.00	0.0	0.000	1.906	1.904	0.717	8.3E-04		
48.23		1.00		0.97	0.93		0.408	Non-Liq.	4.0	9.8	71			0.00	0.0	0.000	1.926					
48.72		1.00		0.98	0.93		0.406	Non-Liq.	3.7	7.5	90			0.00	0.0	0.000	1.945					
49.21		1.00		0.97	0.93		0.404	Non-Liq.	3.9	7.6	77			0.00	0.0	0.000	1.965					
49.70	1.82	1.26	166.8	0.85	0.85	Infin.	0.402	Non-Liq.	4.6	20.0	47	10.0	30.0	0.00	0.0	0.000	1.985	1.957	0.728	6.1E-04		
50.20	1.38	1.26	237.8	0.91	0.85	Infin.	0.399	Non-Liq.	5.0	34.7	34	10.0	44.7	0.00	0.0	0.000	2.005	2.246	0.730	4.9E-04		
50.69	1.41	1.26	267.9	0.89	0.85	Infin.	0.397	Non-Liq.	4.9	38.5	35	10.0	48.5	0.00	0.0	0.000	2.025	2.319	0.732	4.6E-04		
51.18		1.00		0.99	0.92		0.395	Non-Liq.	3.8	14.4	79			0.00	0.0	0.000	2.044					
51.67		1.00		0.97	0.92		0.392	Non-Liq.	3.8	11.7	83			0.00	0.0	0.000	2.064					
52.17	1.59	1.07	167.3	0.94	0.84	Infin.	0.390	Non-Liq.	4.8	24.7	41	10.0	34.7	0.00	0.0	0.000	2.084	2.106	0.739	5.4E-04		
52.66		1.00		0.95	0.91		0.388	Non-Liq.	4.3	19.0	59			0.00	0.0	0.000	2.104					
53.15	2.26	1.02	185.8	0.95	0.87	Infin.	0.386	Non-Liq.	4.3	19.0	57	10.0	28.0	0.00	0.0	0.000	2.123	2.001	0.743	6.0E-04		
53.64	1.88	1.02	181.9	0.95	0.83	Infin.	0.383	Non-Liq.	4.5	21.4	48	10.0	31.4	0.00	0.0	0.000	2.143	2.065	0.745	5.7E-04		
54.13	1.30	1.02	212.2	0.90	0.83	Infin.	0.381	Non-Liq.	5.1	32.2	30	10.0	42.2	0.00	0.0	0.000	2.163	2.269	0.747	4.8E-04		
54.63	1.38	1.02	221.1	0.91	0.82	Infin.	0.379	Non-Liq.	5.0	32.2	34	10.0	42.2	0.00	0.0	0.000	2.183	2.299	0.748	4.8E-04		
55.12	1.49	1.02	217.3	0.92	0.82	Infin.	0.377	Non-Liq.	4.9	30.1	36	10.0	40.1	0.00	0.0	0.000	2.203	2.271	0.750	4.9E-04		
55.61	1.59	1.02	200.6	0.93	0.82	Infin.	0.375	Non-Liq.	4.8	26.5	41	10.0	36.5	0.00	0.0	0.000	2.222	2.211	0.752	5.1E-04		
56.10		1.00		0.96	0.90		0.372	Non-Liq.	3.7	11.9	88			0.00	0.0	0.000	2.242					
56.59		1.00		0.96	0.90		0.370	Non-Liq.	3.9	11.7	79			0.00	0.0	0.000	2.262					
57.09	1.80	1.00	157.8	0.94	0.81	0.445	0.368	0.98	4.6	19.1	47	5.0	24.1	1.55	5.0	0.007	2.282	1.851	0.757	6.3E-04		
57.58	1.05	1.00	248.0	0.83	0.81	Infin.	0.366	Non-Liq.	5.6	41.9	16	7.7	49.6	0.00	0.0	0.000	2.301	2.482	0.759	4.3E-04		
58.07	1.19	1.00	214.7	0.87	0.81	Infin.	0.364	Non-Liq.	5.3	34.3	25	8.7	42.9	0.00	0.0	0.000	2.321	2.385	0.761	4.6E-04		
58.56	1.27	1.00	200.8	0.90	0.80	Infin.	0.362	Non-Liq.	5.1	30.8	20	9.3	40.1	0.00	0.0	0.000	2.341	2.341	0.762	4.7E-04		
59.05	1.76	1.00	184.3	0.93	0.80	Infin.	0.360	Non-Liq.	4.6	22.7	46	10.0	32.7	0.00	0.0	0.000	2.361	2.196	0.764	5.2E-04		
59.55	1.48	1.00	190.8	0.91	0.80	Infin.	0.358	Non-Liq.	4.9	28.0	37	10.0	38.0	0.00	0.0	0.000	2.381	2.318	0.766	4.8E-04		
60.04	1.59	1.00	194.0	0.92	0.80	Infin.	0.356	Non-Liq.	4.8	25.6	41	10.0	35.6	0.00	0.0	0.000	2.400	2.279	0.767	4.9E-04		
60.53	1.36	1.00	193.6	0.91	0.79	Infin.	0.354	Non-Liq.	5.0	28.5	33	10.0	38.5	0.00	0.0	0.000	2.420	2.348	0.769	4.7E-04		
61.02	1.37	1.00	208.3	0.90	0.79	Infin.	0.352	Non-Liq.	5.0	30.4	33	10.0	40.4	0.00	0.0	0.000	2.440	2.396	0.771	4.6E-04		
61.52	1.39	1.00	236.7	0.88	0.79	Infin.	0.350	Non-Liq.	5.0	34.3	34	10.0	44.3	0.00	0.0	0.000	2.460	2.460	0.772	4.3E-04		
62.01	1.45	1.00	238.9	0.88	0.79	Infin.	0.349	Non-Liq.	4.9	33.7	38	10.0	43.7	0.00	0.0	0.000	2.480	2.460	0.774	4.4E-04		
62.50	1.64	1.00	217.2	0.91	0.78	Infin.	0.347	Non-Liq.	4.7	28.1	42	10.0	38.1	0.00	0.0	0.000	2.499	2.377	0.776	4.6E-04		
62.99	1.41	1.00	197.2	0.90	0.78	Infin.	0.345	Non-Liq.	4.9	28.3	35	10.0	38.3	0.00	0.0	0.000	2.519	2.391	0.777	4.6E-04		
63.48	1.26	1.00	193.1	0.88	0.78	Infin.	0.343	Non-Liq.	5.1	29.7	29	8.9	38.6	0.00	0.0	0.000	2.539	2.407	0.779	4.6E-04		
63.98	1.26	1.00	206.7	0.88	0.78	Infin.	0.342	Non-Liq.	5.1	32.1	29	9.6	41.7	0.00	0.0	0.000	2.559	2.480	0.781	4.4E-04		
64.47	1.31	1.00	227.4	0.86	0.78	Infin.	0.340	Non-Liq.	5.1	34.2	31	10.0	44.2	0.00	0.0	0.000	2.578	2.538	0.783	4.2E-04		
64.96	1.17	1.00	277.4	0.79	0.77	Infin.	0.338	Non-Liq.	5.3	44.7	24	10.0	54.7	0.00	0.0	0.000	2.598	2.735	0.784	3.8E-04		
65.45	1.17	1.00	289.5	0.79	0.77	Infin.	0.337	Non-Liq.	5.3	45.5	24	10.0	56.5	0.00	0.0	0.000	2.618	2.776	0.786	3.6E-04		
65.94	1.18	1.00	277.3	0.79	0.77	Infin.	0.335	Non-Liq.	5.3	44.4	24	10.0	54.4	0.00	0.0	0.000	2.638	2.751	0.788	3.8E-04		
66.44	1.26	1.00	231.4	0.84	0.77	Infin.	0.334	Non-Liq.	5.1	35.7	29	10.0	45.7	0.00	0.0	0.000	2.658	2.606	0.790	4.1E-04		
66.93	1.37	1.00	200.9	0.89	0.76	Infin.	0.332	Non-Liq.	5.0	29.4	33	10.0	39.4	0.00	0.0	0.000	2.677	2.490	0.792	4.4E-04		
67.42	1.35	1.00	211.8	0.88	0.76	Infin.	0.331	Non-Liq.	6.0	31.2	33	10.0	41.2	0.00	0.0	0.000	2.697	2.536	0.794	4.3E-04		
67.91	1.47	1.00	216.1	0.89	0.76	Infin.	0.329	Non-Liq.	4.9	30.2	37	10.0	40.2	0.00	0.0	0.000	2.717	2.523	0.796	4.3E-04		
68.41	1.48	1.00	220.0	0.88	0.76	Infin.	0.328	Non-Liq.	4.9	30.9	37	10.0	40.9	0.00	0.0	0.000	2.737	2.548	0.798	4.3E-04		
68.90	1.42	1.00	220.9	0.87	0.78	Infin.	0.327	Non-Liq.	4.9	32.8	35	10.0	42.8	0.00	0.0	0.000	2.756	2.585	0.800	4.2E-04		
69.39	1.38	1.00	244.6	0.85	0.75	Infin.	0.325	Non-Liq.	5.0	35.7	34	10.0	45.7	0.00	0.0	0.000	2.776	2.663	0.802	4.1E-04		
69.88	1.28	1.00	261.4	0.79	0.75	Infin.	0.324	Non-Liq.	5.1	39.9	30	10.0	49.9	0.00	0.0	0.000	2.796	2.752	0.804	3.9E-04		
70.37	1.22	1.00	264.9	0.77	0.75	Infin.	0.323	Non-Liq.	5.2	41.5	27	10.0	51.5	0.00	0.0	0.000	2.816	2.791	0.806	3.8E-04		
70.87	1.23	1.00	266.7	0.77	0.75	Infin.	0.321	Non-Liq.	5.2	41.7	27	10.0	51.7	0.00	0.0	0.000	2.836	2.804	0.808	3.8E-04		
71.36	1.27	1.00	267.1	0.77	0.75	Infin.	0.320	Non-Liq.	5.1	41.1	29	10.0	51.1	0.00	0.0	0.000	2.855	2.802	0.810	3.8E-04		
71.85	1.25	1.00	267.5	0.77	0.74	Infin.	0.319	Non-Liq.	5.2	41.4	28	10.0	51.4	0.00	0.0	0.000	2.875	2.819	0.812	3.8E-04		
72.34	1.24	1.00	263.4	0.76	0.74	Infin.	0.318	Non-Liq.	5.2	41.1	27	10.0	51.1	0.00	0.0	0.000	2.895	2.822	0.814	3.8E-04		
72.83	1.24	1.00	255.9	0.76	0.74	Infin.	0.317	Non-Liq.	5.2	39.8	28	10.0	49.8	0.00	0.0	0.000	2.915	2.808	0.817	3.8E-04		
73.33	1.26	1.00	250.2	0.78	0.74	Infin.	0.316	Non-Liq.	5.2	38.7	28	10.0	48.7	0.00	0.0	0.000	2.935	2.796	0.819	3.9E-04		
73.82	1.24	1.00	245.0	0.79	0.74	Infin.	0.314	Non-Liq.	5.2	38.2	27	10.0	48.2	0.00	0.0	0.000	2.954	2.796	0.821	3.9E-04		
74.31	1.22	1.00	239.8	0.80	0.74	Infin.	0.313	Non-Liq.	5.2	37.6	27	10.0	47.6	0.00	0.0	0.000	2.974	2.794	0.823	3.9E-04		
74.80	1.23	1.00	241.9	0.80	0.73	Infin.	0.312	Non-Liq.	5.2	37.8	27	10.0	47.8	0.00	0.0	0.000	2.994	2.806	0.826	3.9E-04		
75.30	1.28	1.00	242.0	0.81	0.73	Infin.	0.311	Non-Liq.	5.1	37.0	29	10.0	47.0	0.00	0.0	0.000	3.014	2.801	0.828	3.9E-04		
75.79	1.26	1.00	241.7	0.80	0.73	Infin.	0.310	Non-Liq.	5.2	37.4	28	10.0	47.4	0.00	0.0	0.000	3.033	2.818	0.830	3.9E-04		
76.28	1.16	1.00	252.5	0.75	0.73	Infin.	0.309	Non-Liq.	5.3	40.4	24	10.0	50.4	0.00	0.0	0.000	3.053	2.865	0.833	3.8E-04		

Depth (feet)	(m)	Tip Qc (tsf)	Friction Fs (tsf)	Friction Ratio Rf %	qc MPa	Total Unit Wt. (pcf)	Total Stress po (tsf)	Eff. Stress p'o (tsf)	rd	F %	n	Max 1.70 Cq	Q	Moss qc1 MPa	Moss Δqc MPa	Moss qc1mod MPa	Moss eff Kc	Qc1n	Ic	Override	Liquef. Suscept. (0 or 1)	Rel. Dens. Dr (%)	Kσ	Kα	Clean Sand Qc1n	Idriss Ko	1.0 Kσ	CRR	Induced M=7.5 CSR	Liquefac. Safety Factor	Qc1n N1,60 Ratio	Apparent Equiv. N1,60	FC %	Fc Adj. ΔN1,60	Equiv. N1,60cs	Volumetric Strain (%)	sri (%)	dH (m)	p (tsf)	Gmax (tsf)	τav (tsf)	Shear Strain γ	Strain Ei	Strain Enc
76.77	23.40	371.99	6.99	1.88	35.62	120	4.587	2.449	0.560	1.89	0.57	0.62	217.08	29.17	1.40	30.56	1.05	218.52	1.88		1	100	1.17	1.00	255.3	0.75	0.73	Infin.	0.308	Non-Liq.	5.3	41.1	24	10.0	51.1	0.00	0.0	0.000	3.073	2,907	0.835	3.7E-04		
77.26	23.55	362.70	6.88	1.90	34.73	120	4.616	2.463	0.558	1.91	0.57	0.62	210.33	28.39	1.41	29.80	1.05	211.77	1.89		1	100	1.18	1.00	249.8	0.75	0.72	Infin.	0.307	Non-Liq.	5.3	40.0	24	10.0	49.9	0.00	0.0	0.000	3.093	2,895	0.838	3.8E-04		
77.76	23.70	355.18	6.94	1.96	34.01	120	4.646	2.477	0.556	1.97	0.58	0.61	204.39	27.80	1.47	29.27	1.05	205.92	1.91		1	100	1.20	1.00	246.1	0.76	0.72	Infin.	0.306	Non-Liq.	5.3	39.1	25	10.0	49.1	0.00	0.0	0.000	3.113	2,888	0.840	3.8E-04		
78.25	23.85	357.29	7.02	1.97	34.21	120	4.675	2.491	0.555	1.98	0.58	0.61	204.87	27.95	1.48	29.43	1.05	208.31	1.91		1	100	1.20	1.00	246.9	0.76	0.72	Infin.	0.306	Non-Liq.	5.3	39.2	25	10.0	49.2	0.00	0.0	0.000	3.132	2,899	0.843	3.8E-04		
78.74	24.00	356.95	7.16	2.01	34.16	120	4.705	2.505	0.553	2.02	0.58	0.61	203.57	27.93	1.52	29.45	1.05	205.01	1.92		1	100	1.21	1.00	247.1	0.76	0.72	Infin.	0.305	Non-Liq.	5.2	39.1	26	10.0	49.1	0.00	0.0	0.000	3.152	2,906	0.845	3.8E-04		
79.23	24.15	343.86	7.41	2.16	32.93	120	4.734	2.519	0.551	2.17	0.59	0.60	193.60	26.98	1.67	28.64	1.06	195.03	1.98		1	100	1.25	1.00	243.0	0.78	0.72	Infin.	0.304	Non-Liq.	5.2	37.7	28	10.0	47.7	0.00	0.0	0.000	3.172	2,885	0.848	3.8E-04		
79.72	24.30	329.04	7.40	2.25	31.51	120	4.764	2.534	0.549	2.26	0.60	0.59	183.28	25.81	1.76	27.57	1.07	184.71	1.98		1	100	1.28	1.00	238.4	0.81	0.72	Infin.	0.303	Non-Liq.	5.1	35.1	30	10.0	46.1	0.00	0.0	0.000	3.192	2,864	0.850	3.9E-04		
80.22	24.45	#N/A	#N/A	#N/A	#N/A	120	4.793	#N/A	0.547	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
80.71	24.60	#N/A	#N/A	#N/A	#N/A	120	4.823	#N/A	0.546	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
81.20	24.75	#N/A	#N/A	#N/A	#N/A	120	4.852	#N/A	0.544	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
81.69	24.90	#N/A	#N/A	#N/A	#N/A	120	4.882	#N/A	0.542	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
82.19	25.05	#N/A	#N/A	#N/A	#N/A	120	4.911	#N/A	0.541	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
82.68	25.20	#N/A	#N/A	#N/A	#N/A	120	4.941	#N/A	0.539	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
83.17	25.35	#N/A	#N/A	#N/A	#N/A	120	4.970	#N/A	0.538	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
83.66	25.50	#N/A	#N/A	#N/A	#N/A	120	5.000	#N/A	0.536	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
84.15	25.65	#N/A	#N/A	#N/A	#N/A	120	5.030	#N/A	0.535	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
84.65	25.80	#N/A	#N/A	#N/A	#N/A	120	5.059	#N/A	0.533	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
85.14	25.95	#N/A	#N/A	#N/A	#N/A	120	5.089	#N/A	0.532	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
85.63	26.10	#N/A	#N/A	#N/A	#N/A	120	5.118	#N/A	0.531	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
86.12	26.25	#N/A	#N/A	#N/A	#N/A	120	5.148	#N/A	0.529	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
86.61	26.40	#N/A	#N/A	#N/A	#N/A	120	5.177	#N/A	0.528	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
87.11	26.55	#N/A	#N/A	#N/A	#N/A	120	5.207	#N/A	0.527	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
87.60	26.70	#N/A	#N/A	#N/A	#N/A	120	5.236	#N/A	0.525	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
88.09	26.85	#N/A	#N/A	#N/A	#N/A	120	5.266	#N/A	0.524	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
88.58	27.00	#N/A	#N/A	#N/A	#N/A	120	5.295	#N/A	0.523	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
89.07	27.15	#N/A	#N/A	#N/A	#N/A	120	5.325	#N/A	0.522	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
89.57	27.30	#N/A	#N/A	#N/A	#N/A	120	5.354	#N/A	0.520	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
90.06	27.45	#N/A	#N/A	#N/A	#N/A	120	5.384	#N/A	0.519	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
90.55	27.60	#N/A	#N/A	#N/A	#N/A	120	5.413	#N/A	0.518	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
91.04	27.75	#N/A	#N/A	#N/A	#N/A	120	5.443	#N/A	0.517	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
91.54	27.90	#N/A	#N/A	#N/A	#N/A	120	5.472	#N/A	0.516	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
92.03	28.05	#N/A	#N/A	#N/A	#N/A	120	5.502	#N/A	0.515	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
92.52	28.20	#N/A	#N/A	#N/A	#N/A	120	5.531	#N/A	0.513	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
93.01	28.35	#N/A	#N/A	#N/A	#N/A	120	5.561	#N/A	0.512	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
93.50	28.50	#N/A	#N/A	#N/A	#N/A	120	5.591	#N/A	0.511	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
94.00	28.65	#N/A	#N/A	#N/A	#N/A	120	5.620	#N/A	0.510	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
94.49	28.80	#N/A	#N/A	#N/A	#N/A	120	5.650	#N/A	0.509	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
94.98	28.95	#N/A	#N/A	#N/A	#N/A	120	5.679	#N/A	0.508	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
95.47	29.10	#N/A	#N/A	#N/A	#N/A	120	5.709	#N/A	0.507	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
95.96	29.25	#N/A	#N/A	#N/A	#N/A	120	5.738	#N/A	0.506	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
96.46	29.40	#N/A	#N/A	#N/A	#N/A	120	5.768	#N/A	0.505	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
96.95	29.55	#N/A	#N/A	#N/A	#N/A	120	5.797	#N/A	0.504	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
97.44	29.70	#N/A	#N/A	#N/A	#N/A	120	5.827	#N/A	0.503	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
97.93	29.85	#N/A	#N/A	#N/A	#N/A	120	5.856	#N/A	0.502	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
98.43	30.00	#N/A	#N/A	#N/A	#N/A	120	5.886	#N/A	0.501	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
98.92	30.15	#N/A	#N/A	#N/A	#N/A	120	5.915	#N/A	0.501	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
99.41	30.30	#N/A	#N/A	#N/A	#N/A	120	5.945	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
99.90	30.45	#N/A	#N/A	#N/A	#N/A	120	5.974	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	30.60	#N/A	#N/A	#N/A	#N/A	120	6.004	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	30.75	#N/A	#N/A	#N/A	#N/A	120	6.033	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	30.90	#N/A	#N/A	#N/A	#N/A	120	6.063	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.05	#N/A	#N/A	#N/A	#N/A	120	6.093	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.20	#N/A	#N/A	#N/A	#N/A	120	6.122	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.35	#N/A	#N/A	#N/A	#N/A	120	6.152	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.50	#N/A	#N/A	#N/A	#N/A	120	6.181	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.65	#N/A	#N/A	#N/A	#N/A	120	6.211	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.80	#N/A	#N/A	#N/A	#N/A	120	6.240	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	31.95	#N/A	#N/A	#N/A	#N/A	120	6.270	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.10	#N/A	#N/A	#N/A	#N/A	120	6.299	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.25	#N/A	#N/A	#N/A	#N/A	120	6.329	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.40	#N/A	#N/A	#N/A	#N/A	120	6.358	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.55	#N/A	#N/A	#N/A	#N/A	120	6.388	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.70	#N/A	#N/A	#N/A	#N/A	120	6.417	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	32.85	#N/A	#N/A	#N/A	#N/A	120	6.447	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.00	#N/A	#N/A	#N/A	#N/A	120	6.476	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.15	#N/A	#N/A	#N/A	#N/A	120	6.506	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.30	#N/A	#N/A	#N/A	#N/A	120	6.535	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.45	#N/A	#N/A	#N/A	#N/A	120	6.565	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.60	#N/A	#N/A	#N/A	#N/A	120	6.594	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.75	#N/A	#N/A	#N/A	#N/A	120	6.624	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	33.90	#N/A	#N/A	#N/A	#N/A	120	6.654	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.05	#N/A	#N/A	#N/A	#N/A	120	6.683	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.20	#N/A	#N/A	#N/A	#N/A	120	6.713	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.35	#N/A	#N/A	#N/A	#N/A	120	6.742	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.50	#N/A	#N/A	#N/A	#N/A	120	6.772	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.65	#N/A	#N/A	#N/A	#N/A	120	6.801	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.80	#N/A	#N/A	#N/A	#N/A	120	6.831	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	34.95	#N/A	#N/A	#N/A	#N/A	120	6.860	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.10	#N/A	#N/A	#N/A	#N/A	120	6.890	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.25	#N/A	#N/A	#N/A	#N/A	120	6.919	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.40	#N/A	#N/A	#N/A	#N/A	120	6.949	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.55	#N/A	#N/A	#N/A	#N/A	120	6.978	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.70	#N/A	#N/A	#N/A	#N/A	120	7.008	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	35.85	#N/A	#N/A	#N/A	#N/A	120	7.037	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#####	36.00	#N/A	#N/A	#N/A	#N/A	120	7.067	#N/A	0.500	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Non-Liq.	#N/A	#N/A	###	#N/A	#N/A	#N/A	0.0	0.000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

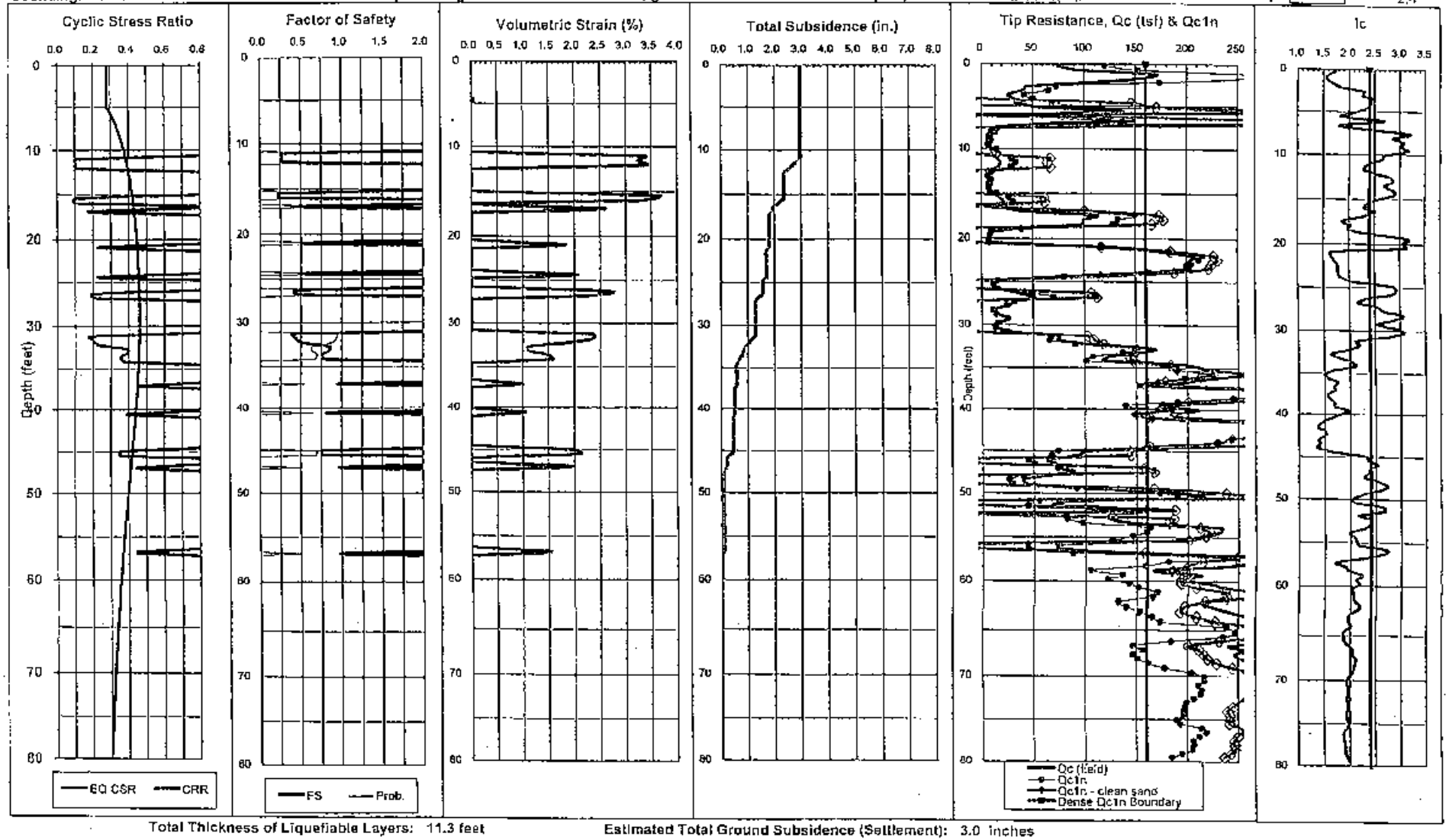
EARTH SYSTEMS - EVALUATION OF LIQUEFACTION POTENTIAL AND INDUCED GROUND SUBSIDENCE

Panay Way Parcel 21 Project No: LA-01052-01 Method Used: 1 1998 NCEER (Robertson & Wride)

Ground Compaction Remediated to depth of: 4.0 feet Settlement Analysis using Wu (2002) using clean sand Qc1n/N1(60) ratio =5

Sounding: CPT4 Earthquake Magnitude: 7.1 PGA, g: 0.50 Calc GWT (feet): 5.0 Qc1n/N1(60): 5

Plot 4 Limiting Ic: 2.4



Total Thickness of Liquefiable Layers: 11.3 feet

Estimated Total Ground Subsidence (Settlement): 3.0 inches

APPENDIX G

Lateral Spreading Analyses

Job Number:	LA-01052-01
Job Name:	Panay Way Parcel 21
Cross Section:	A-A' & B-B'
Date:	August 21, 2006
Calculated By:	mjr

Prediction of Liquefaction Induced Lateral Spreading with Free Face Conditions

Based on Equations by Leslie T. Youd, Corbett M. Hansen, and Steven Bartlett, Journal of Geotechnical and Geoenvironmental Engineering, December 2002, vol 128, no. 12.

Variables Used in Calculation Defined

Earthquake Magnitude (M)
Horizontal Distance to Nearest Seismic Energy Source, km (R)
Free Face Ratio (i.e., 100*(Height of the Free Face/Distance from the Free Face)) (%), (W)
Cumulative Thickness in Meters of Saturated Cohesionless Sediments with SPT $(N1)_{60}$ Values <= 15 (T_{15})
Average Fines Content in Percent (F_{15})
Mean Grain size in milimeters ($D50_{15}$)

$$\text{Log } D_H = -16.713 + 1.532M - 1.406\text{Log}(R^*) - 0.012R + 0.592\text{Log}W + 0.547\text{Log}T_{15} + 3.413\text{Log}(100 - F_{15}) - 0.795\text{Log}(D50_{15} + 0.1\text{mm})$$

where, $R^* = R + R_o$ $\quad R_o = 10^{*}(0.89M - 5.64)$

Requirements and Limitations Used to Develop this Model

Soils must be Liquefiable
Saturated Cohesionless Sediments with SPT $(N1)_{60}$ less than 15
Earthquake Magnitude (M) must be between 6 and 8
Free Face Ratio (W) must be between 1%and 20%
Cumulative Thickness (T15) must be between 1 and 15 meters
Depth to top of Liquefied layer must be between 1 and 10 meters

Input Values			
M =	7.1		
R (km) =	7	R^* =	11.78
W (%) =	0.67		
$T_{15\ (m)}$ =	4		
$F_{15\ (\%)}$ =	25		
$D50_{15\ (mm)}$ =	0.1		

Horizontal Ground Displacement in meters (D_H) =	0.61
Horizontal Ground Displacement in feet (D_H) =	2.0

** If R < R_{min} The Predicted Displacement May Be Less Reliable Due To Extrapolation Of MLR Model

Job Number:	LA-01052-01
Job Name:	Panay Way Parcel 21
Cross Sections:	A-A' & B-B'
Date:	August 21, 2006
Calculated By:	mlr

Prediction of Liquefaction Induced Lateral Spreading with Ground Slope Conditions

Based on Equations by Leslie T. Youd, Corbett M. Hansen, and Steven Bartlett, Journal of Geotechnical and Geoenvironmental Engineering, December 2002, vol 128, no. 12.

Variables Used in Calculation Defined

Earthquake Magnitude (M)
Horizontal Distance to Nearest Seismic Energy Source, km (R)
Percent Slope (S)
Cumulative Thickness in Meters of Saturated Cohesionless Sediments with SPT $(N1)_{60}$ Values <= 15 (T_{15})
Average Fines Content in Percent (F_{15})
Mean Grain size in milimeters ($D50_{15}$)

$$\text{Log } D_H = -16.213 + 1.532M - 1.406\text{Log}(R^*) - 0.012R + 0.338\text{Log}S + 0.540\text{Log}T_{15} + 3.413\text{Log}(100 - F_{15}) - 0.795\text{Log}(D50_{15} + 0.1\text{mm})$$

where, $R^* = R + Ro$ $\quad Ro = 10^{(0.89M - 5.64)}$

Requirements and Limitations Used to Develop this Model

Soils must be Liquefiable
Saturated Cohesionless Sediments with $(N1)_{60}$ less than 15
Earthquake Magnitude (M) must be between 6 and 8
Percent Slope (S) must be between 0.1% and 6%
Cumulative Thickness (T15) must be between 1 and 15 meters
Depth to top of Liquefied layer must be between 1 and 10 meters

Input Values			
M =	7.1		
R (km) =	7	R^* =	11.78
S (%) =	2.6		
$T_{15\ (m)}$ =	4		
$F_{15\ (\%)}$ =	25		
$D50_{15\ (mm)}$ =	0.1		

Horizontal Ground Displacement in meters (D_H) =	3.40
Horizontal Ground Displacement in feet (D_H) =	11.2

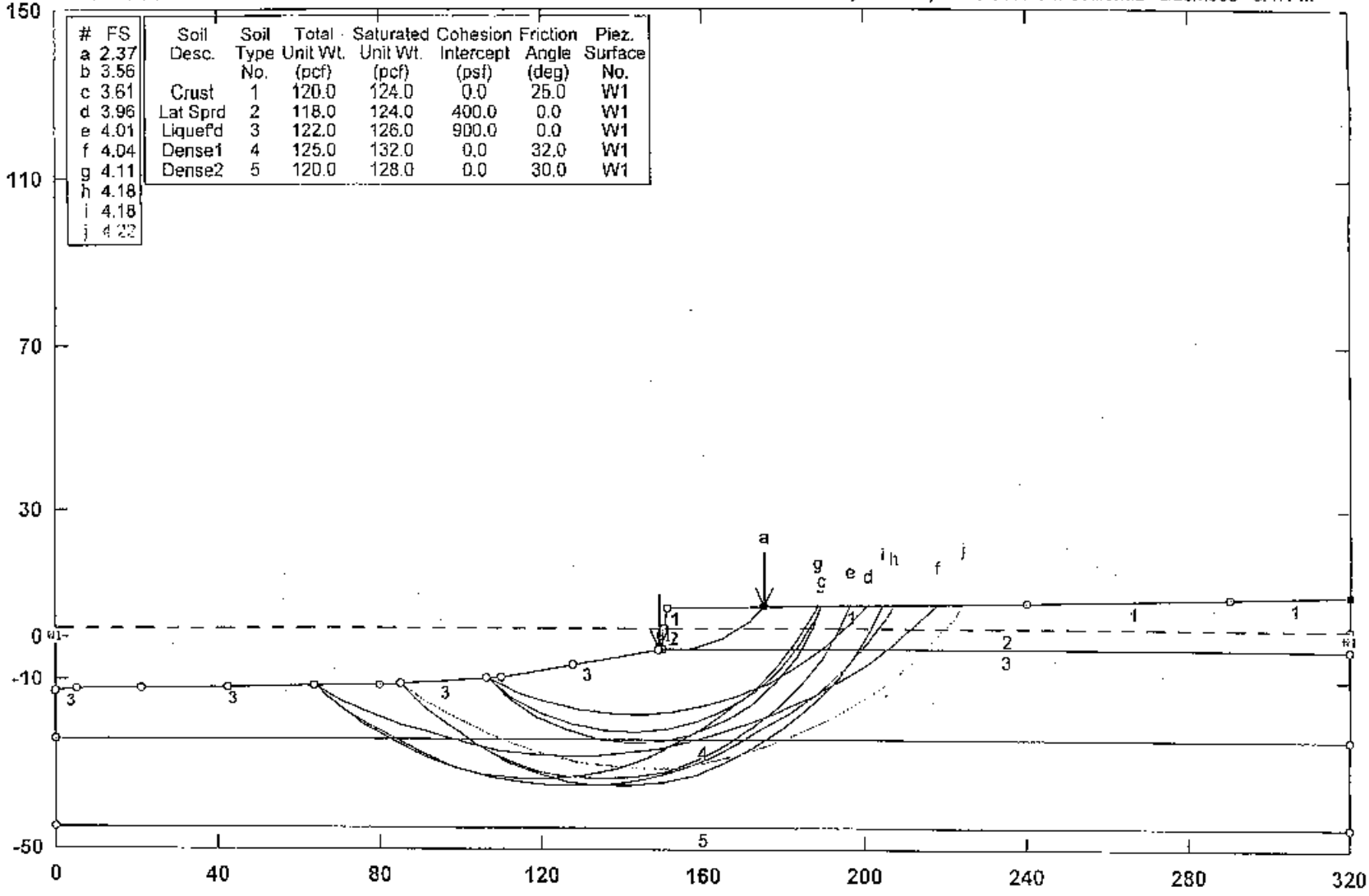
** If R < R_{min} The Predicted Displacement May Be Less Reliable Due To Extrapolation Of MLR Model

Panay Way Parcel 21 Flow Failure1

C:\DOCUME~1\MARLR\MYDOCU~1\PROJECTS\PANAYP~1\SLOPES~1\FLOW1.PL2 Run By: Earth Systems Southern California 8/23/2006 3:47PM

#	FS
a	2.37
b	3.56
c	3.61
d	3.96
e	4.01
f	4.04
g	4.11
h	4.18
i	4.18
j	4.22

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Crust	1	120.0	124.0	0.0	25.0	W1
Lat Sprd	2	118.0	124.0	400.0	0.0	W1
Liquef'd	3	122.0	126.0	900.0	0.0	W1
Dense1	4	125.0	132.0	0.0	32.0	W1
Dense2	5	120.0	128.0	0.0	30.0	W1



STABL6H FSmin=2.37

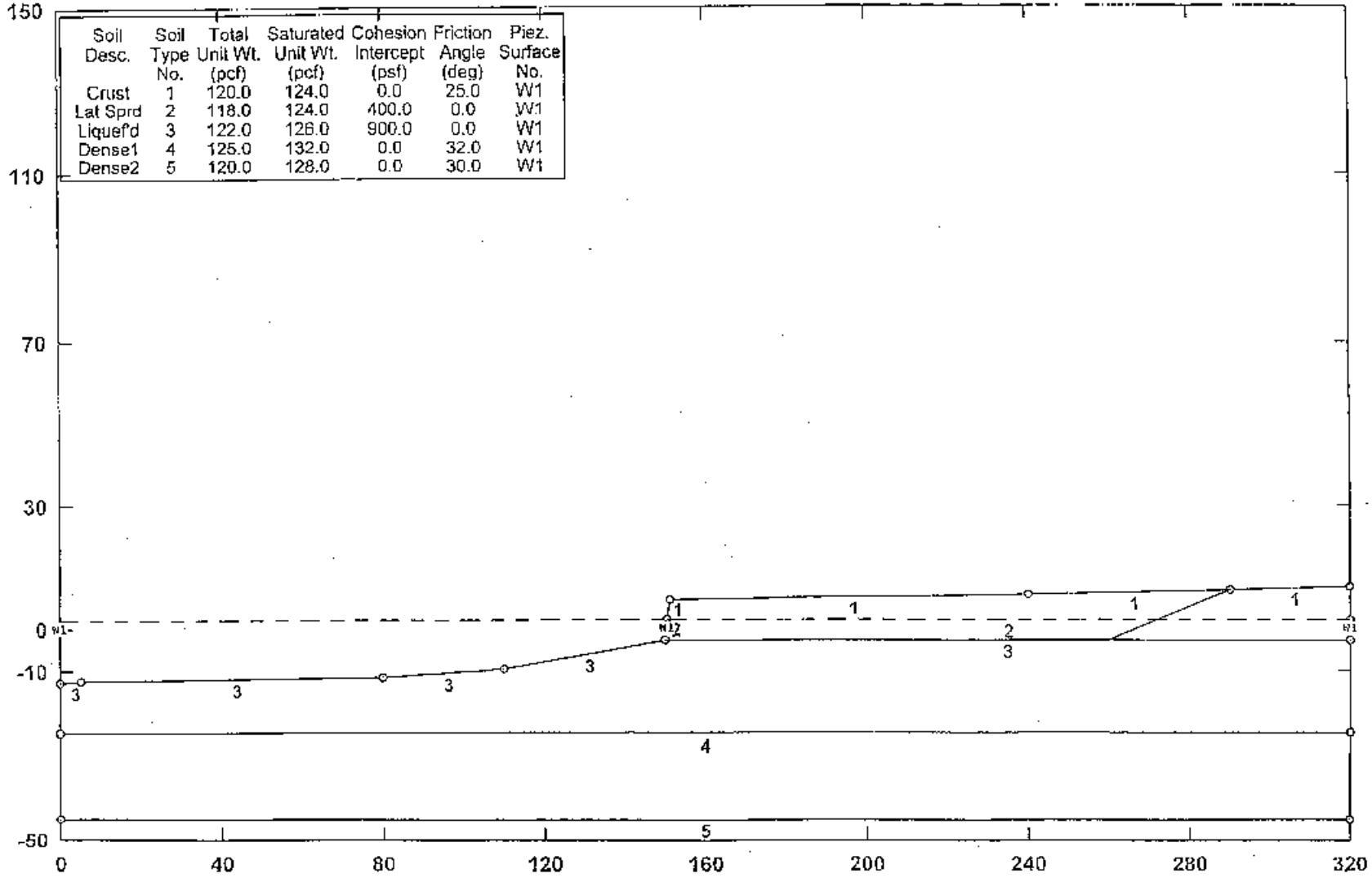
Safety Factors Are Calculated By The Modified Bishop Method

STED

Panay Way Parcel 21 Flow Failure2

C:\DOCUME~1\MARLR\MYDOCU~1\PROJECTS\PANAYP~1\SLOPES~1\FLOW2.PLT Run By: Earth Systems Southern California 8/23/2006 3:49PM

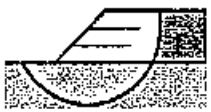
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Crust	1	120.0	124.0	0.0	25.0	W1
Lat Sprd	2	118.0	124.0	400.0	0.0	W1
Liquef'd	3	122.0	126.0	900.0	0.0	W1
Dense1	4	125.0	132.0	0.0	32.0	W1
Dense2	5	120.0	128.0	0.0	30.0	W1



STABL6H FSmin=7.84

Factor Of Safety Is Calculated By The Modified Bishop Method

STED



Panay Way Parcel 21 Anticipated Site Acceleration

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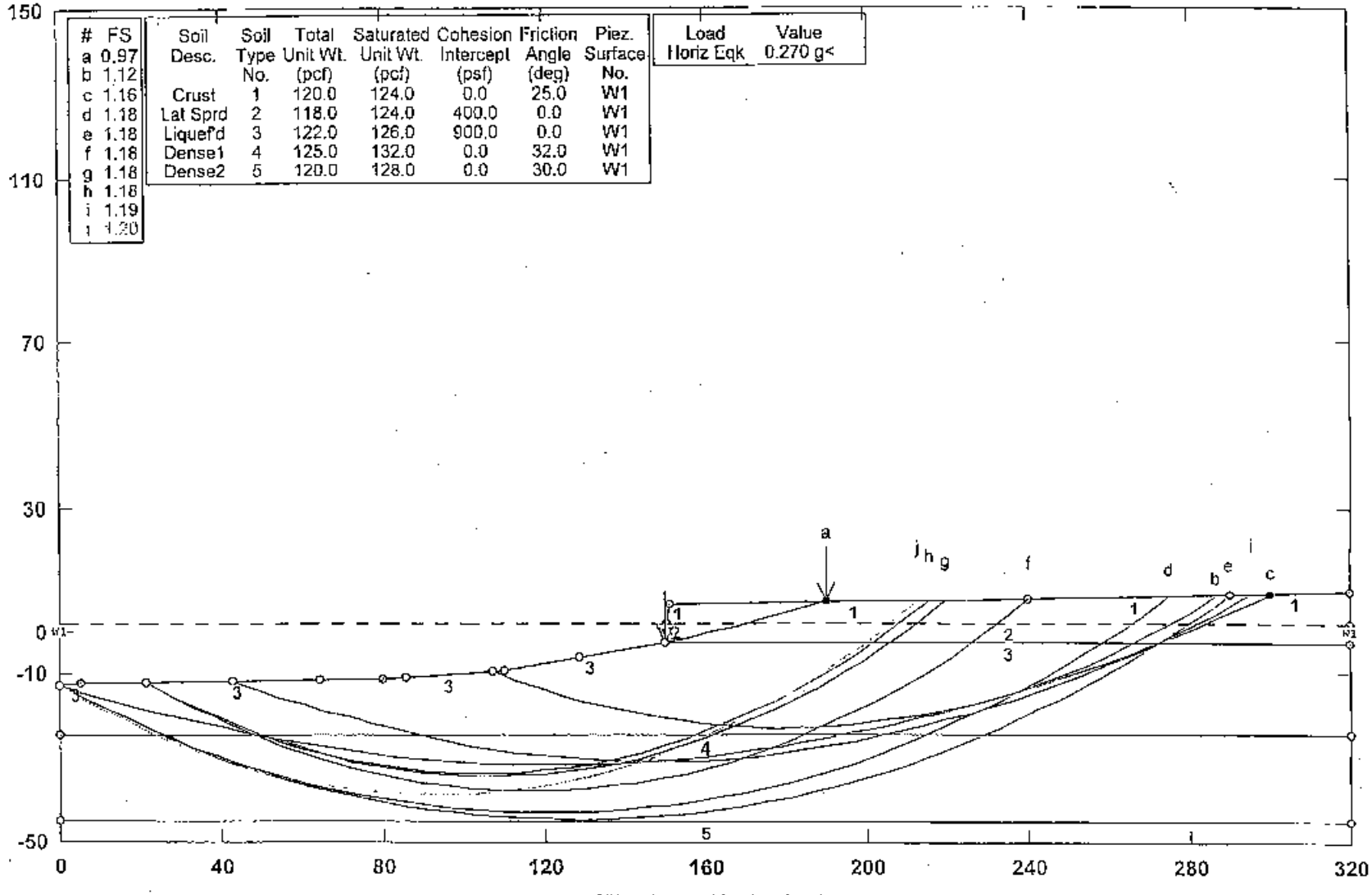
#	FS
a	0.97
b	1.12
c	1.16
d	1.18
e	1.18
f	1.18
g	1.18
h	1.18
i	1.19
j	1.20

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Crust	1	120.0	124.0	0.0	25.0	W1
Lat Sprd	2	118.0	124.0	400.0	0.0	W1
Liquef'd	3	122.0	126.0	900.0	0.0	W1
Dense1	4	125.0	132.0	0.0	32.0	W1
Dense2	5	120.0	128.0	0.0	30.0	W1

Load	Value
Horiz Eqk	0.270 g<



STABL6H FSmin=0.97

Safety Factors Are Calculated By The Modified Bishop Method

STED

Panay Way Parcel 21 Yield Acceleration

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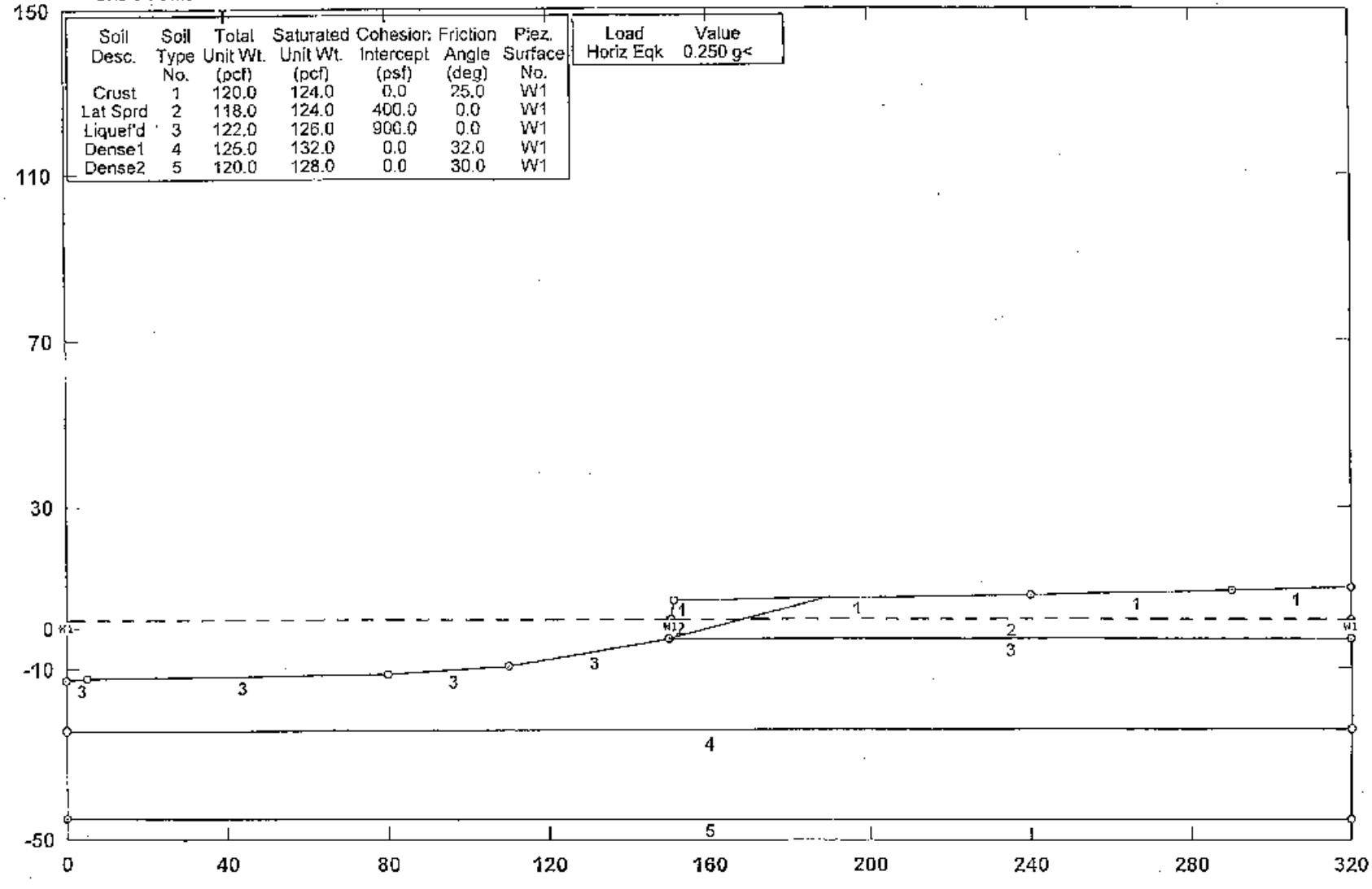
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Crust	1	120.0	124.0	0.0	25.0	W1
Lat Sprd	2	118.0	124.0	400.0	0.0	W1
Liquef'd	3	122.0	126.0	900.0	0.0	W1
Dense1	4	125.0	132.0	0.0	32.0	W1
Dense2	5	120.0	128.0	0.0	30.0	W1

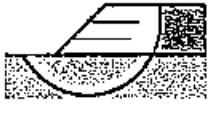
Load	Value
Horiz Eqk	0.250 g<



STABL6H FSmin=1.00

Factor Of Safety Is Calculated By The Modified Bishop Method

STED



Project Number	LA-01052-01
Project Name	Panay Way Parcel 21
Project Location	Marina del Rey, California
Date	8/21/2006

ESTIMATION OF PERMANENT SEISMIC DISPLACEMENT USING THE BRAY AND RATHJE (1998) PROCEDURE.

INPUT PARAMETERS:

Yield Acceleration, ky (g):	0.25		Normalized MHEA Sigma:	0	
Vertical Thickness, h (m):	3		Mean Period Sigma:	0	
Shear Wave Vel., Vs (m/s):	200		Significant Duration Sigma:	0	
Earthquake Magnitude, M:	7.10	*	Normalized Displacement Sigma:	0	
Earthquake Accel., Rock (g):	0.41	*			
Earthquake Distance, r (km):	7	*	Allowable screen displacement (cm):	5	*

CALCULATIONS:

Site Period (s):	0.060
NRF Factor:	0.988
Mean Period (s):	0.518
Duration, D05-95 (s):	15.226
Ts/Tm:	0.1159
MHEA/MHA*NRF:	1.000
MHEA, kmax:	0.4052
ky/kmax:	0.6169
Normalized Disp. (cm/sec):	0.5308

(Input values marked with asterisks are used for calculation of seismic coefficient for screen)

Estimated Displacement (cm):	3.275		**Median f_{eq} for Screen Procedure:**	0.558 *
Estimated Displacement (in):	1.289		**Seismic Coefficient for Screen Procedure:**	0.229 *

LATERAL SPREADING ANALYSIS

Project: Panay Way Parcel 21
Job Number: LA-01052-01
Date: 8/8/2006

CPT or Boring No:	CPT1	CPT2	CPT3	CPT4
Slope (%)=	0.5	0.5	0.5	0.5
Height of Free Face (m)=	5	5	5	5
Distance to Free Face (m)=	30	30	30	30
Cumulative LDI(DPI) (m)=	0.28	0.39	0.13	0.47
Sloping Ground: Lat Displ. = (S÷0.2)LDI =				
meters	0.20	0.27	0.09	0.33
inches	8	11	4	13
Free Face: $LD = 6(L/H)^{-0.8}$ LDI				
meters	0.40	0.56	0.19	0.67
inches	16	22	7	26

Based on "Estimating Liquefaction-Induced Lateral Displacements Using the Standard Penetration Test or Cone Penetration Test," G. Zhang, P.K. Robertson and R.W.I. Brachman, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, August 2004.

APPENDIX H

Laterally Loaded Pile Analyses

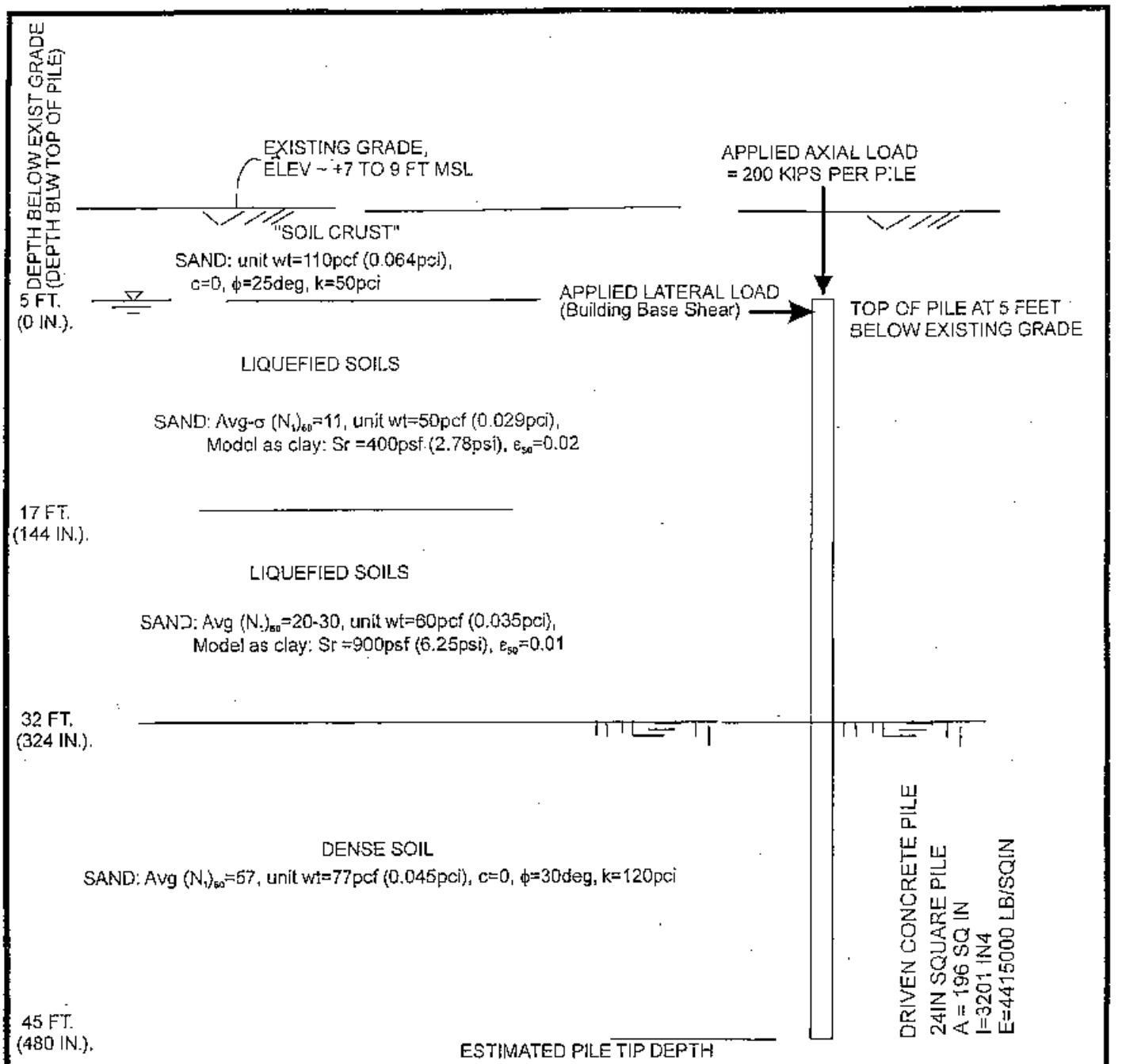


PLATE H1

LPILE INPUT - LOAD CONDITION #0

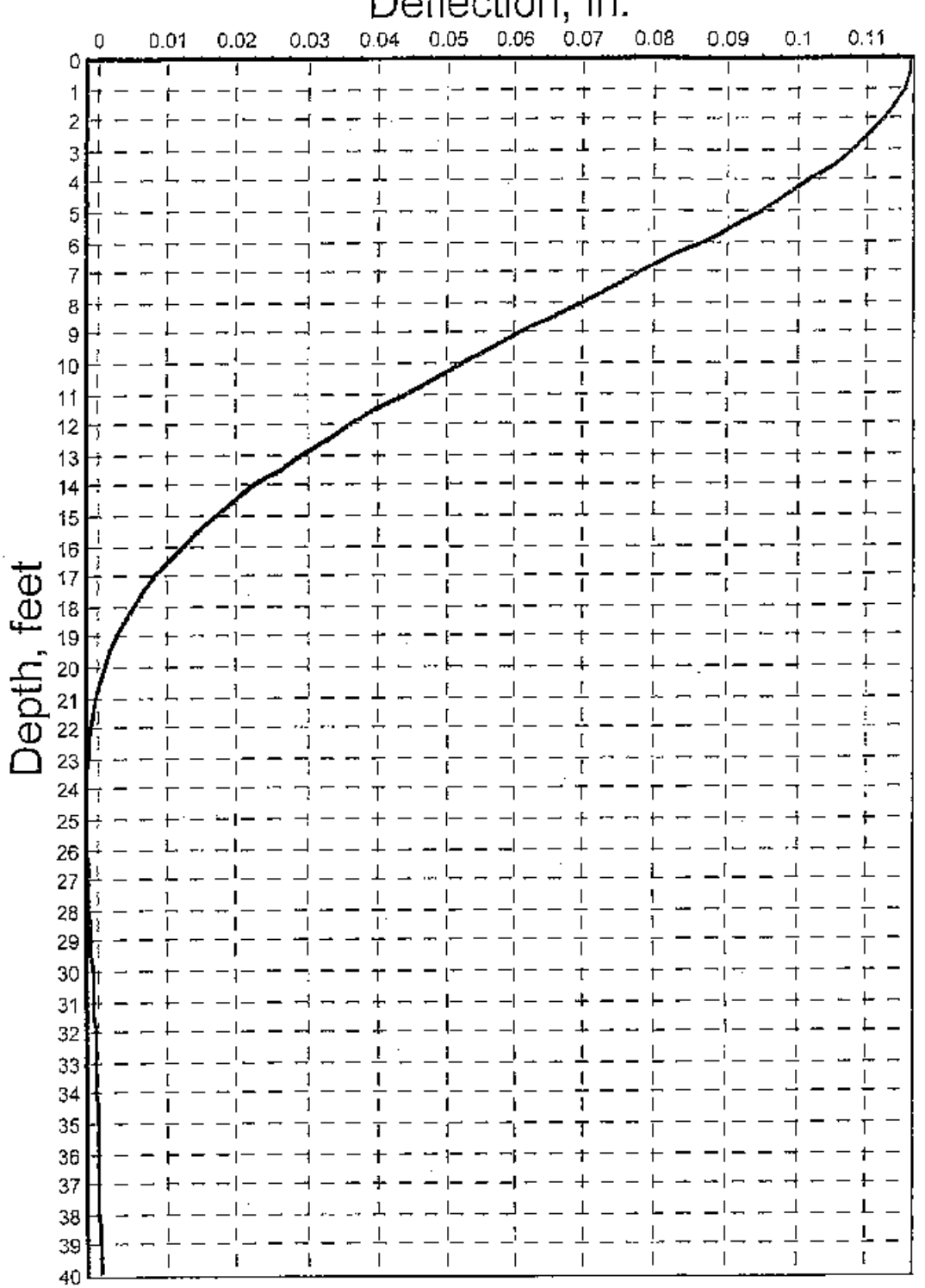
PROPOSED COMMERCIAL DEVELOPMENT
PANAY WAY PARCEL 21
MARINA DEL REY, CALIFORNIA

Earth Systems
Southern California

8-21-2006	LA-01052-01

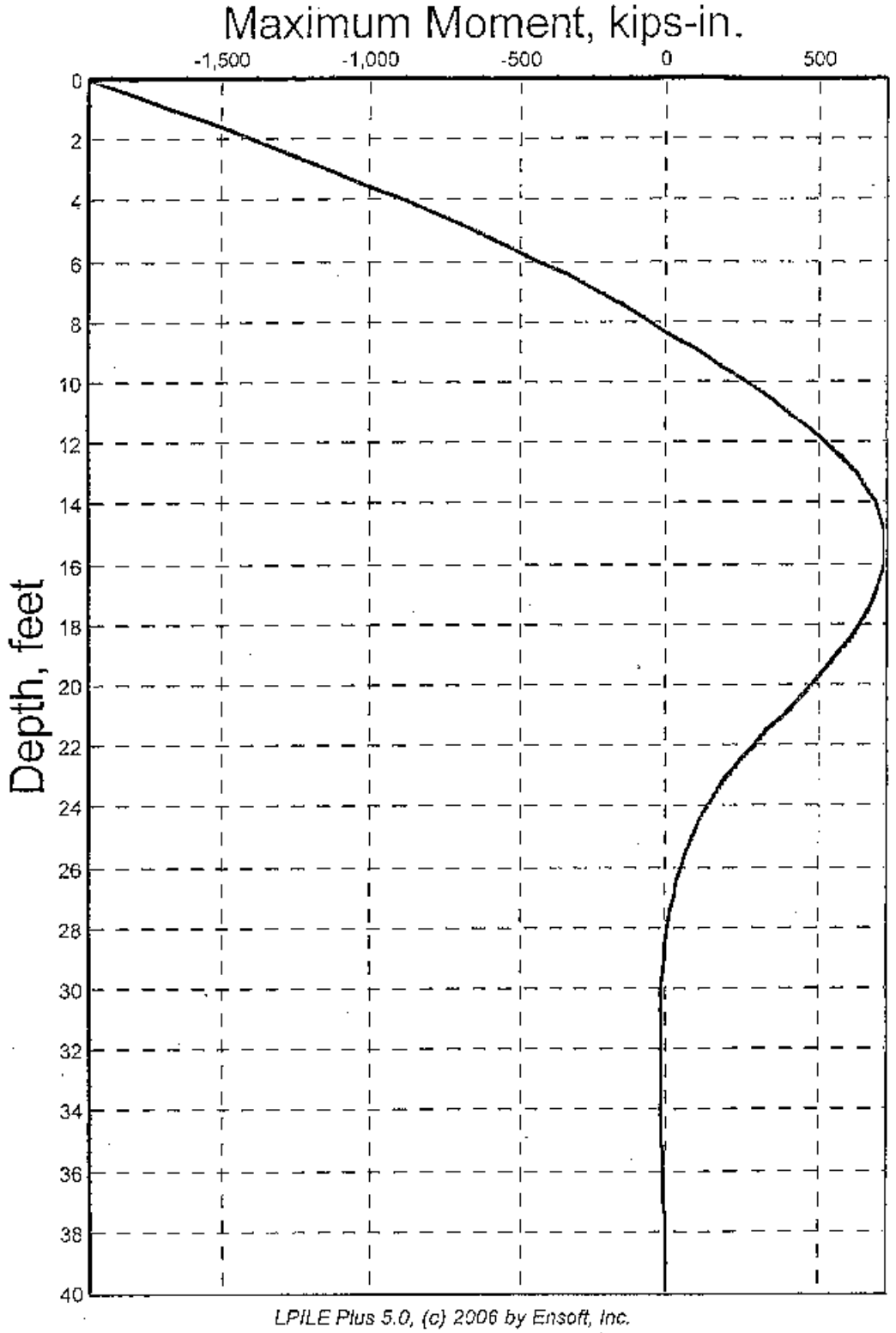
NOT TO SCALE

Lateral Deflection vs. Depth, Condition #0
Panay Way Parcel 21 LA-01052-01



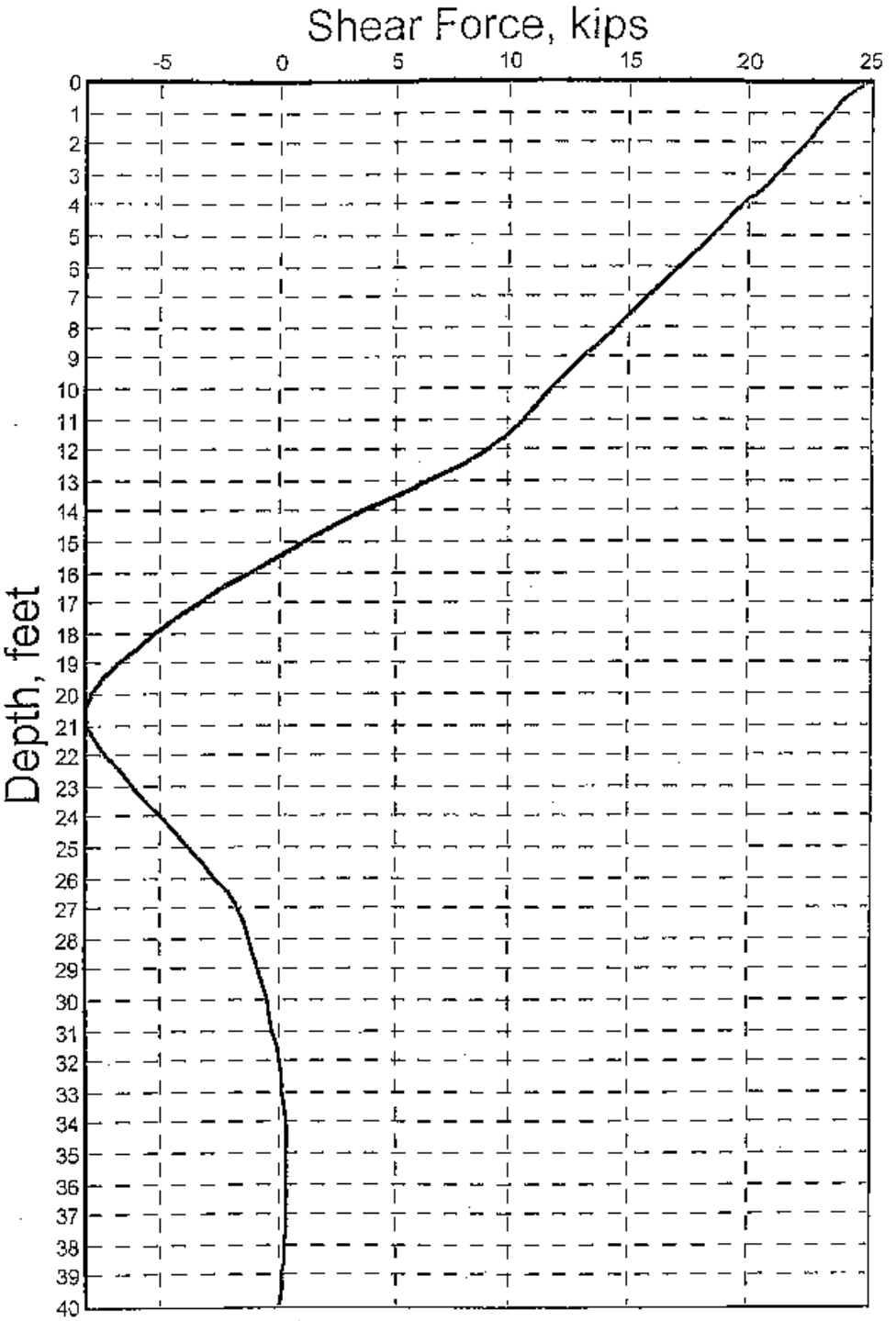
LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

Bending Moment vs. Depth, Load Condition # 0
Panay Way Parcel 21 LA-01052-01



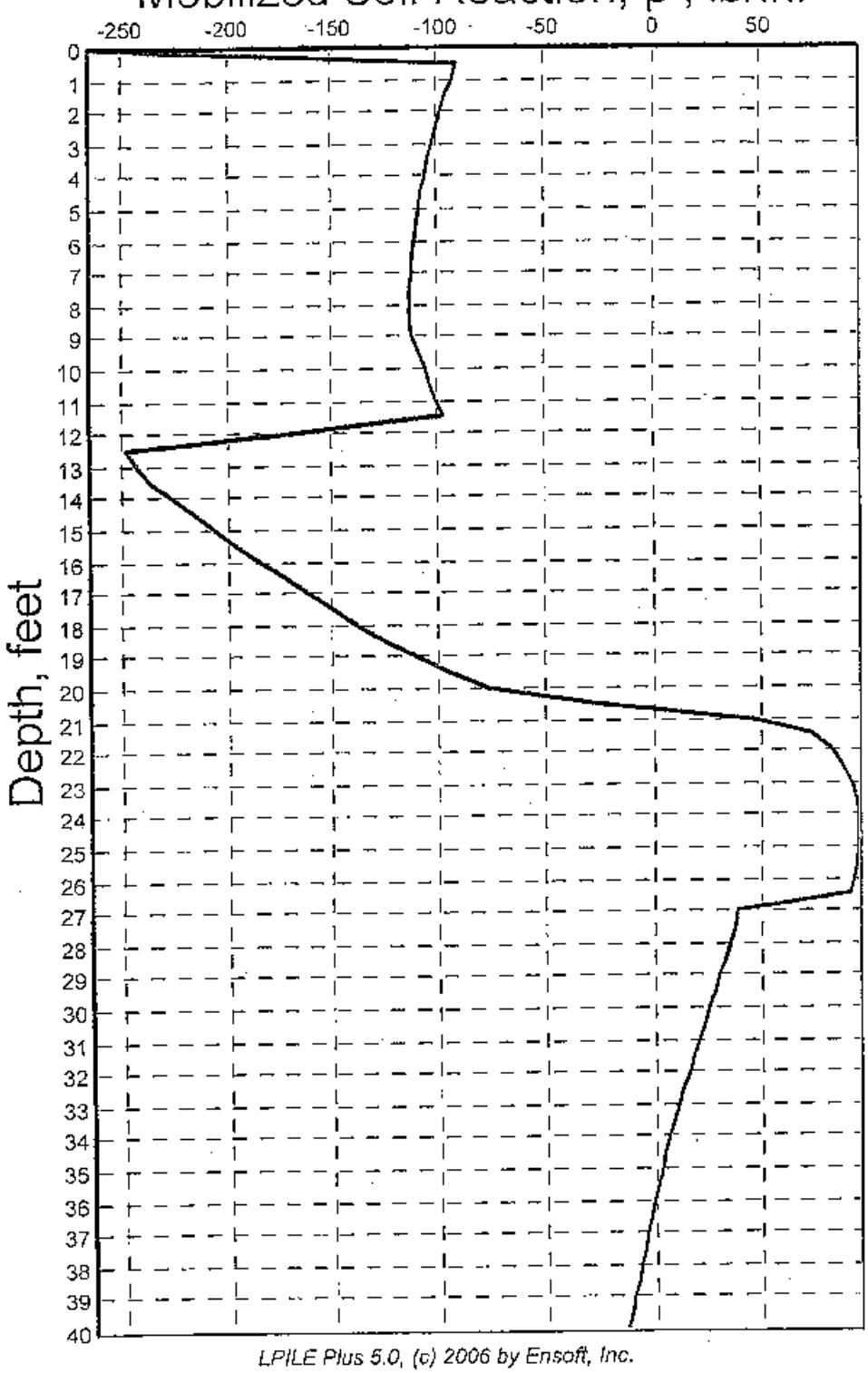
LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

Shear Force vs. Depth, Load Condition #0
Panay Way Parcel 21 LA-01052-01



LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

zed Soil Reaction vs. Depth, Load Condi #0
Panay Way Parcel 21 LA-01052-01



LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 80
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 1

Pile Structural Properties and Geometry

Pile Length = 480.00 in
Depth of ground surface below top of pile = -60.00 in
Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	24.00000000	27648.0000	576.0000	4415000.
2	480.0000	24.00000000	27648.0000	576.0000	4415000.

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = -60.000 in
Distance from top of pile to bottom of layer = 6.000 in
p-y subgrade modulus k for top of soil layer = 50.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 50.000 lbs/in**3

Layer 2 is soft clay, p-y criteria by Matlock, 1970
Distance from top of pile to top of layer = 6.000 in
Distance from top of pile to bottom of layer = 144.000 in

Layer 3 is soft clay, p-y criteria by Matlock, 1970
Distance from top of pile to top of layer = 144.000 in
Distance from top of pile to bottom of layer = 324.000 in

Layer 4 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 324.000 in
Distance from top of pile to bottom of layer = 1200.000 in

LPILE Plus for Windows, Version 5.0 (5.0.26)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

(c) 1985-2006 by Ensoft, Inc.
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This program is licensed to:

User
Earth Systems Southern California

Path to file locations: C:\Documents and Settings\marlr\My Documents\PROJECTS\PanayPc119_21\LPILE\
Name of input data file: PanayLC0a.lpd
Name of output file: PanayLC0a.lpo
Name of plot output file: PanayLC0a.lpp
Name of runtime file: PanayLC0a.lpr

Time and Date of Analysis

Date: August 23, 2006 Time: 16:28: 0

Problem Title

Panay Way Parcel 21, Load Condition #0 - Base Shear

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 1:
- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix elements

Loading Type

Static loading criteria was used for computation of p-y curves

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Slope (BC Type 2)
Shear force at pile head = 25000.000 lbs
Slope at pile head = .000 in/in
Axial load at pile head = 200000.000 lbs

(Zero slope for this load indicates fixed-head condition)

Computed Values of Load Distribution and Deflection for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Slope (BC Type 2)
Specified shear force at pile head = 25000.000 lbs
Specified slope at pile head = 0.0000E+00 in/in
Specified axial load at pile head = 200000.000 lbs

(Zero slope for this load indicates fixed-head conditions)

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res. p lbs/in	Es*h E/L lbs/in
0.000	.116834	-1953196.	25000.0000	-1.1565E-19	1195.0939	-264.8136	6799.7285
6.000	.116516	-1808203.	23934.3874	-9.2451E-05	1132.0336	-90.3906	4653.4646
12.000	.115725	-1666062.	23384.0728	-.0001778	1070.3393	-93.0475	4824.2542
18.000	.114412	-1527870.	22818.2694	-.0002563	1010.0563	-95.5535	5011.0186
24.000	.112648	-1391627.	22237.8955	-.0003281	951.2272	-97.9044	5214.6641
30.000	.110475	-1259528.	21643.8925	-.0003932	893.8922	-100.0966	5436.3145
36.000	.107930	-1130957.	21037.2248	-.0004520	838.0890	-102.1260	5677.3208
42.000	.105052	-1005986.	20418.8805	-.0005045	783.8525	-103.9888	5939.2781
48.000	.101877	-884720.	19788.8712	-.0005509	731.2152	-105.6810	6224.0513
54.000	.098441	-767196.	19151.2324	-.0005915	680.2064	-107.1986	6533.8056
60.000	.094778	-653485.	18504.0239	-.0006265	630.8530	-108.5376	6871.0486
66.000	.090923	-543644.	17849.3295	-.0006559	583.1787	-109.6939	7238.6880
72.000	.086908	-437719.	17188.2573	-.0006800	537.2045	-110.6635	7640.0817
78.000	.082763	-335753.	16521.9400	-.0006990	492.9482	-111.4423	8079.1385
84.000	.078519	-237778.	15851.5346	-.0007131	450.4248	-112.0262	8560.3697
90.000	.074206	-143823.	15178.2238	-.0007225	409.6453	-112.4109	9089.1307
96.000	.069850	-53905.5919	14503.2141	-.0007273	370.6187	-112.5924	9671.5590
102.000	.065478	31961.4351	13827.7377	-.0007279	333.3544	-112.5664	10314.9652
108.000	.061115	113774.	13156.1480	-.0007243	296.6034	-111.2868	10926.6377
114.000	.056786	191574.	12488.4638	-.0007168	430.3705	-106.6046	11475.1665
120.000	.052513	265452.	11851.2006	-.0007056	462.4357	-105.8098	12089.4759

p-y subgrade modulus k for top of soil layer = 120.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 120.000 lbs/in**3

(Depth of lowest layer extends 720.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Distribution of effective unit weight of soil with depth is defined using 8 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	-60.00	.06400
2	6.00	.06400
3	6.00	.02900
4	144.00	.02900
5	144.00	.03500
6	324.00	.03500
7	324.00	.04500
8	1200.00	.04500

Shear Strength of Soils

Distribution of shear strength parameters with depth defined using 8 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	-60.000	.00000	25.00	------	------
2	6.000	.00000	25.00	------	------
3	6.000	2.78000	.00	.02000	.0
4	144.000	2.78000	.00	.02000	.0
5	144.000	6.25000	.00	.01000	.0
6	324.000	6.25000	.00	.01000	.0
7	324.000	.00000	30.00	------	------
8	1200.000	.00000	30.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Output Summary for Load Case No. 1:

Pile-head deflection	=	.11683421 in
Computed slope at pile head	=	-1.1564822E-18
Maximum bending moment	=	-1953496. lbs-in
Maximum shear force	=	25000.00000 lbs
Depth of maximum bending moment	=	0.00000 in
Depth of maximum shear force	=	0.00000 in
Number of iterations	=	19
Number of zero deflection points	=	2

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment,	y = pile-head displacement in
Type 2 = Shear and Slope,	M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness,	V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment,	S = Pile-head Slope, radians
Type 5 = Deflection and Slope.	R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
2	V= 25000.	S= 0.000	200000.	.1168342	-1953496.	25000.0000

The analysis ended normally.

126.000	.048319	335505.	11227.0274	-.0006908	492.8408	-102.9146	12779.3735
132.000	.044224	401834.	10618.5188	-.0006727	521.6284	-99.9212	13556.6725
138.000	.040243	464562.	10024.2604	-.0006534	548.8463	-96.8319	14435.6593
144.000	.036407	523737.	9235.5541	-.0006271	574.5384	-167.4035	27588.5370
150.000	.032722	579874.	7888.8369	-.0000000	597.6014	-240.1689	45505.1754
156.000	.029207	621043.	6316.4645	-.0005706	616.7720	-241.2886	49949.4243
162.000	.025875	656417.	5074.4078	-.0005392	637.1253	-236.7303	54894.8294
168.000	.022736	683230.	3683.9807	-.0005063	643.7629	-226.7454	59837.3899
174.000	.019799	701840.	2354.1529	-.0004722	651.8491	-216.5306	65617.9603
180.000	.017069	712813.	1086.3306	-.0004375	656.5160	-206.0848	72440.7595
186.000	.014549	715925.	-118.1537	-.0004024	657.9536	-195.4019	80501.1773
192.000	.012241	712161.	-1251.7861	-.0003673	656.3188	-184.4688	90620.0496
198.000	.010142	701713.	-2330.9606	-.0003325	651.7853	-173.2626	102500.
204.000	.008251	684987.	-3335.9841	-.0002984	644.5257	-161.7452	117626.
210.000	.006561	662398.	-4270.7844	-.0002653	634.7213	-149.8549	137015.
216.000	.005067	634375.	-5132.8207	-.0002335	622.5584	-137.4905	162821.
222.000	.003759	601364.	-5918.7312	-.0002031	609.2310	-124.4796	198672.
228.000	.002630	563837.	-6623.6926	-.0001745	591.9433	-110.5075	252156.
234.000	.001666	522299.	-7239.9891	-.0001478	573.9144	-94.9280	341089.
240.000	.000856	477312.	-7753.0142	-.0001232	554.3888	-76.0770	532888.
246.000	.000188	429558.	-8054.7429	-.0001008	533.6624	-24.4992	783260.
252.000	-.000354	380897.	-7989.4468	-8.0983E-05	512.5422	46.2646	783268.
258.000	-.000784	333079.	-7629.4184	-6.3415E-05	492.1351	73.7449	564283.
264.000	-.001135	289496.	-7159.3026	-4.8095E-05	472.8717	82.9604	448269.
270.000	-.001361	248083.	-6614.4169	-3.4883E-05	454.8973	88.6682	380810.
276.000	-.001534	209847.	-6101.5803	-2.3629E-05	438.3031	92.2771	360930.
282.000	-.001645	174921.	-5541.3910	-1.4173E-05	423.1427	94.4528	344547.
288.000	-.001704	143384.	-4971.3014	-6.3496E-06	409.4550	95.5570	336527.
294.000	-.001723	115280.	-4396.8831	1.6103E-09	397.2571	95.8953	334323.
300.000	-.001704	90621.7434	-3922.4548	5.3880E-06	386.5546	95.5804	336557.
306.000	-.001669	69398.7068	-3251.4435	9.0008E-06	377.3432	94.7567	342454.
312.000	-.001596	51582.8188	-2686.6130	1.1974E-05	368.6106	93.5201	351589.
318.000	-.001517	37130.6124	-2130.2232	1.4154E-05	363.3379	91.9432	363770.
324.000	-.001426	25986.2702	-1735.2595	1.5706E-05	358.5008	89.7314	367076.
330.000	-.001328	16269.8049	-1502.3149	1.6744E-05	354.2838	87.9388	371396.
336.000	-.001225	7918.2051	-1280.8630	1.7339E-05	350.6589	85.8805	375715.
342.000	-.001120	857.8362	-1072.6035	1.7554E-05	347.5945	83.6060	380036.
348.000	-.001015	-4992.7474	-878.0688	1.7453E-05	349.3892	81.1722	384356.
354.000	-.000911	-9720.8763	-698.6584	1.7091E-05	351.4414	78.6329	388676.
360.000	-.000809	-13617.6270	-534.6464	1.6522E-05	353.0458	26.0361	392996.
366.000	-.000712	-16776.2872	-386.2669	1.5795E-05	354.2432	23.0238	397316.
372.000	-.000620	-19290.7311	-253.4997	1.4953E-05	355.0741	20.8319	401636.
378.000	-.000533	-19254.1711	-136.1336	1.4035E-05	355.5781	18.2901	205956.
384.000	-.000451	-19788.0244	-33.7971	1.3076E-05	355.7978	15.8220	210276.
390.000	-.000376	-19891.1193	54.0015	1.2107E-05	355.7682	13.4652	214596.
396.000	-.000306	-19139.0273	127.8540	1.1132E-05	355.5291	11.1714	218916.
402.000	-.000242	-18183.6368	188.3898	1.0235E-05	355.3144	9.0072	223236.
408.000	-.000183	-16902.9148	236.2737	9.3728E-06	354.5586	6.9543	227556.
414.000	-.000130	-15370.8480	272.1633	8.5797E-06	353.8936	5.0091	231876.
420.000	-8.04E-05	-13657.5469	296.6860	7.8663E-06	353.1500	3.1652	236196.
426.000	-3.52E-05	-11829.4548	310.9169	7.2398E-06	352.3566	1.4118	240516.
432.000	6.48E-06	-9949.9188	313.8596	6.7046E-06	351.5408	-.2562396	244836.
438.000	4.52E-05	-8079.2105	307.4315	6.2615E-06	350.7289	-1.8785	249156.
444.000	6.16E-05	-6275.7697	291.4525	5.9087E-06	349.9461	-3.4479	253476.
450.000	.000116	-4596.0215	266.2386	5.6415E-06	349.2170	-4.9901	257796.
456.000	.000149	-3095.6457	231.5994	5.4595E-06	348.5658	-6.5228	262116.
462.000	.000192	-1829.9099	187.8425	5.3314E-06	348.0165	-8.0629	266436.
468.000	.000213	-854.3276	134.7797	5.2655E-06	347.5930	-9.6249	270756.
474.000	.000245	-225.1909	72.2417	5.2389E-06	347.3200	-11.2211	275076.
480.000	.000275	0.0000	0.0000	5.2334E-06	347.2222	-12.8595	139698.

Output Verification:

Computed forces and moments are within specified convergence limits.

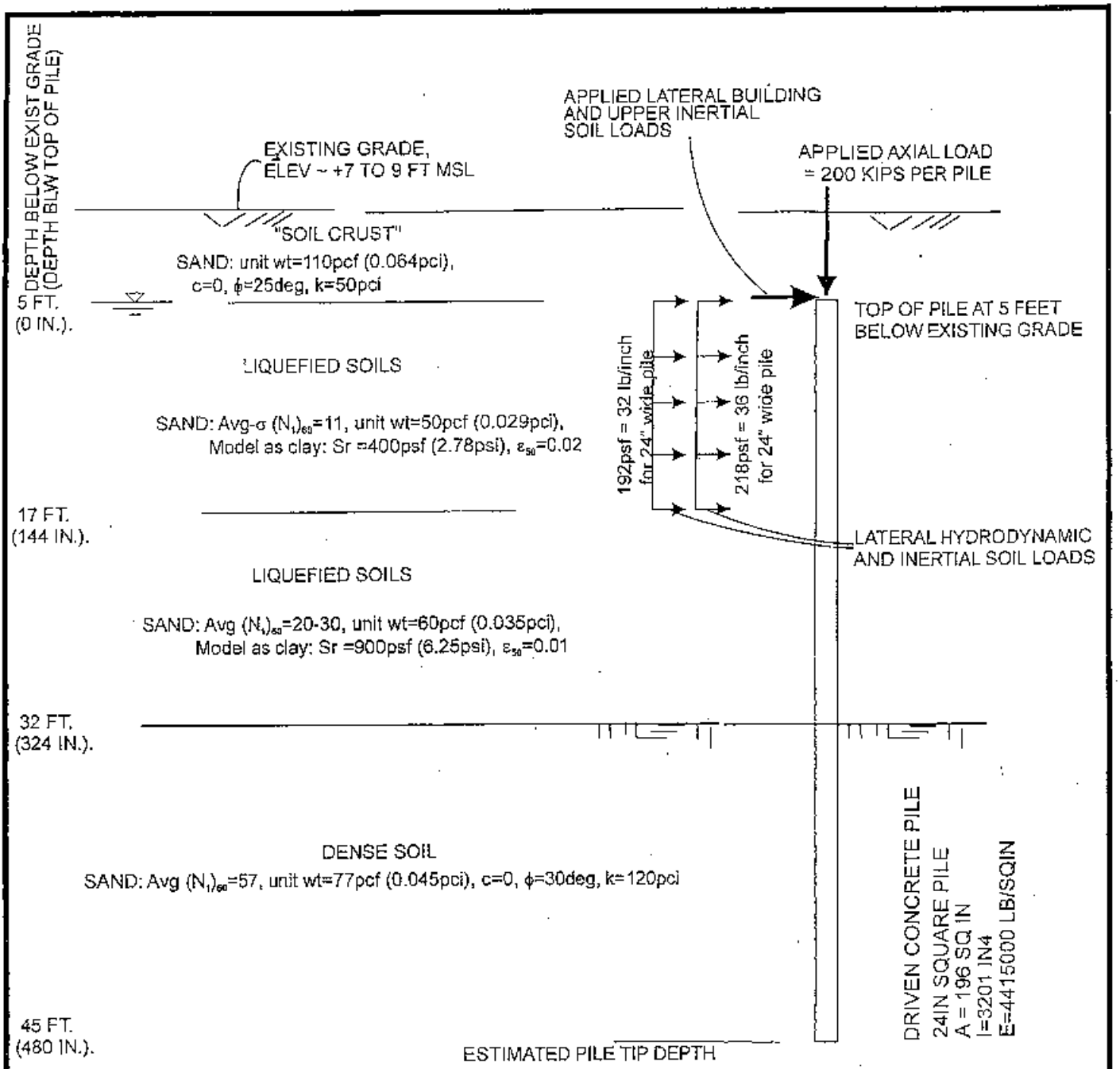
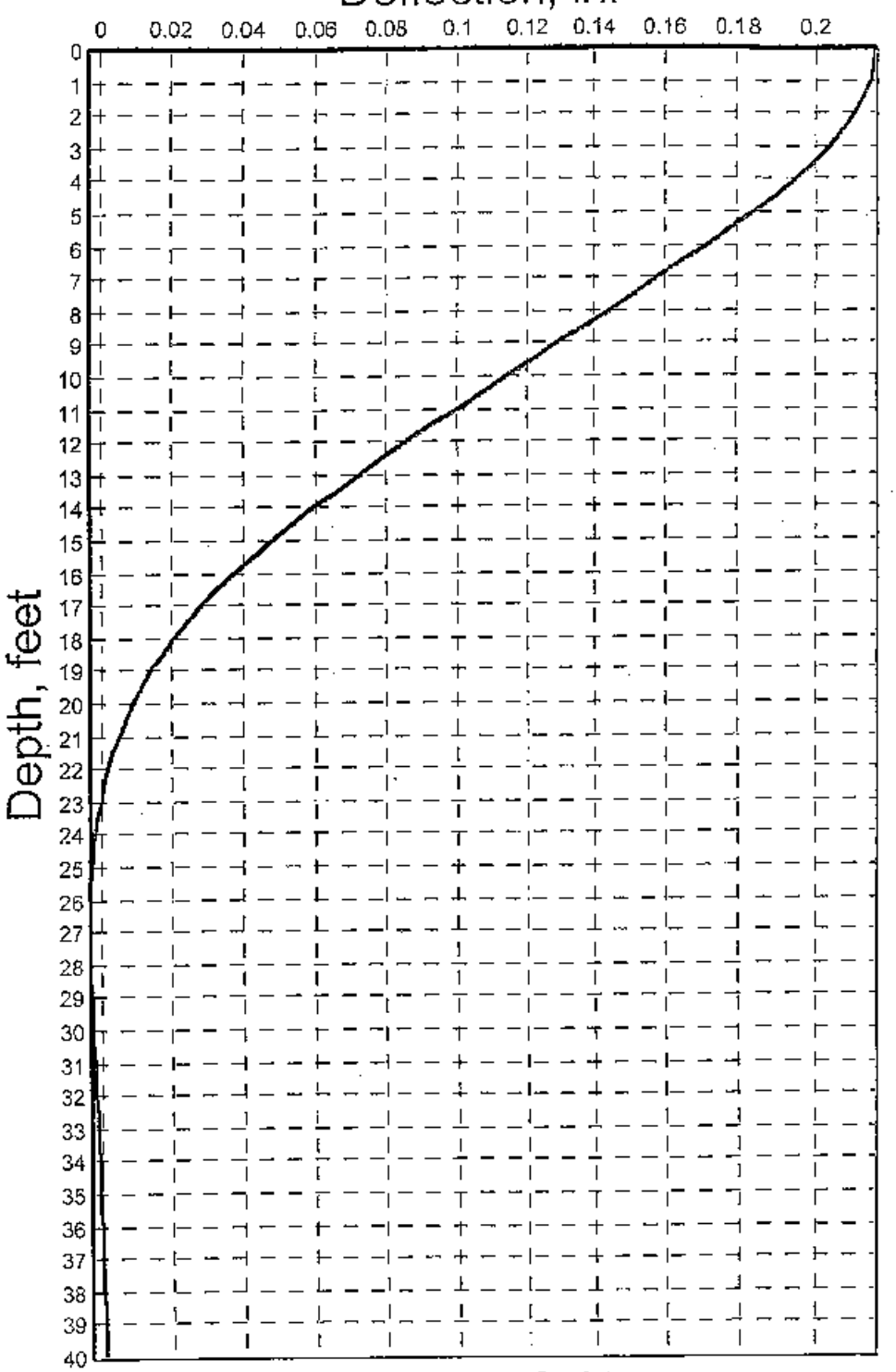


PLATE H2

LPILE INPUT - LOAD CONDITION #1	
PROPOSED COMMERCIAL DEVELOPMENT PANAY WAY PARCEL 21 MARINA DEL REY, CALIFORNIA	
Earth Systems **Southern California**	
8-21-2006	LA-01052-01

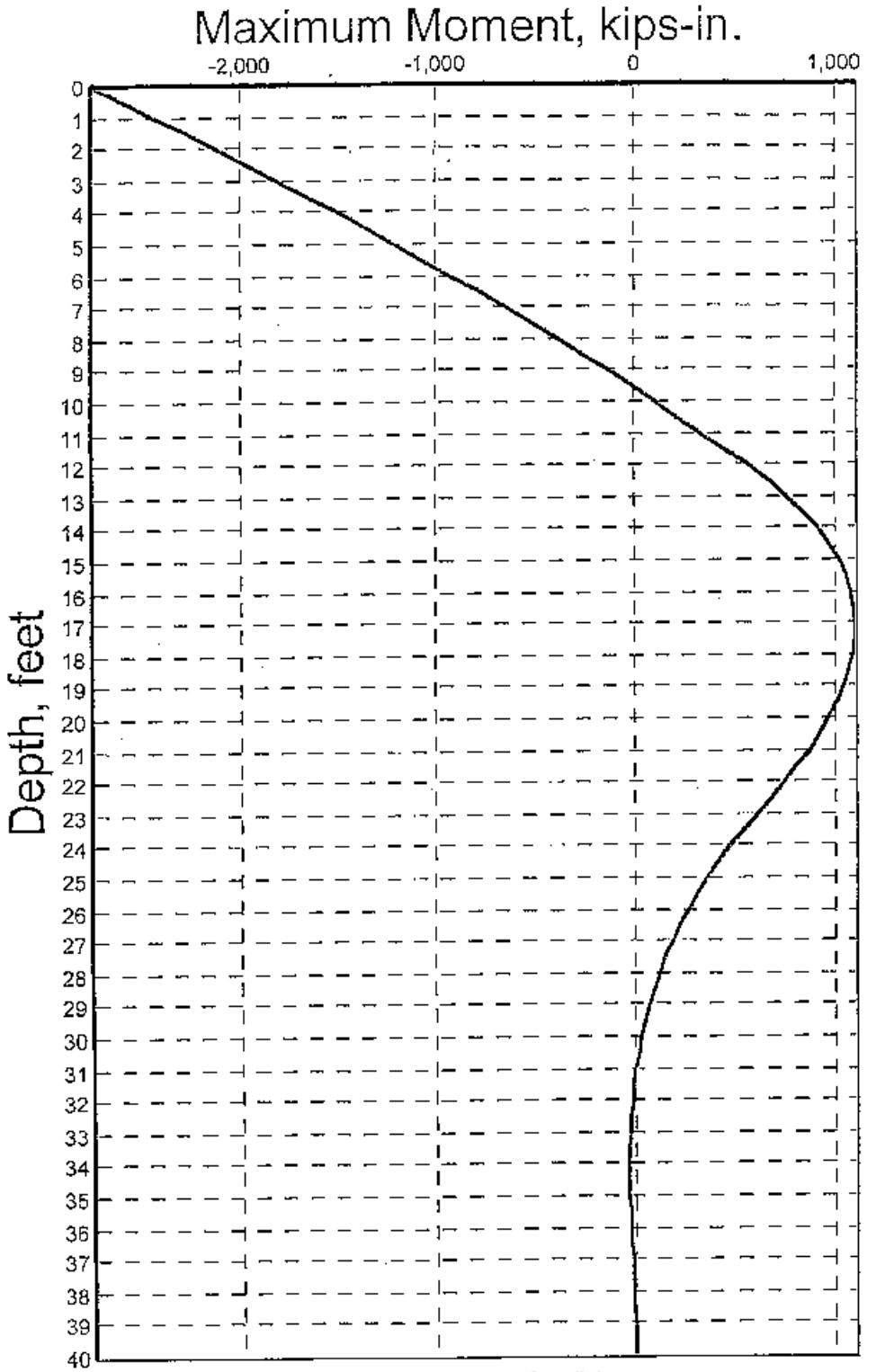
NOT TO SCALE

Lat Deflection vs. Depth, Load Condn #1
Panay Way Parcel 21 LA-01052-01



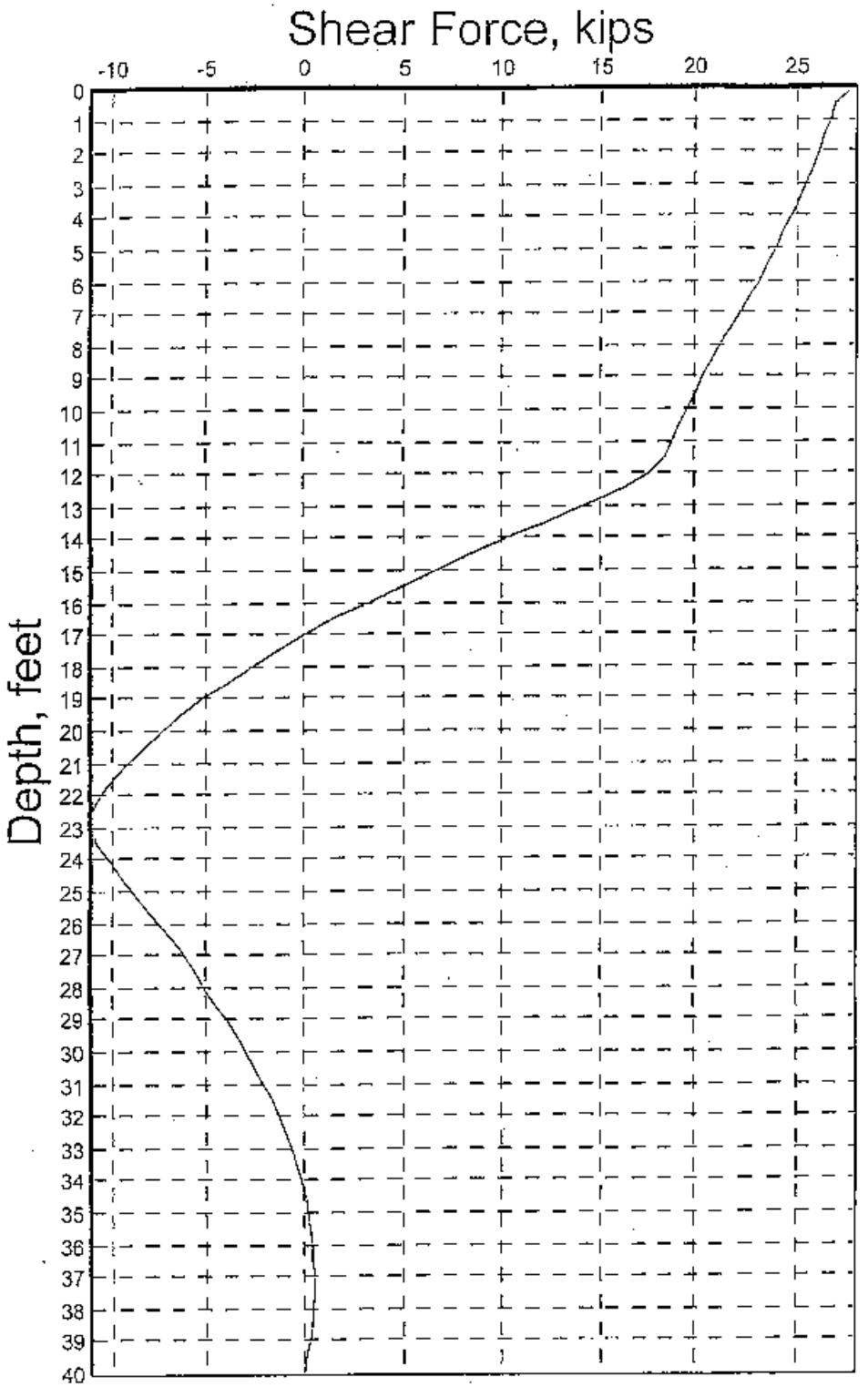
LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

Bend Moment vs. Depth, Load Cond #1
Panay Way Parcel 21 LA-01052-01



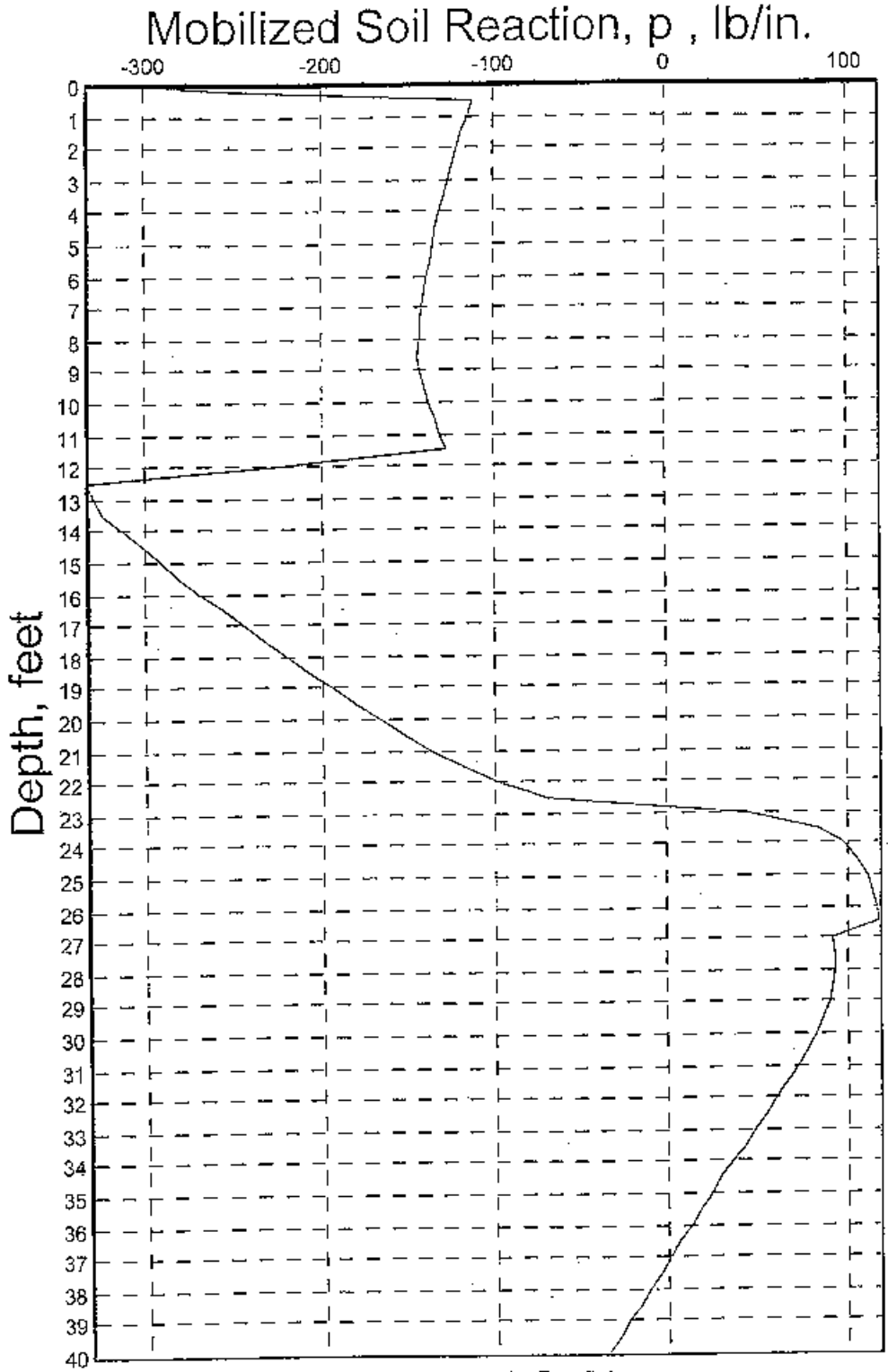
LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

Shear Force vs. Depth, Load Condn. #1
Panay Way Parcel 21 LA-01052-01



LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

Mob Soil Reaction vs. Depth, Load Condn. #1
Panay Way Parcel 21 LA-01052-01



LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 80
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 1

Pile Structural Properties and Geometry

Pile Length = 480.00 in
Depth of ground surface below top of pile = -60.00 in
Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	24.00000000	27648.0000	576.0000	4415000.
2	480.0000	24.00000000	27648.0000	576.0000	4415000.

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = -60.000 in
Distance from top of pile to bottom of layer = 6.000 in
p-y subgrade modulus k for top of soil layer = 50.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 50.000 lbs/in**3

Layer 2 is soft clay, p-y criteria by Matlock, 1970
Distance from top of pile to top of layer = 6.000 in
Distance from top of pile to bottom of layer = 144.000 in

Layer 3 is soft clay, p-y criteria by Matlock, 1970
Distance from top of pile to top of layer = 144.000 in
Distance from top of pile to bottom of layer = 324.000 in

Layer 4 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 324.000 in
Distance from top of pile to bottom of layer = 1200.000 in

LPILE Plus for Windows, Version 5.0 (5.0.26)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

(c) 1985-2006 by Ensoft, Inc.
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This program is licensed to:

User
Earth Systems Southern California

Path to file locations: C:\Documents and Settings\marlx\My Documents\PROJECTS\PanayPcl19_21\LPILE\
Name of input data file: PanayLC1a.lpd
Name of output file: PanayLC1a.lpo
Name of plot output file: PanayLC1a.lpp
Name of runtime file: PanayLC1a.lpr

Time and Date of Analysis

Date: August 23, 2006 Time: 16:52: 9

Problem Title

Panay Way Parcel 21, Load Condition #1 - Inertial Loads

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 1:
- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix elements

Loading Type

Static loading criteria was used for computation of p-y curves

Distributed Lateral Loading

Distributed lateral load intensity defined using 2 points

Point No.	Depth X in	Dist. Load lbs/in
1	.000	68.00000
2	144.000	68.00000

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Slope (BC Type 2)
Shear force at pile head = 28000.000 lbs
Slope at pile head = .000 in/in
Axial load at pile head = 200000.000 lbs

(Zero slope for this load indicates fixed-head condition)

Computed Values of Load Distribution and Deflection for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Slope (BC Type 2)
Specified shear force at pile head = 28000.000 lbs
Specified slope at pile head = 0.000E+00 in/in
Specified axial load at pile head = 200000.000 lbs

(Zero slope for this load indicates fixed-head conditions)

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res. p lbs/in	Es*h F/L lbs/in
0.000	.216603	-2758859.	28000.0000	6.70758-17	1544.6437	-327.5390	4534.8167
6.000	.216276	-2596062.	26990.1555	-.0001316	1473.9850	-121.0758	3081.5025
12.000	.215104	-2434661.	26721.7178	-.0002552	1403.9329	-114.4034	3191.1150
18.000	.213213	-2274788.	26453.7514	-.0003710	1334.5435	-117.5855	3308.9566
24.000	.210652	-2116566.	26127.1446	-.0004789	1265.8707	-120.6168	3435.5330
30.000	.207466	-1960113.	25802.8181	-.0005791	1197.9658	-123.4920	3571.6384

p-y subgrade modulus k for top of soil layer = 120.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 120.000 lbs/in**3

(Depth of lowest layer extends 720.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Distribution of effective unit weight of soil with depth is defined using 8 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	-60.00	.06400
2	6.00	.06400
3	6.00	.02900
4	144.00	.02900
5	144.00	.03500
6	324.00	.03500
7	324.00	.04500
8	1200.00	.04500

Shear Strength of Soils

Distribution of shear strength parameters with depth defined using 8 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	-60.000	.00000	25.00	------	------
2	6.000	.00000	25.00	------	------
3	6.000	2.78000	.00	.02000	.0
4	144.000	2.78000	.00	.02000	.0
5	144.000	6.25000	.00	.01000	.0
6	324.000	6.25000	.00	.01000	.0
7	324.000	.00000	30.00	------	------
8	1200.000	.00000	30.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

462.000	.000368	-4661.1845	458.5504	2.1317E-05	349.2453	-16.3358	266436.
468.000	.000495	-2229.3684	342.5194	2.1147E-05	348.1898	-22.3412	270756.
474.000	.000622	-601.7058	189.9863	2.1078E-05	347.6834	-28.4998	275076.
480.000	.000748	0.0000	0.0000	2.1063E-05	347.2222	-34.8323	139698.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection	=	.21668284 in
Computed slope at pile head	=	6.7075975E-17
Maximum bending moment	=	-2758859. lbs-in
Maximum shear force	=	28000.00000 lbs
Depth of maximum bending moment	=	0.00000 in
Depth of maximum shear force	=	0.00000 in
Number of iterations	=	21
Number of zero deflection points	=	2

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = Pile-head displacement in
Type 2 = Shear and Slope, M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment, S = Pile-head Slope, radians
Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
2	V= 28000.	S= 0.000	200000.	.2166828	-2758859.	28000.0000

The analysis ended normally.

36.000	.203702	-1805562.	25461.7241	-.0006717	1130.8778	-126.2059	3717.3607
42.000	.199406	-1652961.	25104.8479	-.0007567	1064.6530	-128.7529	3874.0904
48.000	.194623	-1502468.	24733.2054	-.0008342	999.5352	-131.1279	4042.5306
54.000	.189386	-1354160.	24347.8653	-.0009044	936.9653	-133.3255	4223.7109
60.000	.183770	-1208124.	23949.8482	-.0009674	871.5814	-135.3402	4418.8032
66.000	.177787	-1064440.	23540.3267	-.0010232	809.2189	-137.1669	4629.1413
72.000	.171491	-923184.	23120.4256	-.0010721	747.9086	-138.8001	4856.2451
78.000	.164922	-784422.	22691.3216	-.0011143	687.6831	-140.2345	5101.8484
84.000	.158122	-648214.	22254.2238	-.0011499	628.5652	-141.4647	5367.9328
90.000	.151131	-514613.	21810.3335	-.0011778	570.5786	-142.4854	5656.7691
96.000	.143988	-383683.	21361.0443	-.0011999	513.7426	-143.2913	5970.9656
102.000	.136732	-255401.	20907.5408	-.0012156	458.0732	-143.8766	6313.5271
108.000	.129400	-129855.	20455.1784	-.0012251	403.5829	-142.9415	6626.4808
114.000	.122031	-8989.3156	20014.0058	-.0012265	350.2587	-140.3454	6850.6663
120.000	.114659	113261.	19589.7753	-.0012258	296.3808	-137.2847	7182.9473
126.000	.107320	231021.	19183.1659	-.0012176	243.4918	-134.2717	7506.7742
132.000	.100050	346381.	18794.8413	-.0012032	197.5613	-131.1688	7866.1777
138.000	.092882	458447.	18425.4622	-.0011834	146.6349	-127.9586	8265.8644
144.000	.085850	567327.	17679.1616	-.0011581	584.7599	-222.8083	15572.0117
150.000	.078985	674376.	16114.0719	-.0011275	639.9202	-332.8883	25267.4126
156.000	.072320	766402.	14128.0333	-.0010921	678.8618	-329.1246	27305.8291
162.000	.065880	846534.	12170.9369	-.0010524	714.6413	-323.2409	29438.9866
168.000	.059689	914979.	10262.8631	-.0010091	744.3484	-312.7837	31440.6329
174.000	.053770	972110.	8418.2648	-.0009628	769.1447	-302.0824	33308.0328
180.000	.048137	1018309.	6638.5892	-.0009139	789.1965	-291.1428	35299.3888
186.000	.042804	1053966.	4925.2533	-.0008629	804.6729	-279.9691	39244.1775
192.000	.037782	1079483.	3279.6580	-.0008105	815.7477	-268.5627	42649.2221
198.000	.033078	1095267.	1703.2043	-.0007570	822.5986	-256.9218	46002.4299
204.000	.028698	1101738.	197.3177	-.0007030	825.4071	-245.0406	51232.2687
210.000	.024642	1099322.	-1236.5274	-.0006489	824.3581	-232.9078	56710.3886
216.000	.020910	1088457.	-2596.7639	-.0005952	819.6429	-220.5044	62271.7085
222.000	.017500	1068580.	-3881.6780	-.0005421	811.4536	-207.8003	71247.1908
228.000	.014405	1043178.	-5089.3272	-.0004902	799.9905	-194.7494	81320.0185
234.000	.011617	1008584.	-6217.4166	-.0004398	785.4576	-181.2804	93627.8830
240.000	.009127	966625.	-7263.0997	-.0003911	768.0662	-167.2807	109984.
246.000	.006924	923476.	-8222.6410	-.0003446	748.0363	-152.5664	132213.
252.000	.004992	871786.	-9090.7907	-.0003005	725.5989	-136.8158	164433.
258.000	.003318	815107.	-9858.4740	-.0002588	701.0014	-119.4116	215830.
264.000	.001884	754088.	-10514.4246	-.0002204	674.5173	-98.9059	314957.
270.000	.000673	689463.	-11021.8328	-.0001850	646.4584	-70.2302	626301.
276.000	-.000335	622270.	-11101.1628	-.0001527	617.3046	43.7869	783268.
282.000	-.001160	556616.	-10717.7109	-.0001238	588.8090	84.0104	434631.
288.000	-.001820	493954.	-10172.5776	-9.7935E-05	561.6121	97.6807	321940.
294.000	-.002335	434780.	-9561.0912	-7.5110E-05	535.9268	106.1481	272728.
300.000	-.002722	379401.	-8907.4983	-5.5100E-05	511.8930	111.7162	246271.
306.000	-.002996	328022.	-8226.2722	-3.7713E-05	489.5930	115.3592	230993.
312.000	-.003174	280777.	-7527.3880	-2.2751E-05	469.0871	117.6022	222286.
318.000	-.003269	237746.	-6816.2779	-1.0607E-05	450.4116	118.7679	217959.
324.000	-.003294	198981.	-6186.7632	7.2626E-07	433.5857	91.7370	167076.
330.000	-.003261	163505.	-5632.1132	9.6351E-05	418.1881	93.1463	171396.
336.000	-.003179	131373.	-5073.3894	1.6802E-05	404.2417	93.0949	175716.
342.000	-.003058	102584.	-4518.8151	2.2632E-05	391.7466	91.7650	180036.
348.000	-.002907	77092.7809	-3975.5436	2.7048E-05	380.6826	89.3277	184356.
354.000	-.002734	54812.6842	-3449.8705	3.0293E-05	371.0324	85.9600	188676.
360.000	-.002544	35623.9163	-2946.3335	3.2513E-05	362.6840	81.8224	192996.
366.000	-.002343	19378.6523	-2468.6687	3.3864E-05	355.6331	77.0659	197316.
372.000	-.002137	5906.8169	-2022.9846	3.4485E-05	349.7855	71.8288	201636.
378.000	-.001930	-4979.9281	-1608.7924	3.4508E-05	349.3836	66.2353	205956.
384.000	-.001723	-13481.7119	-1228.9046	3.4055E-05	353.0737	60.3940	210276.
390.000	-.001521	-19808.5158	-884.5292	3.3237E-05	355.8137	54.3978	214596.
396.000	-.001324	-24175.8303	-576.3655	3.2156E-05	359.7152	48.3234	218916.
402.000	-.001135	-26802.0759	-304.7013	3.0903E-05	358.8551	42.2313	223236.
408.000	-.000954	-27906.4124	-69.5082	2.9558E-05	359.3344	36.1664	227556.
414.000	-.000780	-27707.1141	129.4653	2.8193E-05	359.2479	30.1581	231876.
420.000	-.000615	-26620.4886	292.6061	2.6861E-05	358.6894	24.2221	236196.
426.000	-.000458	-24260.3079	420.3549	2.5616E-05	357.7519	18.3608	240516.
432.000	-.000308	-21137.7076	513.1321	2.4492E-05	356.5768	12.5649	244836.
438.000	-.000163	-18161.5049	571.2734	2.3519E-05	355.1048	6.8155	249156.
444.000	-2.51E-05	-14638.8733	594.9755	2.2713E-05	353.5758	1.0852	253476.
450.000	.000108	-11076.3101	584.2546	2.2081E-05	352.0296	-4.6583	257796.
456.000	.000239	-7683.8127	539.9178	2.1620E-05	350.5559	-10.4534	262116.

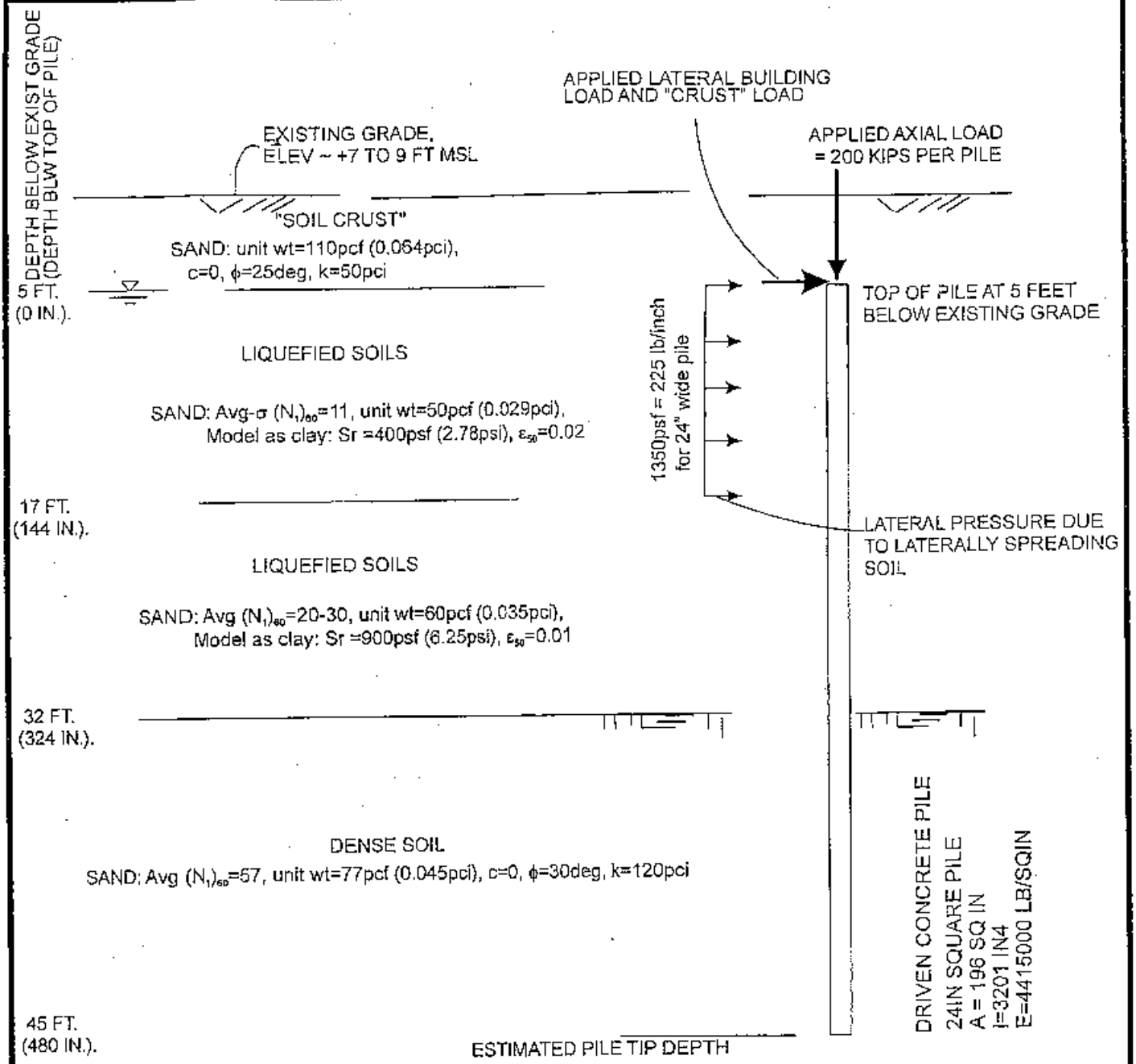


PLATE H3

LPILE INPUT - LOAD CONDITION #2

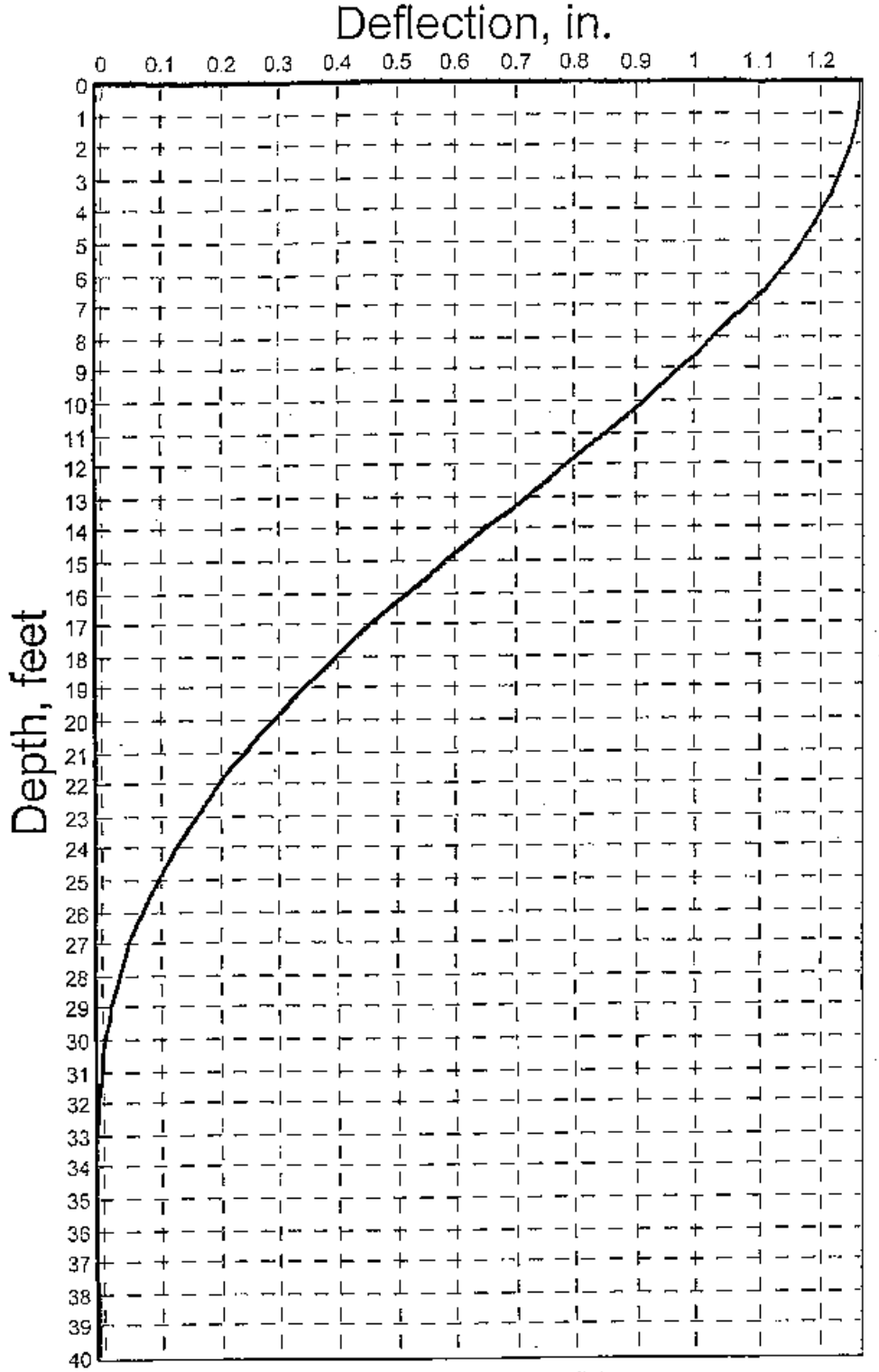
PROPOSED COMMERCIAL DEVELOPMENT
PANAY WAY PARCEL 21
MARINA DEL REY, CALIFORNIA

Earth Systems
Southern California

NOT TO SCALE

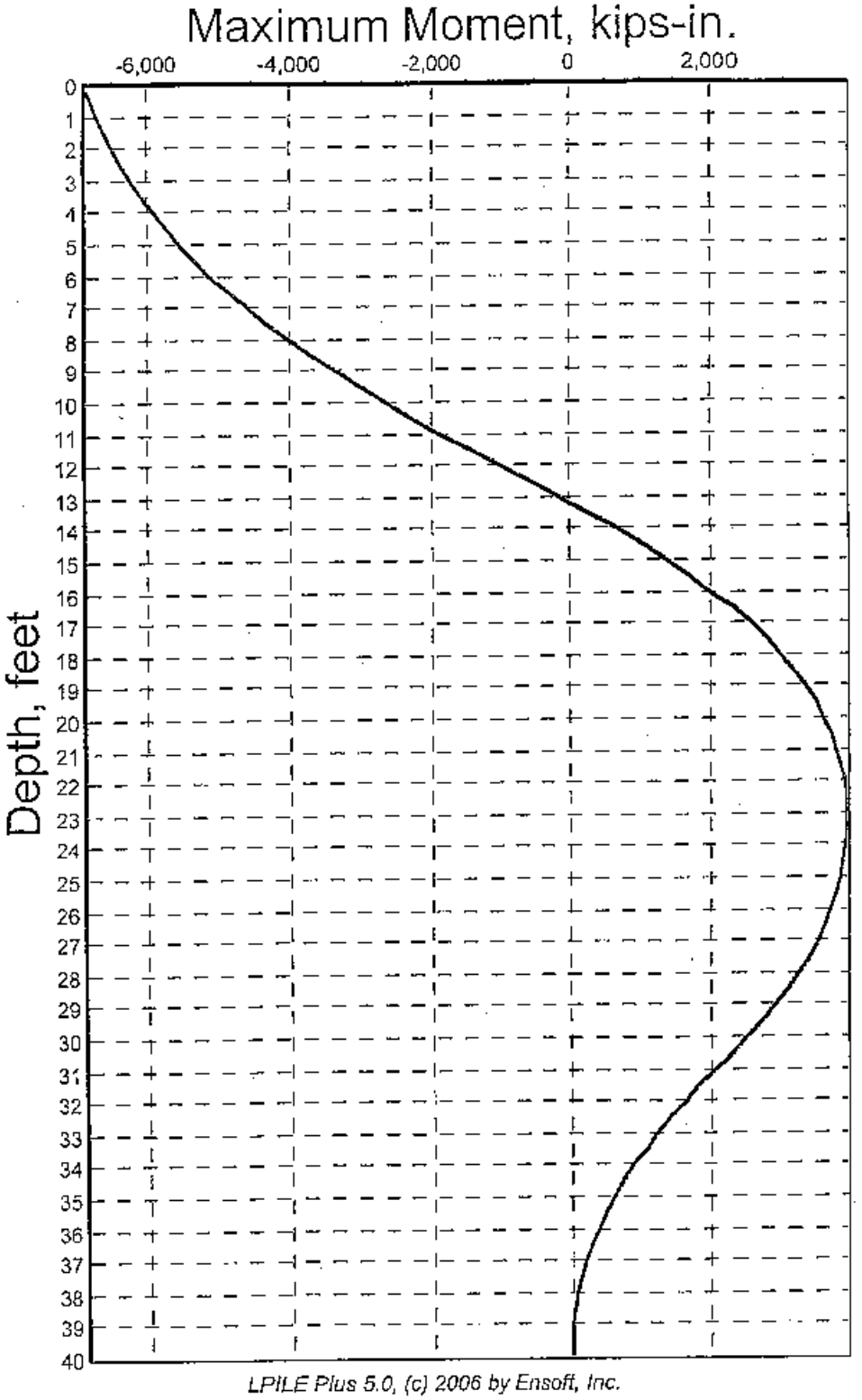
8-21-2006	LA-01052-01

Lat Deflection vs. Depth, Load Cond #2a
Panay Way Parcel 21 LA-01052-01



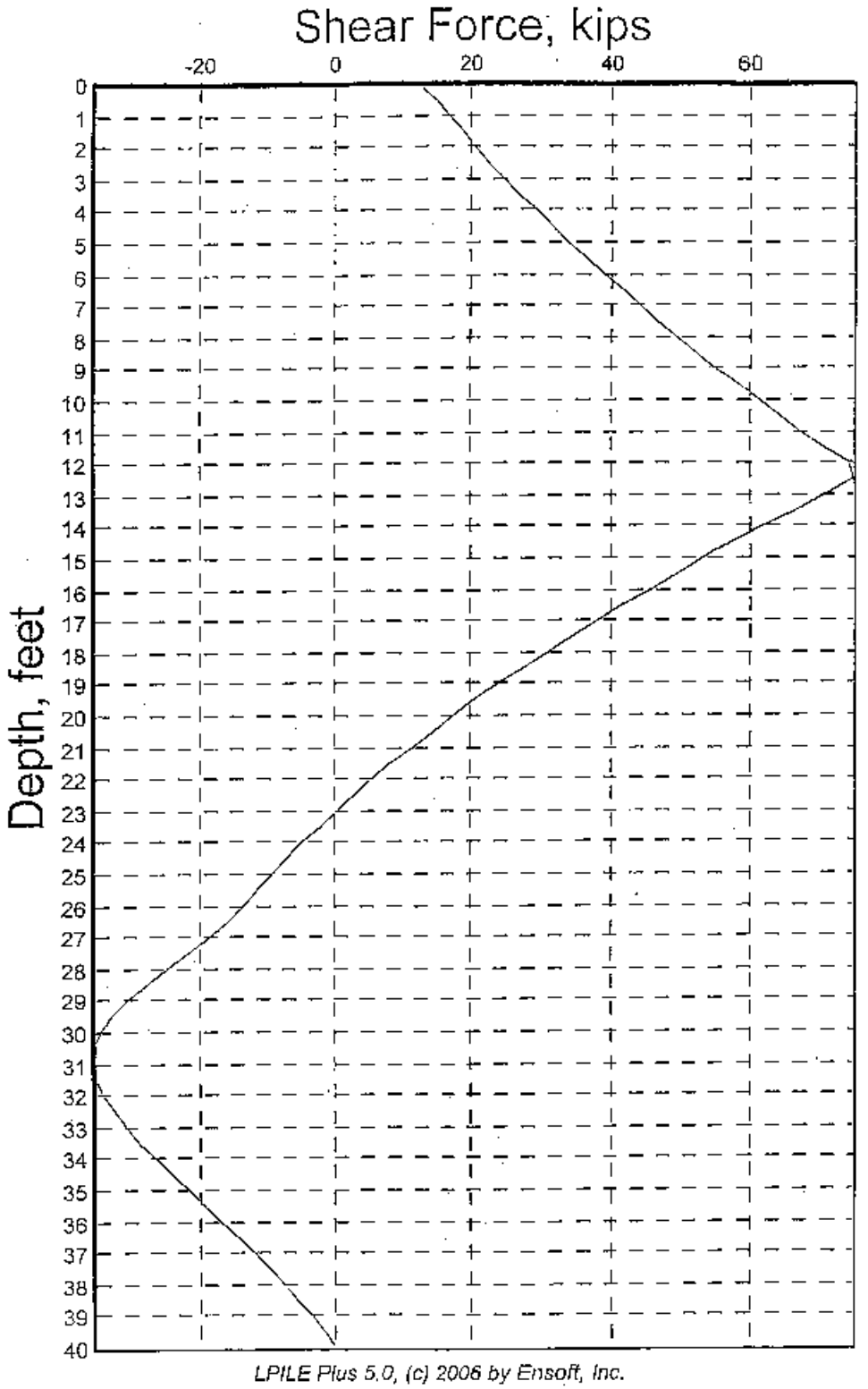
LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

Bend Mmnt vs. Depth, Load Cond #2a
Panay Way Parcel 21 LA-01052-01



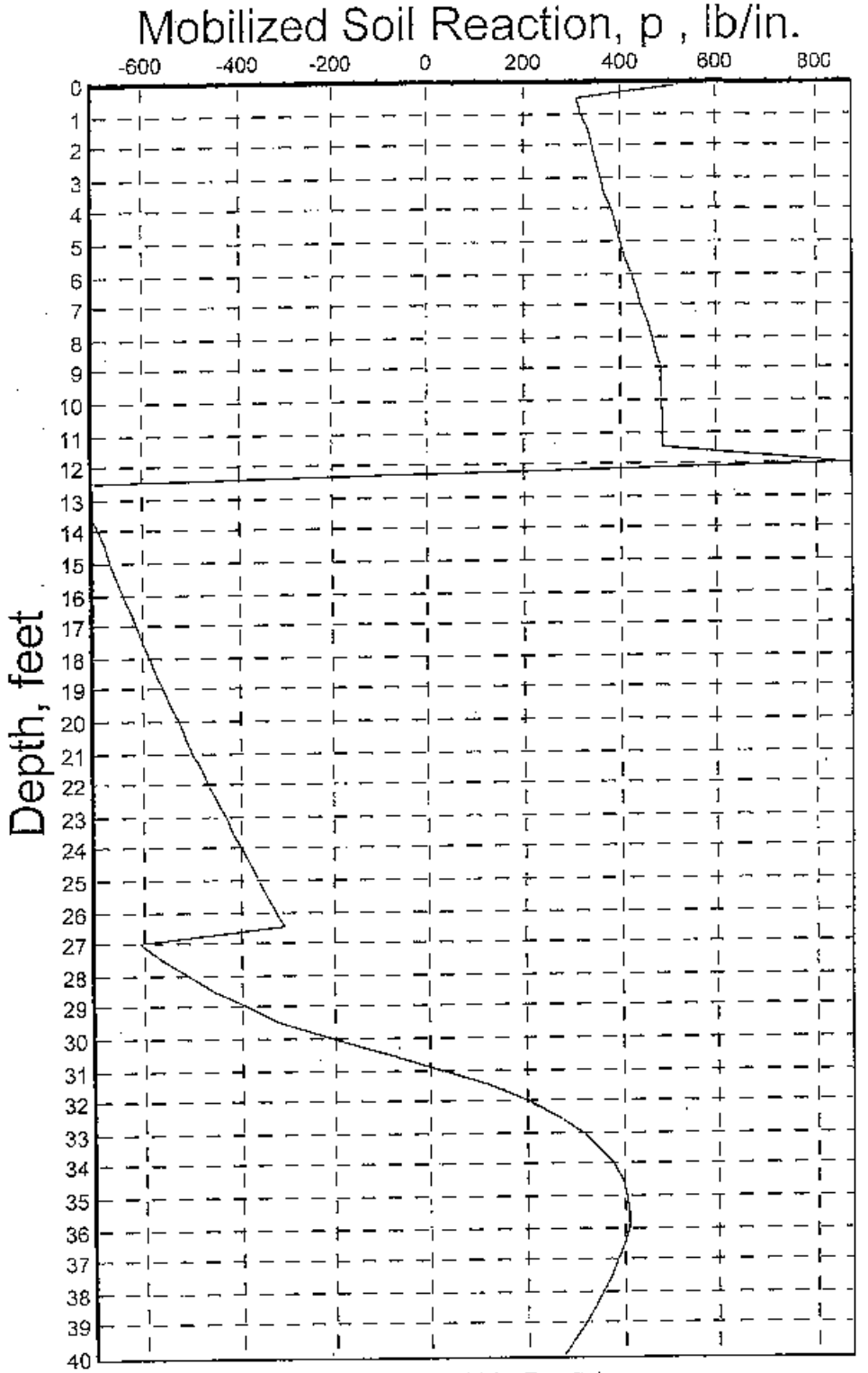
LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

Shear Force vs. Depth, Load Condition #2a
Panay Way Parcel 21 LA-01052-01



LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

Mobilized Soil Reaction vs. Depth, Load Condition #2a
Panay Way Parcel 21 LA-01052-01



LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

- Output pile response for full length of pile
- Analysis includes effects of soil movement on pile response
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 80
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 1

Pile Structural Properties and Geometry

Pile Length = 480.00 in
Depth of ground surface below top of pile = -60.00 in
Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	24.00000000	27648.0000	576.0000	4415000.
2	480.0000	24.00000000	27648.0000	576.0000	4415000.

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = -60.000 in
Distance from top of pile to bottom of layer = 6.000 in
p-y subgrade modulus k for top of soil layer = 50.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 50.000 lbs/in**3

Layer 2 is soft clay, p-y criteria by Matlock, 1970
Distance from top of pile to top of layer = 6.000 in
Distance from top of pile to bottom of layer = 144.000 in

Layer 3 is soft clay, p-y criteria by Matlock, 1970
Distance from top of pile to top of layer = 144.000 in
Distance from top of pile to bottom of layer = 324.000 in

Layer 4 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 324.000 in
Distance from top of pile to bottom of layer = 1200.000 in

LPILE Plus for Windows, Version 5.0 (5.0.26)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

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This program is licensed to:

User
Earth Systems Southern California

Path to file locations: C:\Documents and Settings\marlr\My Documents\PROJECTS\PanayPc119_21\LPILE\
Name of input data file: PanayLC2a.lpd
Name of output file: PanayLC2a.lpo
Name of plot output file: PanayLC2a.lpp
Name of runtime file: PanayLC2a.lpr

Time and Date of Analysis

Date: August 24, 2006 Time: 11: 6:11

Problem Title

Panay Way Parcel 21, Load Condition #2a - Lateral Spread by Relative Movement

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 1:
- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix elements

Lateral Soil Movements

Profile of soil movement with depth defined using 2 points

Point No.	Depth X in	Soil Movement in
1	.000	6.000
2	144.000	6.000

Loading Type

Static loading criteria was used for computation of p-y curves

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Slope (BC Type 2)
Shear force at pile head = 12000.000 lbs
Slope at pile head = .000 in/in
Axial load at pile head = 200000.000 lbs

(Zero slope for this load indicates fixed-head condition)

Computed Values of Load Distribution and Deflection for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Slope (BC Type 2)
Specified shear force at pile head = 12000.000 lbs
Specified slope at pile head = 0.000E+00 in/in
Specified axial load at pile head = 200000.000 lbs

(Zero slope for this load indicates fixed-head conditions)

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res. p lbs/in	Es*h f/b lbs/in
0.000	1.269	-6918904.	12000.0000	-1.85048-17	3350.2189	578.4871	366.8342
6.000	1.268	-6836287.	14667.4428	-.0003381	3314.3609	310.6605	393.9114
18.000	1.269	-6742084.	16561.2717	-.0006718	3273.4738	320.6158	406.2738

p-y subgrade modulus k for top of soil layer = 120.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 120.000 lbs/in**3

(Depth of lowest layer extends 720.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Distribution of effective unit weight of soil with depth is defined using 8 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	-60.00	.06400
2	6.00	.06400
3	6.00	.02900
4	144.00	.02900
5	144.00	.03500
6	324.00	.03500
7	324.00	.04500
8	1200.00	.04500

Shear Strength of Soils

Distribution of shear strength parameters with depth defined using 8 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	-60.000	.00000	25.00	------	------
2	6.000	.00000	25.00	------	------
3	6.000	2.78000	.00	.02000	.0
4	144.000	2.78000	.00	.02000	.0
5	144.000	6.25000	.00	.01000	.0
6	324.000	6.25000	.00	.01000	.0
7	324.000	.00000	30.00	------	------
8	1200.000	.00000	30.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

444.000	-.008218	204254.	-12063.2369	7.8916E-05	435.8741	389.4321	250476.
450.000	-.008715	138784.	-9771.6483	8.7347E-05	407.4582	374.4307	251796.
456.000	-.008170	86784.6007	-7577.6079	9.2891E-05	384.8891	356.9161	262116.
462.000	-.007600	47629.4136	-5494.4179	9.6194E-05	367.8947	337.4807	266436.
468.000	-.007016	20620.7215	-3532.2045	9.7872E-05	356.1722	316.5904	270756.
474.000	-.006425	5008.6672	-1698.6931	9.8502E-05	349.3959	294.5801	275076.
480.000	-.005834	0.0000	0.0000	9.8625E-05	347.2222	271.6510	139698.

Output Verification:

Computed forces and moments are within specified convergance limits.

Output Summary for Load Case No. 2:

Pile-head deflection	=	1.26908574 in
Computed slope at pile head	=	-1.8503726-17
Maximum bending moment	=	-6918804. lbs-in
Maximum shear force	=	74435.51077 lbs
Depth of maximum bending moment	=	0.00000 in
Depth of maximum shear force	=	150.00000 in
Number of iterations	=	22
Number of zero deflection points	=	1

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

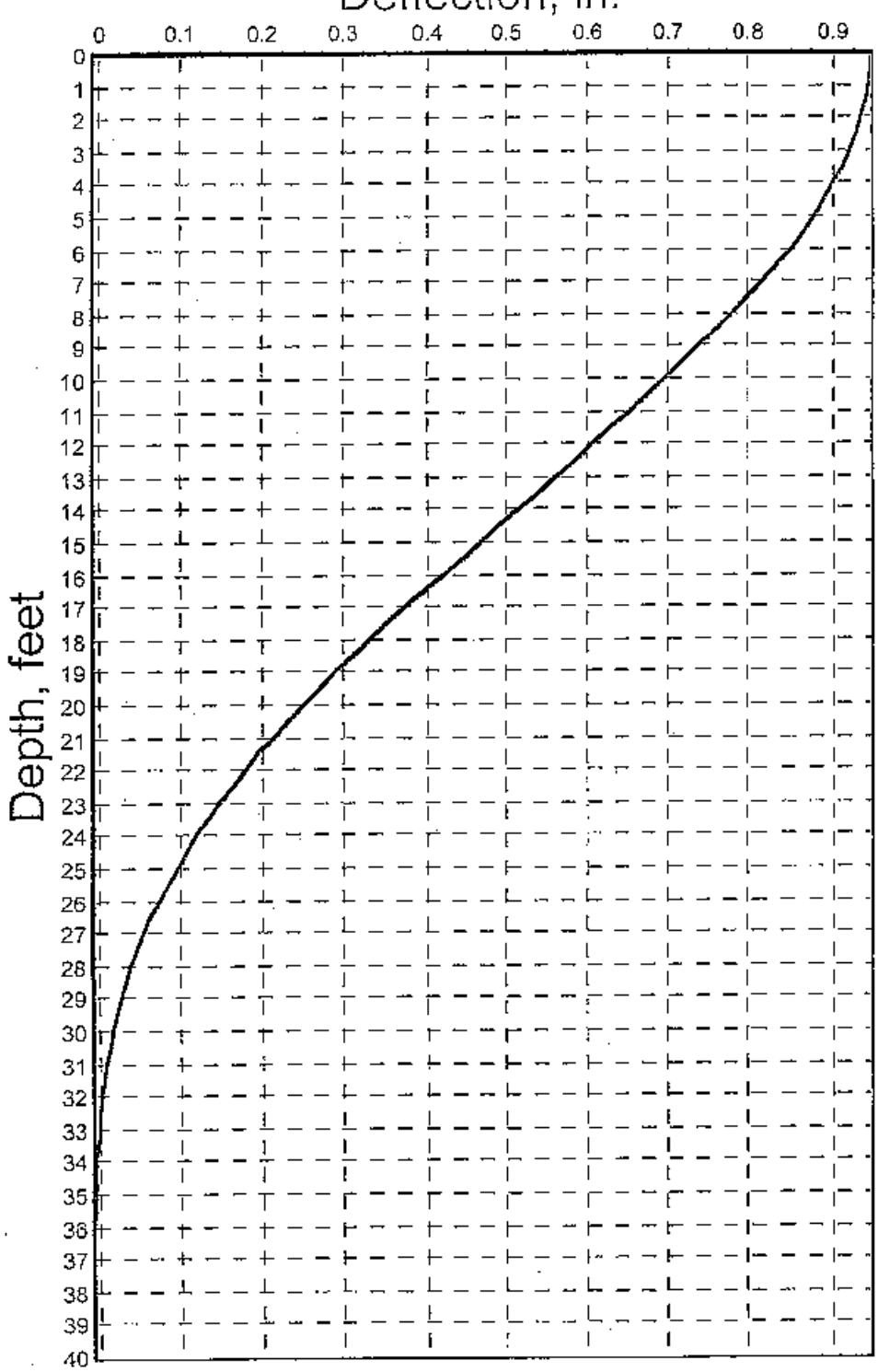
Type 1 = Shear and Moment, y = pile-head displacement in
Type 2 = Shear and Slope, M = Pile-Head Moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = Pile-Head Shear Force lbs
Type 4 = Deflection and Moment, S = Pile-Head Slope, radians
Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 2	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
2	V=	12000. S= 0.000	200000.	1.2691	-6918804.	74435.5108

The analysis ended normally.

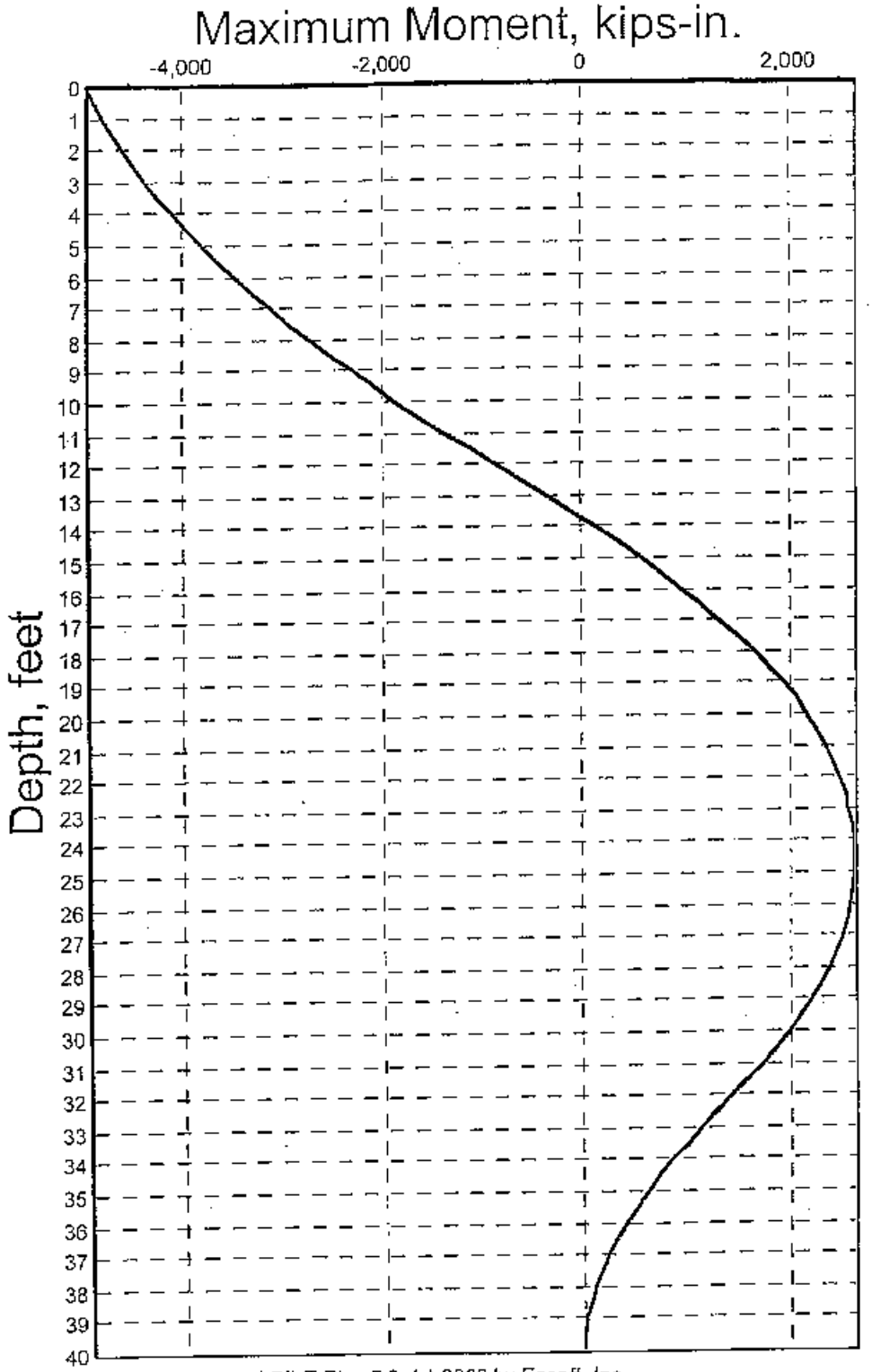
18.000	1.260	-6635940.	18514.9838	-.0010006	3229.4045	330.6216	418.5087
24.000	1.253	-6517502.	20528.8816	-.0013238	3175.9993	340.6810	430.6019
30.000	1.244	-6386416.	22803.3268	-.0016410	3118.1042	350.7973	442.5644
36.000	1.233	-6242324.	24739.8386	-.0019513	3056.5643	360.9733	454.3717
42.000	1.221	-6084869.	26935.1926	-.0022543	2989.2245	371.2114	466.0242
48.000	1.206	-5913692.	29193.3691	-.0025492	2916.9286	381.5141	477.5172
54.000	1.190	-5728431.	31513.5611	-.0028359	2839.5203	391.8833	488.8470
60.000	1.172	-5528724.	33896.1728	-.0031120	2756.8420	402.3207	500.0107
66.000	1.153	-5314208.	36341.6178	-.0033785	2668.7360	412.8277	511.0063
72.000	1.132	-5084516.	38850.3170	-.0036340	2574.0435	423.4056	521.8329
78.000	1.109	-4839252.	41422.6965	-.0038779	2472.6052	434.0545	532.4906
84.000	1.085	-4578137.	44059.1887	-.0041094	2364.2608	444.7753	542.9803
90.000	1.060	-4303710.	46760.2149	-.0043276	2248.8496	455.5678	553.3040
96.000	1.033	-4016628.	49526.2134	-.0045318	2086.2101	466.4317	563.4643
102.000	1.005	-3695519.	52357.6068	-.0047211	1951.1800	477.3661	573.4661
108.000	.976594	-3367006.	55241.3543	-.0048946	1806.5864	488.3681	583.3161
114.000	.946729	-3020875.	58147.5239	-.0050516	1658.3660	484.0401	575.0748
120.000	.915974	-2659112.	61059.5091	-.0051912	1506.4826	465.8217	553.3508
126.000	.884435	-2275302.	63977.4471	-.0053124	1334.9403	486.8243	580.9918
132.000	.852225	-1876633.	66901.4516	-.0054145	1161.7330	407.8438	568.6075
138.000	.819462	-1459890.	69831.6133	-.0054965	980.8551	488.8767	586.2076
144.000	.786267	-1025462.	72925.5117	-.0055576	792.3012	875.7564	1047.8263
150.000	.752771	-558446.	74435.5108	-.0055965	590.0373	-705.7564	5625.2690
156.000	.719109	-118801.	70193.1079	-.0056132	398.7865	-707.7112	5904.8979
162.000	.685413	296367.	65955.1002	-.0056088	475.8537	-705.6247	6176.9329
168.000	.651804	686118.	61756.5336	-.0055847	645.0166	-693.8976	6387.4054
174.000	.618387	1050849.	57629.3366	-.0055420	803.3127	-681.8345	6615.5055
180.000	.585300	1390971.	53575.4923	-.0054820	950.9423	-669.4469	6862.6048
186.000	.552613	1706911.	49596.9146	-.0054058	1088.0691	-656.7456	7130.6185
192.000	.520430	1999108.	45695.4556	-.0053147	1214.8906	-643.7407	7421.6414
198.000	.488836	2268012.	41872.9090	-.0052099	1331.6025	-630.4415	7738.0701
204.000	.457911	2514087.	38131.0744	-.0050923	1438.4056	-616.8567	8082.6550
210.000	.427728	2737806.	34471.4615	-.0049633	1535.5060	-602.9943	8458.5640
216.000	.398352	2938656.	30895.8943	-.0048237	1623.1145	-588.8615	8868.4594
222.000	.369843	3120134.	27405.9153	-.0046748	1701.4469	-574.4648	9319.5932
228.000	.342255	3279746.	24003.0903	-.0045175	1770.7233	-559.8102	9813.9260
234.000	.315633	3419013.	20688.9525	-.0043529	1831.1687	-544.9024	10358.2743
240.000	.290020	3538461.	17465.0384	-.0041819	1883.0325	-529.7456	10959.4978
246.000	.265450	3638629.	14332.7428	-.0040055	1926.4884	-514.3429	11625.7370
252.000	.241954	3720067.	11293.6254	-.0038246	1961.8346	-498.6963	12366.7137
258.000	.219555	3783332.	8349.1175	-.0036402	1989.2934	-482.8068	13194.1485
264.000	.198272	3828993.	5500.6809	-.0034531	2009.1115	-466.6725	14122.2430
270.000	.178117	3857628.	2749.7869	-.0032642	2021.5390	-450.2922	15168.4147
276.000	.159100	3869824.	97.9284	-.0030743	2026.8335	-433.6607	16354.2191
282.000	.141225	3866181.	-2453.3661	-.0028842	2025.2522	-416.7708	17706.6434
288.000	.124490	3847306.	-4902.5151	-.0025946	2017.0589	-399.6121	19259.9285
294.000	.108890	3813818.	-7247.8612	-.0025063	2002.5252	-382.1699	21058.1536
300.000	.094414	3768367.	-9487.6432	-.0023200	1981.9214	-364.4241	23159.0427
306.000	.081049	3705534.	-11619.9574	-.0021364	1955.5231	-346.3473	25639.6809
312.000	.068778	3632035.	-13642.7056	-.0019561	1923.6262	-327.9024	28605.4781
318.000	.057577	3546516.	-15553.5282	-.0017796	1886.5089	-309.0382	32204.4793
324.000	.047422	3449664.	-17348.8143	-.0016077	1844.4720	-289.7238	77093.9485
330.000	.038284	3330672.	-21825.1138	-.0014411	1792.8262	-562.8427	80209.5725
336.000	.030129	3191221.	-25047.4813	-.0012808	1732.3007	-511.2831	101818.
342.000	.022915	3033176.	-27944.4648	-.0011278	1663.7016	-454.3747	118971.
348.000	.016596	2858594.	-30482.1583	-.0009830	1587.9314	-391.5231	141550.
354.000	.011119	2668749.	-32621.0408	-.0008471	1505.9874	-321.4377	173446.
360.000	.006430	2468174.	-34205.8320	-.0007208	1418.9125	-206.8427	192996.
366.000	.002470	2261008.	-35070.0629	-.0006046	1329.5626	-81.2176	197316.
372.000	-.000824	2049785.	-35230.6107	-.0004986	1236.8953	27.7017	201636.
378.000	-.003519	1839436.	-34785.6056	-.0004030	1145.5892	120.6133	205956.
384.000	-.005661	1633124.	-33820.6691	-.0003177	1056.1302	198.3855	210276.
390.000	-.007326	1434256.	-32447.4505	-.0002423	968.7291	262.0207	214596.
396.000	-.008568	1244536.	-30723.5271	-.0001765	883.3854	312.6204	218916.
402.000	-.009443	1065997.	-28731.6072	-.0001197	809.8946	351.3528	223236.
408.000	-.010004	900044.	-26538.2824	-7.1351E-05	737.8603	379.4221	227556.
414.000	-.010300	747691.	-24206.8942	-3.0855E-05	671.7436	398.0406	231876.
420.000	-.010375	609635.	-21782.5608	2.5042E-06	611.8209	408.4038	236196.
426.000	-.010270	486240.	-19327.3460	2.8437E-05	558.2640	411.6675	240516.
432.000	-.010021	377636.	-16865.5592	5.0669E-05	511.1208	408.8284	244836.
438.000	-.009662	283732.	-14435.3536	6.6923E-05	470.3697	401.2068	249156.

Lat Deflection vs. Depth, Load Cndn #2b
Panay Way Parcel 21 LA-01052-01



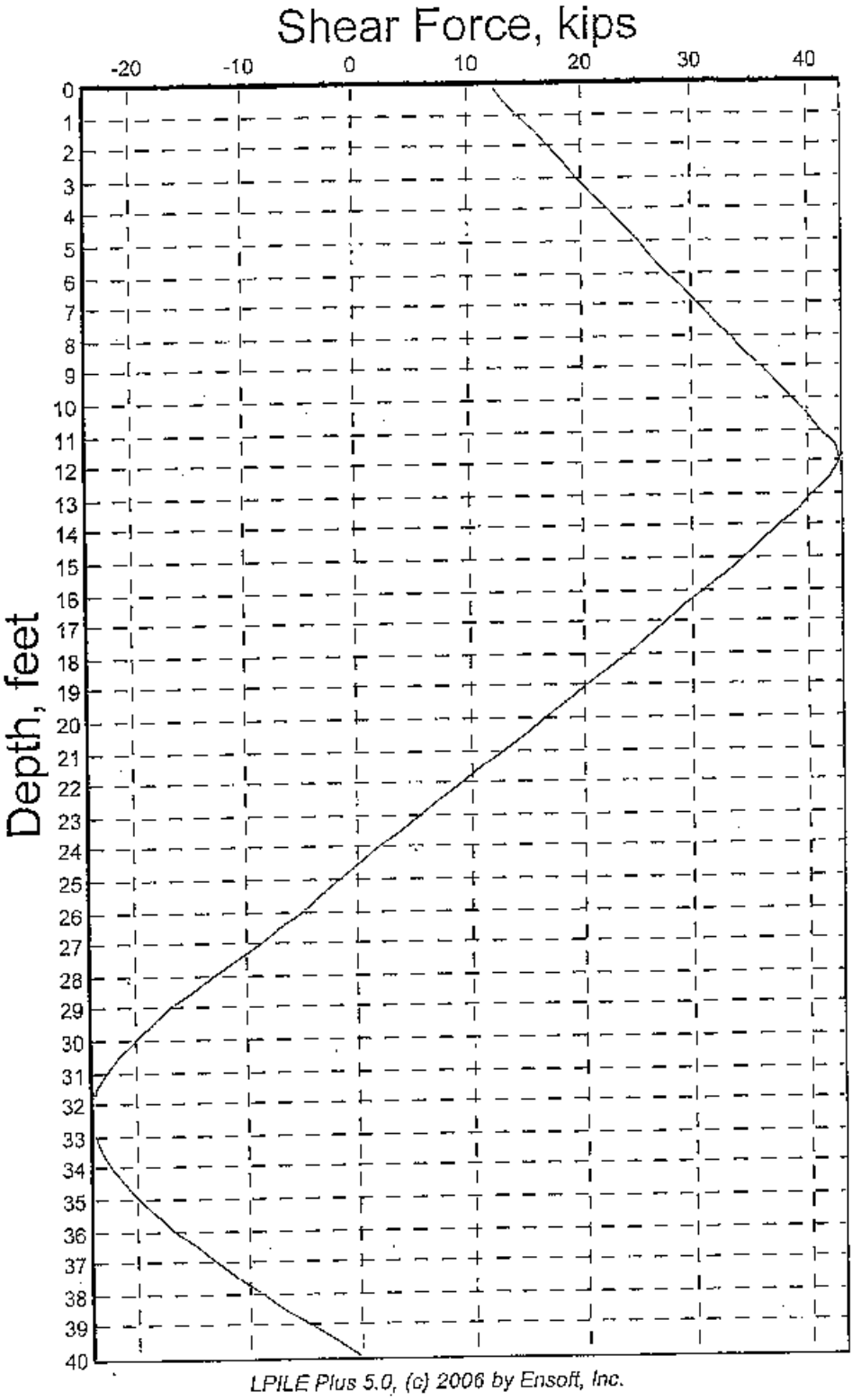
LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

Bend Mmnt vs. Depth, Load Cndn #2b
Panay Way Parcel 21 LA-01052-01



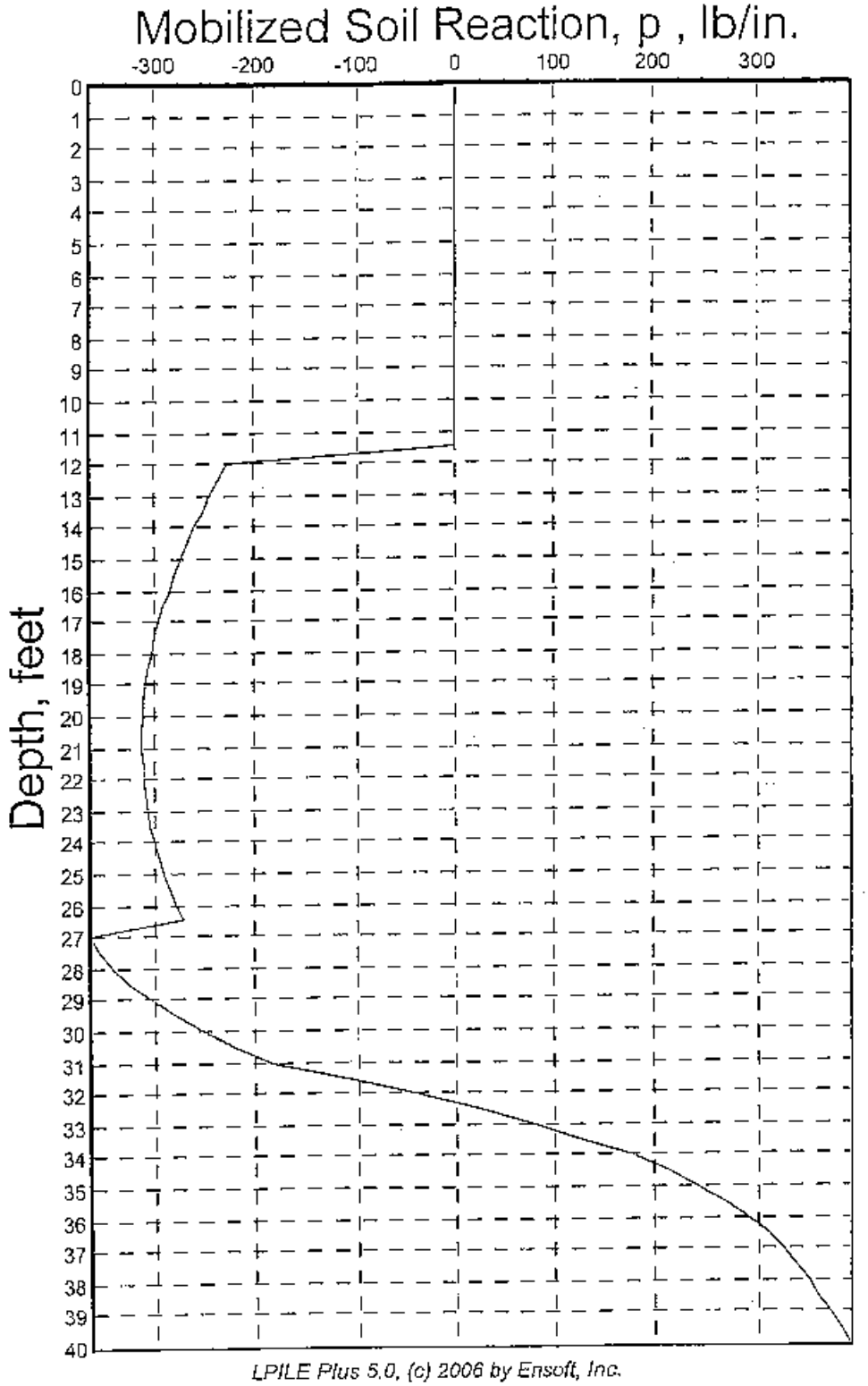
LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

Shear Force vs. Depth, Load Condition #2b
Panay Way Parcel 21 LA-01052-01



LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

Mbed Soil Reaction vs. Depth, Load Condition #26
Panay Way Parcel 21 LA01052-01



LPILE Plus 5.0, (c) 2006 by Ensoft, Inc.

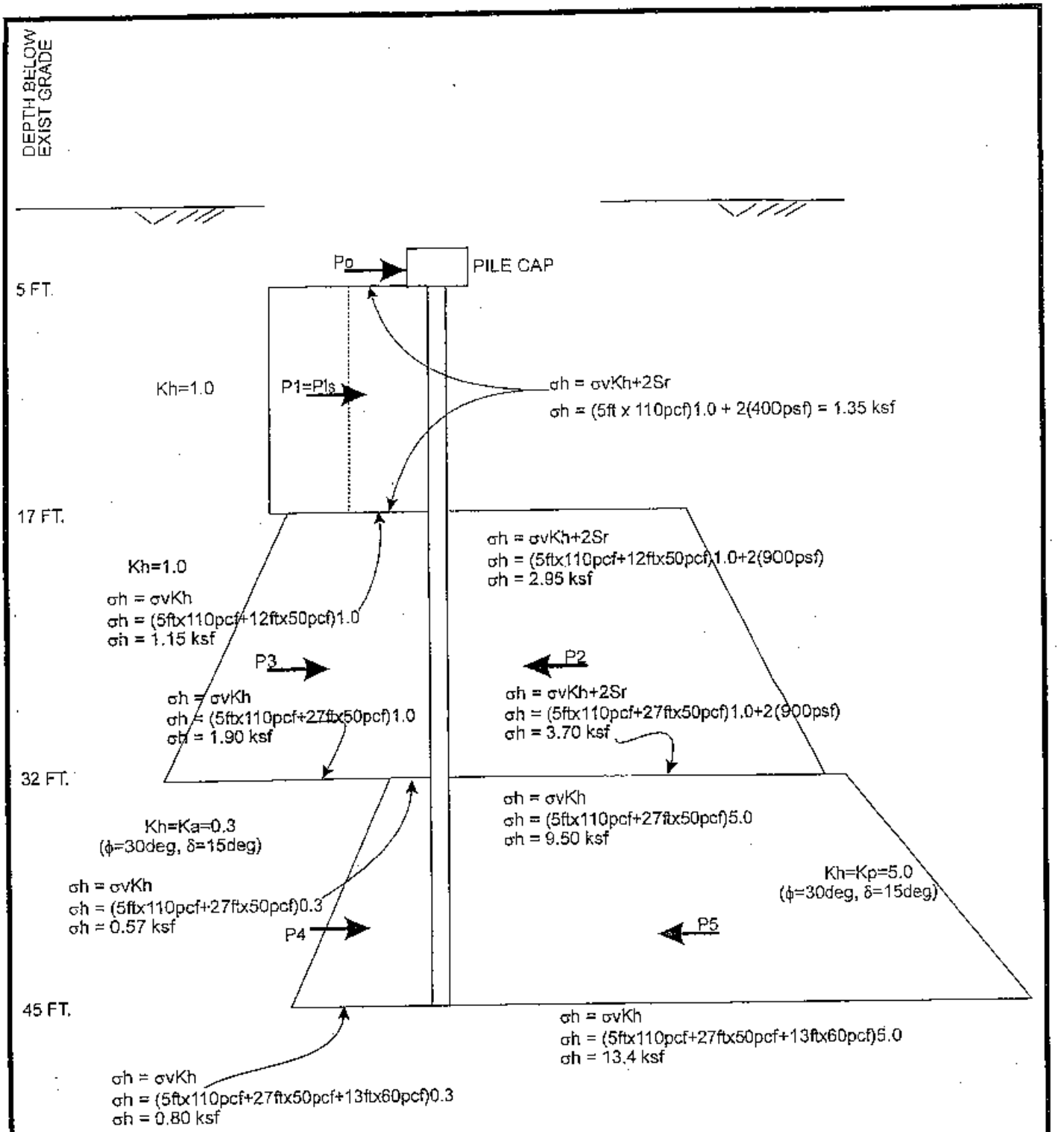


PLATE H4

FREE BODY - LOAD CONDITION #2

PROPOSED COMMERCIAL DEVELOPMENT
PANAY WAY PARCEL 21
MARINA DEL REY, CALIFORNIA

Earth Systems
Southern California

8-21-2006	LA-01052-01

- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 80
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 1

Pile Structural Properties and Geometry

Pile Length = 480.00 in
Depth of ground surface below top of pile = 144.00 in
Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	24.00000000	27648.0000	576.0000	4415000.
2	480.0000	24.00000000	27648.0000	576.0000	4415000.

Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is soft clay, p-y criteria by Matlock, 1970
Distance from top of pile to top of layer = 144.000 in
Distance from top of pile to bottom of layer = 324.000 in

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 324.000 in
Distance from top of pile to bottom of layer = 1200.000 in
p-y subgrade modulus k for top of soil layer = 120.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 120.000 lbs/in**3

(Depth of lowest layer extends 720.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

LPILE Plus for Windows, Version 5.0 (5.0.26)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

(c) 1985-2006 by Ensoft, Inc.
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This program is licensed to:

User
Earth Systems Southern California

Path to file locations: C:\Documents and Settings\marlr\My Documents\PROJECTS\PanayPcl19_21\LPILE\
Name of input data file: PanayLC2b.lpd
Name of output file: PanayLC2b.lpo
Name of plot output file: PanayLC2b.lpp
Name of runtime file: PanayLC2b.lpr

Time and Date of Analysis

Date: August 24, 2006 Time: 11:10:41

Problem Title

Panay Way Parcel 21, Load Condition #2b - Lateral Spreading by uniform pressure

Program Options

Units Used in Computations = US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 1:
- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix elements

2	144.000	225.00000

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Slope (BC Type 2)
Shear force at pile head = 12000.000 lbs
Slope at pile head = .000 in/in
Axial load at pile head = 200000.000 lbs

(Zero slope for this load indicates fixed-head condition)

Computed Values of Load Distribution and Deflection for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Slope (BC Type 2)
Specified shear force at pile head = 12000.000 lbs
Specified slope at pile head = 0.000E+00 in/in
Specified axial load at pile head = 200000.000 lbs

(Zero slope for this load indicates fixed-head conditions)

Depth X in	Deflec. Y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res. p lbs/in	Es*h Y/L lbs/in
0.000	.945852	-4325795.	12000.0000	1.8504E-17	2465.3540	0.0000	0.0000
6.000	.945125	-4851624.	13012.5000	-.0002403	2452.9620	0.0000	0.0000
12.000	.942968	-4769068.	14362.5000	-.0004767	2417.1302	0.0000	0.0000
18.000	.939404	-4678130.	15712.5000	-.0007089	2377.6607	0.0000	0.0000
24.000	.934461	-4578817.	17062.5000	-.0009384	2334.5556	0.0000	0.0000
30.000	.928167	-4471133.	18412.5000	-.0011589	2287.8181	0.0000	0.0000
36.000	.920555	-4355085.	19762.5000	-.0013758	2237.4502	0.0000	0.0000
42.000	.911658	-4230681.	21112.5000	-.0015868	2183.4553	0.0000	0.0000
48.000	.901513	-4097927.	22462.5000	-.0017915	2125.8364	0.0000	0.0000
54.000	.890160	-3956831.	23812.5000	-.0019894	2064.5970	0.0000	0.0000
60.000	.877640	-3807402.	25162.5000	-.0021803	1999.7406	0.0000	0.0000
66.000	.863997	-3649648.	26512.5000	-.0023635	1931.2712	0.0000	0.0000
72.000	.849278	-3483580.	27862.5000	-.0025388	1859.1927	0.0000	0.0000
78.000	.833531	-3309206.	29212.5000	-.0027058	1783.5096	0.0000	0.0000
84.000	.816808	-3126535.	30562.5000	-.0028640	1704.2257	0.0000	0.0000
90.000	.799163	-2935582.	31912.5000	-.0030129	1621.3464	0.0000	0.0000
96.000	.780653	-2736355.	33262.5000	-.0031523	1534.8763	0.0000	0.0000
102.000	.761335	-2528866.	34612.5000	-.0032817	1444.8205	0.0000	0.0000
108.000	.741272	-2313129.	35962.5000	-.0034007	1351.1844	0.0000	0.0000
114.000	.720526	-2089155.	37312.5000	-.0035089	1253.9734	0.0000	0.0000
120.000	.699164	-1856957.	38662.5000	-.0036059	1153.1933	0.0000	0.0000
126.000	.677255	-1616550.	40012.5000	-.0036913	1048.8500	0.0000	0.0000
132.000	.654869	-1367948.	41362.5000	-.0037646	940.9497	0.0000	0.0000
138.000	.632079	-1111165.	42712.5000	-.0038256	829.4988	0.0000	0.0000
144.000	.608962	-846217.	43046.6525	-.0038737	714.5036	-226.1158	2327.8818
150.000	.585595	-585309.	42000.8500	-.0039089	601.2624	-224.9850	2407.6538

Distribution of effective unit weight of soil with depth
is defined using 4 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	144.00	.03500
2	324.00	.03500
3	324.00	.04500
4	1200.00	.04500

Shear Strength of Soils

Distribution of shear strength parameters with depth
defined using 4 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	144.000	6.25000	.00	.01000	.0
2	324.000	6.25000	.00	.01000	.0
3	324.000	.00000	30.00	------	------
4	1200.000	.00000	30.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves

Distributed Lateral Loading

Distributed lateral load intensity defined using 2 points

Point No.	Depth X in	Dist. Load lbs/in
1	.000	225.00000

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacement in
Type 2 = Shear and Slope, M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment, S = Pile-head Slope, radians
Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
2	V= 12000.	S= 0.000	200000.	.9458517	-4925795.	43046.6525

The analysis ended normally.

156.000	.562056	-332825.	40565.5987	-.0039314	491.6777	-243.4321	2588.6616
162.000	.538418	-89086.0279	39080.9706	-.0039418	385.8888	-251.4439	2802.6297
168.000	.514754	145607.	37549.8161	-.0039404	430.4195	-259.0076	3019.6056
174.000	.491133	370966.	35974.2608	-.0039277	508.2319	-266.1108	3238.9815
180.000	.467622	596724.	34357.7040	-.0039042	601.8760	-272.7415	3459.5347
186.000	.444283	822629.	32702.6161	-.0038703	691.2451	-278.8819	3786.3535
192.000	.421178	988447.	31012.5366	-.0038265	776.2355	-284.5387	4053.4658
198.000	.398365	1173863.	29289.8722	-.0037734	856.7540	-289.6828	4363.4754
204.000	.375898	1348881.	27537.8851	-.0037113	932.7175	-294.3096	4697.7029
210.000	.353828	1513325.	25759.7431	-.0036410	1004.0472	-298.4084	5060.2161
216.000	.332206	1666936.	23958.6084	-.0035628	1070.6736	-302.9692	5453.0897
222.000	.311075	1809379.	22137.7557	-.0034774	1132.5430	-306.9813	5882.4702
228.000	.290477	1940835.	20300.5037	-.0033852	1189.5967	-307.4363	6350.3034
234.000	.270452	2061110.	18450.8236	-.0032868	1241.8010	-309.3231	6862.3625
240.000	.251034	2170121.	16589.3566	-.0031829	1289.1174	-310.6326	7424.4604
246.000	.232257	2267833.	14724.3937	-.0030738	1331.5246	-311.3551	8043.3737
252.000	.214149	2354196.	12855.8851	-.0029602	1369.0089	-311.4811	8721.0563
258.000	.196734	2429208.	10988.4394	-.0028427	1401.5660	-311.0008	9484.6912
264.000	.180037	2492860.	9125.7237	-.0027217	1429.2015	-309.9044	10328.0491
270.000	.164074	2545249.	7271.4662	-.0025979	1451.9309	-308.1815	11269.8495
276.000	.148862	2586373.	5429.4519	-.0024718	1469.7796	-305.8213	12326.3673
282.000	.134413	2616334.	3603.5566	-.0023438	1482.7840	-302.8125	13517.7198
288.000	.120735	2635241.	1797.6819	-.0022148	1490.9888	-299.1424	14866.0272
294.000	.107835	2643222.	15.8723	-.0020852	1494.4541	-294.7974	16402.6992
300.000	.095714	2640435.	-1733.8057	-.0019552	1493.2445	-289.7619	18164.2906
306.000	.084372	2627061.	-3459.1447	-.0018258	1487.4398	-284.0178	20191.5172
312.000	.073805	2603307.	-5143.8295	-.0016972	1477.1300	-277.5438	22563.0720
318.000	.064005	2569408.	-6787.4052	-.0015701	1462.4169	-270.3141	25339.8632
324.000	.054964	2525627.	-8393.3600	-.0014449	1443.4145	-262.4085	28645.1338
330.000	.046667	2468556.	-10852.8187	-.0013221	1418.6441	-254.0481	45623.3509
336.000	.039098	2398565.	-12941.4387	-.0012025	1388.2661	-241.3253	52380.2492
342.000	.032236	2316115.	-14938.5350	-.0010867	2352.4934	-324.3735	60374.1520
348.000	.026058	2221911.	-16923.3780	-.0009751	1311.5931	-303.9075	69976.5307
354.000	.020535	2116805.	-18574.4724	-.0008685	1265.8074	-279.7906	81750.8939
360.000	.015636	2001101.	-20169.1844	-.0007673	1215.7558	-251.7800	96615.4162
366.000	.011327	1876436.	-21582.7819	-.0006720	1161.6388	-219.4191	116225.
372.000	.007572	1743721.	-22786.4013	-.0005830	1104.0454	-181.7803	144046.
378.000	.004331	1604378.	-23680.7539	-.0005007	1043.5610	-138.9969	184852.
384.000	.001563	1460557.	-24177.9083	-.0004256	981.1881	-44.0716	169172.
390.000	-.000774	1315264.	-24243.0802	-.0003572	918.0832	22.3773	173492.
396.000	-.002723	1170598.	-23933.8318	-.0002961	855.2943	80.6909	177812.
402.000	-.004327	1028768.	-23291.6923	-.0002420	793.7365	131.3475	182132.
408.000	-.005628	891607.	-22379.0183	-.0001948	734.2042	174.8773	186452.
414.000	-.006665	760888.	-21218.6287	-.0001542	677.3818	211.9192	190772.
420.000	-.007478	637353.	-19853.3898	-.0001199	623.8512	243.1605	195092.
426.000	-.008104	522735.	-18315.9318	-9.1363E-05	574.1038	269.3256	199412.
432.000	-.008575	417781.	-16634.4864	-6.0248E-05	528.5508	291.1562	203732.
438.000	-.008923	323285.	-14832.8391	-3.0034E-05	487.5366	309.3928	208052.
444.000	-.009175	239907.	-12930.3936	-3.6193E-05	451.3486	324.7557	212372.
450.000	-.009357	166207.	-10942.3462	-2.6183E-05	420.2287	337.9268	216692.
456.000	-.009488	102662.	-8879.9687	-1.8358E-05	394.3845	349.5324	221012.
462.000	-.009588	51693.6922	-6750.9972	-1.5171E-05	373.9990	360.1248	225332.
468.000	-.009671	27666.3410	-4560.1282	-1.2975E-05	359.2389	370.1649	229652.
474.000	-.009745	7003.2937	-2309.6195	-1.2122E-05	350.2610	380.0045	233972.
480.000	-.009817	0.0000	0.0000	-1.1950E-05	347.2222	389.6685	119146.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection	=	.94555163 in
Computed slope at pile head	=	1.0503722E-17
Maximum bending moment	=	-4925795. lbs-in
Maximum shear force	=	43046.65250 lbs
Depth of maximum bending moment	=	0.00000 in
Depth of maximum shear force	=	144.00000 in
Number of iterations	=	20
Number of zero deflection points	=	1

Po = LATERAL LOAD APPLIED BY BUILDING AT PILE CAP
= 25 kips

P1=LATERAL SPREADING EARTH LOADS (Pls)

= (1.350 ksf) (12ft length of pile)(2ft wide)
= 32.4kips

P2 = LATERAL EARTH LOAD OF LIQUEFIED NON-SPREADING SOIL (LEEWARD SIDE OF PILE)

= 0.5(σh1 + σh2)h = 0.5(2.95+3.70)(15ft)(2ft wide)
= 99.8 kips

P3 = LATERAL EARTH LOAD OF LIQUEFIED NON-SPREADING SOIL (SOUTH SIDE OF PILE)

= 0.5(σh1 + σh2)h = 0.5(1.50+1.9)(15ft)(2ft wide)
= 51.0 kips

P4 = ACTIVE LATERAL EARTH LOAD OF BEARING SOIL

= 0.5(σh1 + σh2)h = 0.5(0.57+0.804)(13ft)(2ft wide)
= 33.0 kips

P5 = PASSIVE LATERAL EARTH LOAD OF BEARING SOIL

= 0.5(σh1 + σh2)h = 0.5(9.5+13.4)(13ft)(2ft wide)
= 298 kips

PLATE H5

FREE BODY FORCES-LOAD CONDITION #2	
PROPOSED COMMERCIAL DEVELOPMENT PANAY WAY PARCEL 21 MARINA DEL REY, CALIFORNIA	
Earth Systems Southern California	
8-21-2006	LA-01052-01

August 21, 2006

24-inch Square Concrete Pile

Panay Way Parcel 21
LA-01052-01

LOAD CONDITION #2

Force No.	Force (kip)	Height from Pile Tip (ft)	Driving Moment About Pile Tip (k-ft)	Resisting Moment About Pile Tip (k-ft)
Po=Apld Bldg+Crust Load	25	40.0	1000	
P1=Pls,liqsoil	32.4	34.0	1102	
P2	-99.8	20.5		-2046
P3	51	20.5	1046	
P4	33	6.5	215	
P5	-298	6.5		-1937
Mo=Resist Mmt at Pile Cap				-437
		Sum Moments	3362	-4420

Overturning Safety Factor: 1.31

Note: Value for resisting moment of the fixed-head pile cap at the top of the pile is the value used in the structural design.

Driving Forces	(kips)	Resisting Forces	(kips)
Po=Apld Bldg+Crust Load	25.0		
P1 = Pls,liqsoil	32.4		
P3	51.0	P2	-99.8
P4	33.0	P5	-298
Sum Forces	141		-398

Sliding (translation) Safety Factor: 2.81

Drainage Concept / Hydrology Study / SUSMP Reports

APPENDIX C

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION
ENGINEERING AND SURVEY BRANCH
STORM DRAIN AND HYDROLOGY SECTION

TO: S.E.C. Civil Engineers, Inc. DATE 6/10/09

Attention Ronald Spindler

REVIEW OF DRAINAGE CONCEPT / HYDROLOGY STUDY / SUSMP

CUP NO. 200600115
SUBMITTAL DATE 6/08/09

We have reviewed your Drainage Concept / Hydrology Study / SUSMP.

[X] The drainage concept / hydrology study / SUSMP has been approved for Area and Q only subject to the comments noted on the returned map and report.

AZ **APPROVED BY** Lizbeth Córdova

LIZBETH CORDOVA
(626) 458-4921

DRAINAGE CONCEPT/HYDROLOGY STUDY/SUSMP

APPROVED FOR AREA AND Q ONLY

APPROVED BY: [signature] RCE NO. C68328 DATE: 6/10/09

CHECKED BY: _____ DATE: 6/10/09

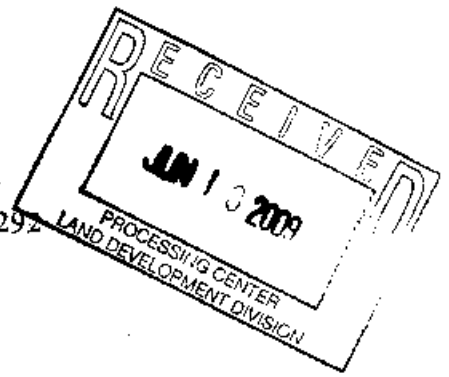
LAND DEVELOPMENT DIVISION

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

Drainage Concept/Hydrology Study/SUSMP

For CUP ND.200600115

OCEANA LUXURY RETIREMENT HOMES



Project Site:

4220 Admiralty Way
Marina Del Ray, CA 90292

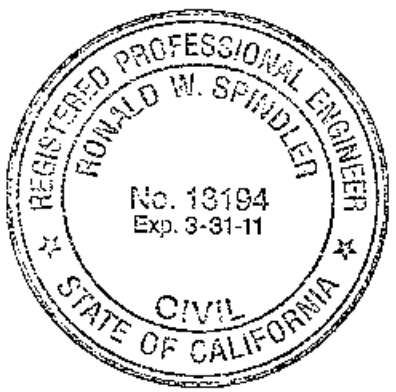
Prepared By:

S.E.C. Civil Engineers, Inc.
16823 Saticoy Street
Van Nuys, CA 91406
(818) 782-2788

For:

Prestige Homes, Inc.
5150 Overland Avenue
Culver City, CA 90230

June, 08, 2009



RCE 13194
EXP. 03-31-11

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I. INTRODUCTION:

This "Hydrology Study" addresses the hydrological issues associated with the proposed development of a condominium project with 115 luxury retirement units. The project site encompasses approximately 2 acres of land. The 25 Year flood is the design storm used for calculating peak flows.

II. EXISTING CONDITIONS:

The project site presently is a parking lot facility with an impervious surface area about 71%. The Northern part of the lot with an area of A=1.8 ac sheet flows Northeasterly to Washington Blvd and discharges to Oxford Retention Basin through catch basin alternately discharges to basin "E" via Los Angeles County underground storm drains. The total discharge from this area is 5 cfs. The Southern portion of the existing parking lot with an area at A=0.06 ac and runoff of 0.14 cfs discharges to Admiralty Way and ultimately goes to Grand Canal via Storm Drains on Via Marina, Alley and Washington Blvd. The Eastern portion of the site with an area of 0.3 ac. and discharge of 0.76 cfs sheet flows to the Oxford Retention Basin.

III. PROPOSED DEVELOPED:

The proposed development of the 115-unit residential retirement community increases the impervious about 87%. The proposed developed area consists of two portions: Northern and Southern; The Northern portion with an area of approximately 1.8 ac. and discharge of 5 cfs goes to Washington Blvd. and through catch basin goes to Oxford Retention Basin alternately discharges to basin "E" via Los Angeles County underground storm drains. The Southern portion of proposed development with an area of 0.1 ac discharges to Admiralty Way, which is ultimately, discharges to Grand Canal with Q=0.26cfs. The Eastern portion of the site with an area of 0.23 ac remains undisturbed.

IV. SUSMP/TMDL:

Basin" E" located in Marina Del Rey is listed as impaired due to bacteria. The intent of the Bacteria TMDL is to reduce bacterial levels in the Back Basins. The RWQCB also adopted zero TMDL for toxic pollutants on Marina Del Rey Harbor. A number of BMP's was incorporated into the site to minimize water quality impact and maintain predeveloped runoff conditions by detaining the difference of 1 cfs onsite.
The discharge generated from the proposed development will be fully mitigated by Bio Basin Planters and Filterra Bio-retention Filtration System or approved equivalent to meet SUSMP and TMDL requirements. The runoff of the Northern portion of the development which includes roof is mitigated by using Bio Basin Planters. It discharges to Washington Blvd. through the sidewalk culvert. The runoff from the alley is going to Filterra and being filtered is pumped to Washington Blvd. The runoff from the hardscape area adjacent to Washington Blvd is mitigated by series of Bio Basin Planters. It discharges to Washington Blvd through the force main. The runoff from the Southern portion of the development is filtered by the Bio Basin Planters and is pumped back to Admiralty Way. The Bio-Filter Planters are sized using the method for calculating SUSMP flow rates and volumes based on 0.75 inch of rainfall.

APPENDIX A

PREDEVELOPED INPUT

Project	Subarea	Area	%imp	Frequency	Soil Type	Length	Slope	Isohyet	Fire Factor
7038	1A	0.31	0.4	25	17	310	0.01328	4.74	1
7038	2B	0.29	0.95	25	17	340	0.01250	4.74	1
7038	4C	0.77	0.95	25	17	356	0.01328	4.74	1
7038	5A	0.05	0.01	25	17	30	0.13300	4.74	1
7038	7B	0.28	0.95	25	17	320	0.01250	4.74	1
7038	9A	0.09	0.01	25	17	30	0.13300	4.74	1
7038	C	0.3	0.01	25	17	54	0.05400	4.74	1
7038	D	0.06	0.95	25	17	199	0.00190	4.74	1
		2.15							

PRE-DEVELOPED OUTPUT

Project	Subarea	Area (acre	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft	Isohyet (in	Tc-calcula	Intensity (i	Cu	Cd	Flowrate (c
7038	1A	0.31	0.4	25	17	310	0.01328	4.74	6	2.6	0.88	0.89	0.72
7038	2B	0.29	0.95	25	17	340	0.0125	4.74	6	2.6	0.88	0.9	0.68
7038	4C	0.77	0.95	25	17	356	0.01328	4.74	6	2.6	0.88	0.9	1.8
7038	5A	0.05	0.01	25	17	30	0.133	4.74	5	2.83	0.89	0.89	0.13
7038	7B	0.28	0.95	25	17	320	0.0125	4.74	6	2.6	0.88	0.9	0.66
7038	9A	0.09	0.01	25	17	30	0.133	4.74	5	2.83	0.89	0.89	0.23
7038	C	0.3	0.01	25	17	54	0.054	4.74	5	2.83	0.89	0.89	0.76
7038	D	0.06	0.95	25	17	199	0.0019	4.74	6	2.6	0.88	0.9	0.14

25 YEAR PRE DEVELOPED

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LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG
F060IM

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S.E.C. C. ENGR'S. PRESTIGE HOMES. PREDEVELOPED

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMP
7038	1A	.3	1.	.3	1.	3	50.	.00200	.00	.00	0.	17	6	A27	.4
7038	2B	.3	1.	.3	1.	4	46.	.02000	2.00	.00	0.	17	6	A27	.9
7038	3AB	.3	1.	.6	2.	3	75.	.00200	.00	.00	0.	17	0	A27	.0
7038	4C	.8	2.	.8	2.	4	46.	.02000	2.00	.00	0.	17	6	A27	.9
7038	5A	.1	0.	.7	2.	3	73.	.00200	.00	.00	0.	17	5	A27	.0
7038	6AC	.8	2.	1.5	4.	0	0.	.00000	.00	.00	0.	17	0	A27	.0
7038	7B	.3	1.	.3	1.	4	46.	.02000	2.00	.00	0.	17	6	A27	.9
7038	8B	.0	0.	.3	1.	4	60.	.00200	2.00	.00	0.	17	6	A27	.4
7038	9A	.1	0.	1.6	4.	0	0.	.00000	.00	.00	0.	17	5	A27	.0
7038	10AB	.3	1.	1.9	5.	3	1.	.00200	.00	.00	0.	17	0	A27	.0

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006  7038    5A 017 01 0.1 5A273   73000200
006  7038    6AC017        A27
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POST - DEVELOPED INPUT

Project	Subarea	Area	%imp	Frequency	Soil Type	Length	Slope	Isohyet	Fire Factor
7038	1A	0.66	1	25	17	291	0.02000	4.74	1
7038	2B	0.14	1	25	17	105	0.02000	4.74	1
7038	4A	0.46	1	25	17	296	0.02000	4.74	1
7038	5A	0.05	1	25	17	155	0.00200	4.74	1
7038	6C	0.09	1	25	17	80	0.00200	4.74	1
7038	B1	0.05	1	25	17	100	0.02000	4.74	1
7038	B2	0.03	1	25	17	100	0.02000	4.74	1
7038	B(B3→B14)	0.06	0.9	25	17	25	0.00200	4.74	1
7038	~~8B~~ 12C	0.25	0.9	25	17	325	0.028	4.74	1
7038	~~12A~~ 14A	0.03	0.42	25	17	60	0.002	4.74	1
7038	E	0.09	0.9	25	17	65	0.05000	4.74	1
7038	D	0.23	0.01	25	17	28	0.30000	4.74	1
7038	F	0.01	0.9	25	17	30	0.071	4.74	1

POST - DEVELOPED OUTPUT

Project	Subarea	Area (ac	%imp	Frequer	Soil Typ	Length	Slope (f	Isohyet	Tc-calcu	Intensity	Cu	Cd	Flow rat	Tc Equa	Fire Fac	Burned	Volume
7038	1A	0.66	1	25	17	291	0.02	4.74	5	2.83	0.89	0.9	1.68	Tc=(10)	1	n/a	0.23
7038	2B	0.14	1	25	17	105	0.02	4.74	5	2.83	0.89	0.9	0.36	Tc=(10)	1	n/a	0.05
7038	4A	0.46	1	25	17	296	0.02	4.74	5	2.83	0.89	0.9	1.17	Tc=(10)	1	n/a	0.16
7038	5A	0.05	1	25	17	155	0.002	4.74	5	2.83	0.89	0.9	0.13	Tc=(10)	1	n/a	0.02
7038	6C	0.09	1	25	17	80	0.002	4.74	5	2.83	0.89	0.9	0.23	Tc=(10)	1	n/a	0.03
7038	B1	0.05	1	25	17	100	0.02	4.74	5	2.83	0.89	0.9	0.13	Tc=(10)	1	n/a	0.02
7038	B2	0.03	1	25	17	100	0.02	4.74	5	2.83	0.89	0.9	0.08	Tc=(10)	1	n/a	0.01
7038	B(B3→B4)	0.06	0.9	25	17	25	0.002	4.74	5	2.83	0.89	0.9	0.15	Tc=(10)	1	n/a	0.02
7038	~~3~~ 12C	0.25	0.9	25	17	325	0.0281	4.74	5	2.83	0.89	0.9	0.64	Tc=(10)	1	n/a	0.08
7038	1~~4~~A	0.03	0.42	25	17	60	0.002	4.74	5	2.83	0.89	0.89	0.08	Tc=(10)	1	n/a	0.01
7038	E	0.09	0.9	25	17	65	0.05	4.74	5	2.83	0.89	0.9	0.23	Tc=(10)	1	n/a	0.03
7038	D	0.23	0.01	25	17	28	0.3	4.74	5	2.83	0.89	0.89	0.58	Tc=(10)	1	0.61	0.02
7038	F	0.01	0.9	25	17	30	0.071	4.74	5	2.83	0.89	0.9	0.03	Tc=(10)	1	n/a	0

FIRST FLUSH

Project	Subarea	Area (ac	%Imp	Frequen	Soil Typ	Length	Slope (f	Isohyet	Tc-calcu	Intensity	Cu	Cd	Flow rat	Tc Equa	Fire Fac	Burned	Volume
7038	1A	0.61	1	first flus	17	291	0.02	0.75	18	0.25	0.1	0.9	0.14	Tc=(10)	1	n/a	0.03
7038	2B	0.14	1	first flus	17	105	0.02	0.75	9	0.34	0.17	0.9	0.04	Tc=(10)	1	n/a	0.01
7038	4A	0.44	1	first flus	17	296	0.02	0.75	18	0.25	0.1	0.9	0.1	Tc=(10)	1	n/a	0.02
7038	5A	0.05	1	first flus	17	155	0.002	0.75	18	0.25	0.1	0.9	0.01	Tc=(10)	1	n/a	0
7038	6C	0.09	1	first flus	17	80	0.002	0.75	12	0.3	0.1	0.9	0.02	Tc=(10)	1	n/a	0.01
7038	B1	0.05	1	first flus	17	100	0.02	0.75	9	0.34	0.17	0.9	0.02	Tc=(10)	1	n/a	0
7038	B2	0.03	1	first flus	17	100	0.02	0.75	9	0.34	0.17	0.9	0.01	Tc=(10)	1	n/a	0
7038	B(~~B3~~→~~B4~~)	0.06	0.9	first flus	17	25	0.002	0.75	6	0.41	0.3	0.84	0.02	Tc=(10)	1	n/a	0
7038	~~8D~~ 12C	0.25	0.9	first flus	17	325	0.0281	0.75	19	0.24	0.1	0.82	0.05	Tc=(10)	1	n/a	0.01
7038	E	0.07	0.9	first flus	17	65	0.05	0.75	6	0.41	0.3	0.84	0.02	Tc=(10)	1	n/a	0

DETERMINING THE VOLUME (Vm)

USE THE EQUATION:

$V_M = 2{,}722.5\ FT^2/acre \times [(A_i \times 0.9) + (A_p + A_u)(C_u)]$

FOR AREAS: 1A, 2A, 3A, 4A, 5A, B1, B2

$A_p = 0$, $A_u = 0$.

$V_{m(1A)} = 2{,}722.5 \times 0.61 \times 0.9 = 1494.7 = 1495 (FT^3)$

$V_M (2B) = 2{,}722.5 \times 0.14 \times 0.9 = 343 (FT^3)$

$V_M (4A) = 2{,}722.5 \times 0.44 \times 0.9 = 1078 (FT^3)$

$V_M (5A) = 2{,}722.5 \times 0.05 \times 0.9 = 122.5 = 123 (FT^3)$

$V_M (6C) = 2{,}722.5 \times 0.09 \times 0.9 = 221\ FT^3$

$V_M (8D) = 2{,}722.5 \times 0.25 \times 0.9 = 612\ FT^3$, USE FILTERRA 6'x6'.

$V_M (B1) = 2{,}722.5 \times 0.05 \times 0.9 = 123\ FT^3$

$V_M (B2) = 2{,}722.5 \times 0.03 \times 0.9 = 74\ FT^3$

FOR AREAS B3 TO B14 & E $A_p = 0.9 \times A_{TOT}$; $C_u = 0.3$

$V_{M\ B13, B14} = 2{,}722.5 \times \frac{(576+114)}{43560} \times 0.9 + 0.1 \times \frac{(576+114)}{43560} \times 0.3 = 38\ FT^3$

$V_M (E) = 2{,}7225 \times 0.07 \times 0.9 = 172\ FT^3$

B_3 TO $B_{12} < B_{13} + B_{14}$ ∴ BIO-FILTER PLANTERS WITH AREA OF 50 SQ FT HAVE CAPACITY TO MITIGATE B_3 TO B_{12}

S.E.C. CIVIL ENGINEERS, INC.
16823 SATICOY STREET VAN NUYS, CA. 91406
(818) 782-2788 (323) 873-1788 FAX: (818) 782-0111
RONALD W. SPINDLER R.C.E. 13194

JOB NO. 7038.00
DATE: 05-29-09
SCALE:
REVISION:
REVISION:
CLIENT:
PROJECT: PRESTIGE HOMES

25 YEAR DOS1 - DEVELOPED

Program Package Serial Number: 2050
06/09/09 FILE: 7038po INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG
F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\Program Files\Civild\lar04\cst_soilx_83.dat

S.E.C. C. ENGR'S. PRESTIGE HOMES. POSTDEVELOPED

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY PCT IMP
7038	1A	.7	2.	.7	2.	0	0.	.00000	.00	.00	0.	17	5	A27	1.0
7038	2B	.1	0.	.1	0.	4	65.	.02000	2.00	.00	0.	17	5	A27	1.0
7038	3AB	.1	1.	.8	3.	4	116.	.00732	2.00	.00	0.	17	0	A27	.0
7038	4A	.5	1.	1.3	4.	4	44.	.00568	2.00	.00	0.	17	5	A27	1.0
7038	5A	.1	0.	1.4	4.	4	152.	.00500	2.00	.00	0.	17	5	A27	1.0
7038	6C	.1	0.	.1	0.	4	75.	.02000	2.00	.00	0.	17	5	A27	1.0
7038	7AC	.1	1.	1.5	5.	4	135.	.00615	2.00	.00	0.	17	0	A27	.0
7038	8D	.0	0.	.0	0.	0	0.	.00000	.00	.00	0.	17	99	A27	.0
7038	9AD	.0	0.	1.5	5.	4	80.	.00200	2.00	.00	0.	17	0	A27	.0
7038	10B	.1	0.	.1	0.	0	0.	.00000	.00	.00	0.	17	5	A27	1.0
7038	11AB	.1	0.	1.6	5.	4	1.	.00200	2.00	.00	0.	17	0	A27	.0
7038	12C	.3	1.	.3	1.	4	85.	.00100	2.00	.00	0.	17	5	A27	.9
7038	13AC	.3	1.	1.9	6.	3	143.	.00200	.00	.00	0.	17	0	A27	.0
7038	14A	.0	0.	1.9	6.	3	1.	.00200	.00	.00	0.	17	5	A27	.4

A_{TOT} FOR 1A $= A_{1A} + A_{PLANTER\ "1A"} = 0.61 + \frac{2056}{43560} = 0.66\,(ac)$

A_{TOT} FOR 2B $= 0.14\,(ac)$

A_{TOT} FOR 4A $= A_{4A} + A_{PLANTER\ "4A"} = 0.44 + \frac{916}{43560} = 0.46\,(ac)$

A_{TOT} FOR 5A $= A_{5A} + A_{PLANTER\ "5A"} = 0.05 + \frac{200}{43560} = 0.05\,(ac)$

A_{TOT} FOR B1 $= A_{B1} + A_{PLANTER\ "B1"} = 0.05 + \frac{140}{43560} = 0.05\,(ac)$

A_{TOT} FOR E $= A_{E} + A_{PLANTER\ "E"} = 0.07 + \frac{850}{43560} = 0.09\,(ac)$

$A_{10B} = \Sigma A_{B1\ TO\ B14} = 0.1\,(ac)$

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006  7038     8D 017        99A27
006  7038     9AD017          A273   8000200
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006  7038    14A 017042 0.0 5A273     100200                2  2
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005 7038 1A S.E.C. C. ENGR'S. PRESTIGE HOMES. POSTDEVELOPED
005 7038 14A INPUT BY L.R.

Program Package Serial Number: 2050
06/08/09 FILE: 7038P INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG
F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:
INPUT BY L.R. DATE:05-29-09 File: 7038PO.INL
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500	1.	600	1.	700	1.	800	1.	900	1.
1000	1.	1050	1.	1100	1.	1110	1.	1120	1.
1130	1.	1131	1.	1132	1.	1133	1.	1134	1.
1135	1.	1136	1.	1137	1.	1138	1.	1139	1.
1140	1.	1141	2.	1142	2.	1143	2.	1144	2.
1145	2.	1146	2.	1147	2.	1148	2.	1149	2.
1150	2.	1151	2.	1152	3.	1153	3.	1154	3.
1155	2.	1156	2.	1157	2.	1158	2.	1159	1.
1160	1.	1161	1.	1162	1.	1163	1.	1164	1.
1165	1.	1166	1.	1167	1.	1168	1.	1169	1.
1170	1.	1171	1.	1172	1.	1173	1.	1174	1.
1175	1.	1176	1.	1177	1.	1178	1.	1179	1.
1180	1.	1181	1.	1182	1.	1183	1.	1184	1.
1185	1.	1186	1.	1187	1.	1188	1.	1189	1.
1190	1.	1191	1.	1192	1.	1193	1.	1194	1.
1195	1.	1196	1.	1197	1.	1198	1.	1199	1.
1200	1.	1201	1.	1202	1.	1203	1.	1204	1.
1205	1.	1206	1.	1207	1.	1208	1.	1209	1.
1210	1.	1211	1.	1212	1.	1213	1.	1214	1.
1215	1.	1216	1.	1217	1.	1218	1.	1219	1.
1220	1.	1221	1.	1222	1.	1223	1.	1224	1.
1225	1.	1226	1.	1227	1.	1228	1.	1229	1.
1230	1.	1231	1.	1232	1.	1233	1.	1234	1.
1235	1.	1236	1.	1237	1.	1238	1.	1239	1.
1240	1.	1241	1.	1242	1.	1243	1.	1244	1.
1245	1.	1246	1.	1247	1.	1248	1.	1249	1.
1250	1.	1251	1.	1252	1.	1253	1.	1254	1.
1255	1.	1256	1.	1257	1.	1258	1.	1259	1.
1260	1.	1261	1.	1262	1.	1263	1.	1264	1.
1265	1.	1266	1.	1267	1.	1268	1.	1269	1.
1270	1.	1271	1.	1272	1.	1273	1.	1274	1.
1275	1.	1276	1.	1277	1.	1278	1.	1279	1.
1280	1.	1281	1.	1282	1.	1283	1.	1284	1.
1285	1.	1286	1.	1287	1.	1288	1.	1289	1.
1290	1.	1291	1.	1292	1.	1293	1.	1294	1.
1295	1.	1296	1.	1297	1.	1298	1.	1299	1.
1300	1.	1310	1.	1320	1.	1330	1.	1340	1.
1350	1.	1360	1.	1370	1.	1380	1.	1390	1.

1400 1. 1420 1. 1440 1. 1460 1. 1500 1.

TOTAL VOLUME THIS HYDROGRAPH = 2.22(Ac.Ft)

Program Package Serial Number: 2050
06/09/09 FILE: 7038po INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG
F0601M

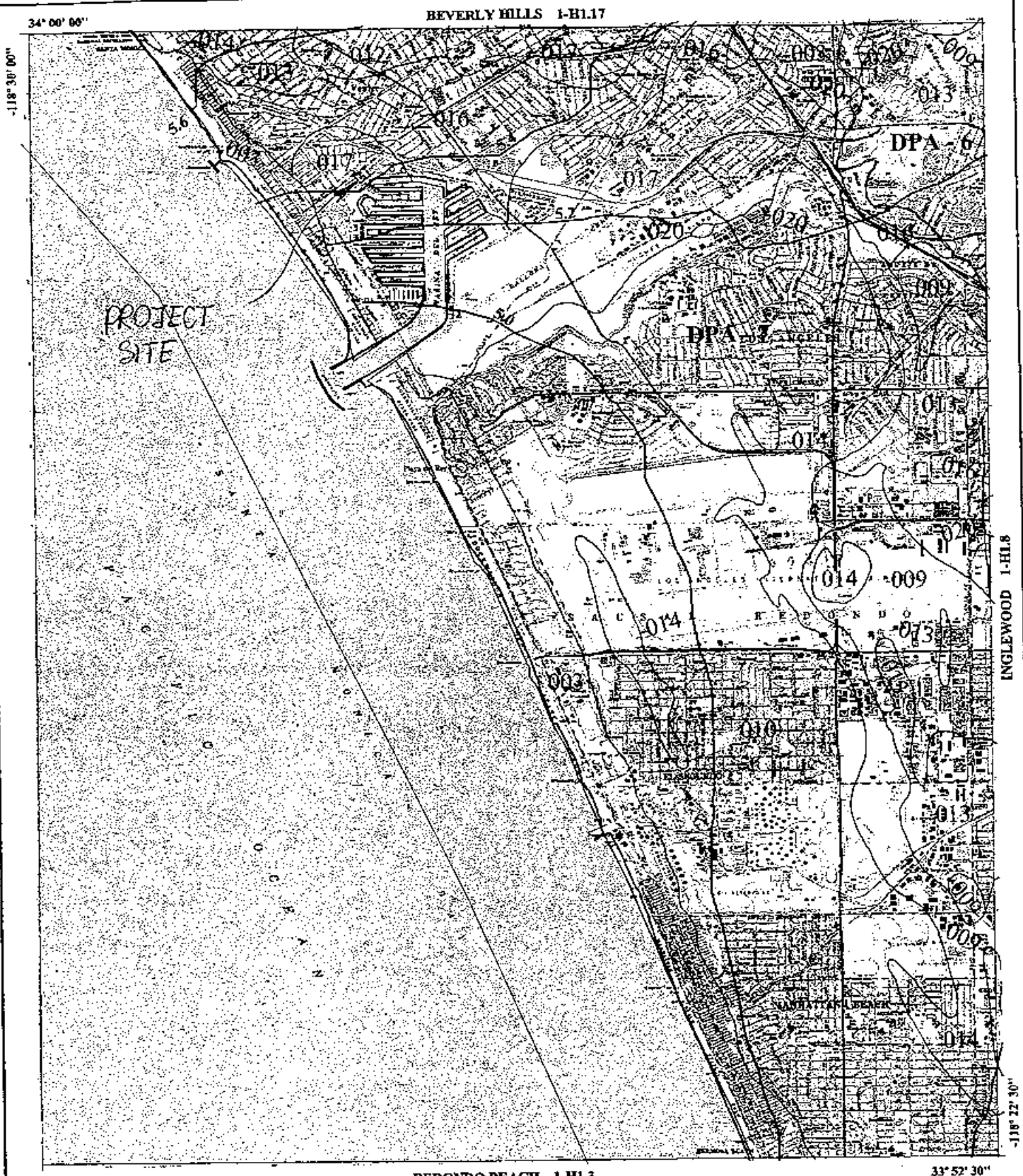
MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:
INPUT BY L.R.
HYDROGRAPH AT 7038 14A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	0.	100	3.	200	3.	300	3.	400	3.
500	3.	600	3.	700	3.	800	3.	900	3.
1000	3.	1050	3.	1100	4.	1110	4.	1120	4.
1130	4.	1131	4.	1132	4.	1133	4.	1134	4.
1135	4.	1136	4.	1137	4.	1138	4.	1139	4.
1140	4.	1141	4.	1142	4.	1143	4.	1144	4.
1145	4.	1146	4.	1147	4.	1148	4.	1149	4.
1150	4.	1151	5.	1152	5.	1153	5.	1154	5.
1155	6.	1156	6.	1157	6.	1158	6.	1159	6.
1160	6.	1161	5.	1162	5.	1163	5.	1164	4.
1165	4.	1166	4.	1167	4.	1168	4.	1169	4.
1170	4.	1171	4.	1172	4.	1173	4.	1174	4.
1175	4.	1176	4.	1177	4.	1178	4.	1179	4.
1180	4.	1181	4.	1182	3.	1183	3.	1184	3.
1185	3.	1186	3.	1187	3.	1188	3.	1189	3.
1190	3.	1191	3.	1192	3.	1193	3.	1194	3.
1195	3.	1196	3.	1197	3.	1198	3.	1199	3.
1200	3.	1201	3.	1202	3.	1203	3.	1204	3.
1205	3.	1206	3.	1207	3.	1208	3.	1209	3.
1210	3.	1211	3.	1212	3.	1213	3.	1214	3.
1215	3.	1216	3.	1217	3.	1218	3.	1219	3.
1220	3.	1221	3.	1222	3.	1223	3.	1224	3.
1225	3.	1226	3.	1227	3.	1228	3.	1229	3.
1230	3.	1231	3.	1232	3.	1233	3.	1234	3.
1235	3.	1236	3.	1237	3.	1238	3.	1239	3.
1240	3.	1241	3.	1242	3.	1243	3.	1244	3.
1245	3.	1246	3.	1247	3.	1248	3.	1249	3.
1250	3.	1251	3.	1252	3.	1253	3.	1254	3.
1255	3.	1256	3.	1257	3.	1258	3.	1259	3.
1260	3.	1261	3.	1262	3.	1263	3.	1264	3.
1265	3.	1266	3.	1267	3.	1268	3.	1269	3.
1270	3.	1271	3.	1272	3.	1273	3.	1274	3.
1275	3.	1276	3.	1277	3.	1278	3.	1279	3.
1280	3.	1281	3.	1282	3.	1283	3.	1284	3.
1285	3.	1286	3.	1287	3.	1288	3.	1289	3.
1290	3.	1291	3.	1292	3.	1293	3.	1294	3.
1295	3.	1296	3.	1297	3.	1298	3.	1299	3.
1300	3.	1310	3.	1320	3.	1330	3.	1340	3.
1350	3.	1360	3.	1370	3.	1380	3.	1390	3.

1400	3.	1420	3.	1440	3.	1460	3.	1500	3.

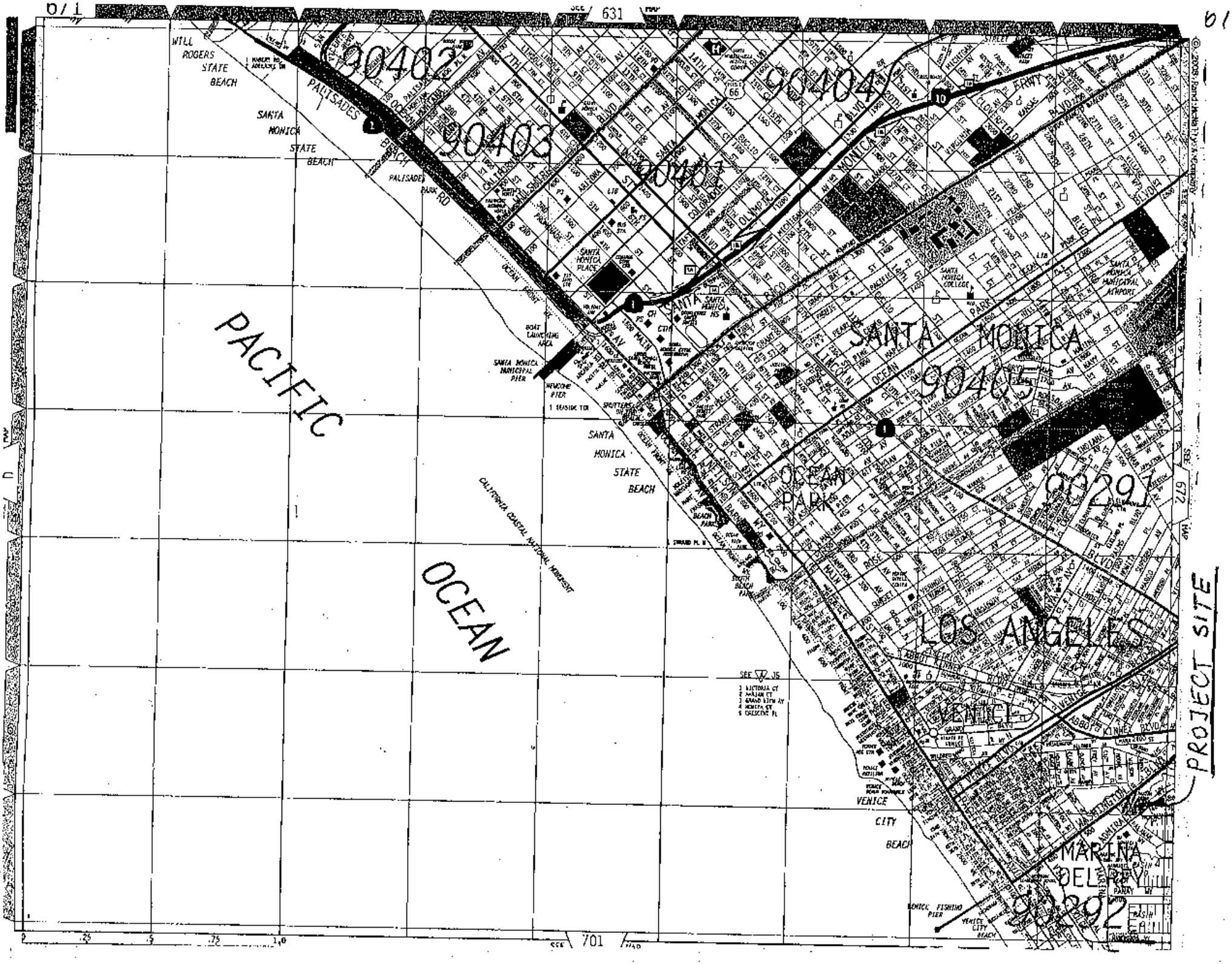
TOTAL VOLUME THIS HYDROGRAPH = 6.52(Ac.Ft)

APPENDIX B



SOIL TYPE - 017
ISOHYET - 5.4, 50 YR
- 4.74, 25 YR

2.09 - 2 YR.


90402
90403
90404
90405
90291
90292
PACIFIC
OCEAN
SANTA MONICA
LOS ANGELES
MARINA DEL REY
VENICE
PROJECT SITE
SANTA MONICA STATE BEACH
WILL ROGERS STATE BEACH
PALISADES PARK
OCEAN PARK
CALIFORNIA COASTAL NATIONAL MONUMENT
SANTA MONICA MUNICIPAL PIER
SANTA MONICA PLACE
SANTA MONICA COLLEGE
SANTA MONICA MUNICIPAL AIRPORT
VENICE CITY BEACH
631
701
671

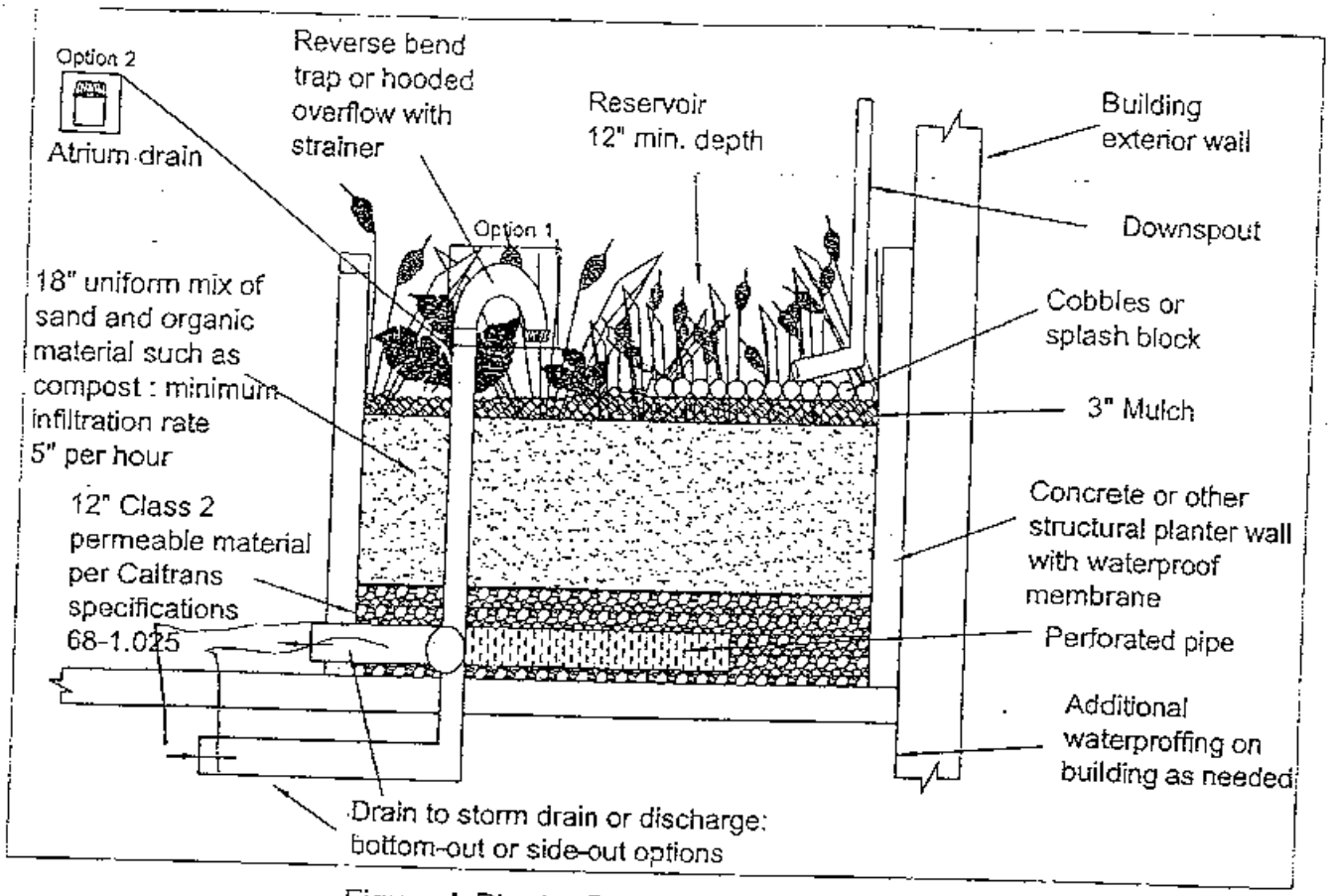


Figure A Planter Box Above Grade Illistration

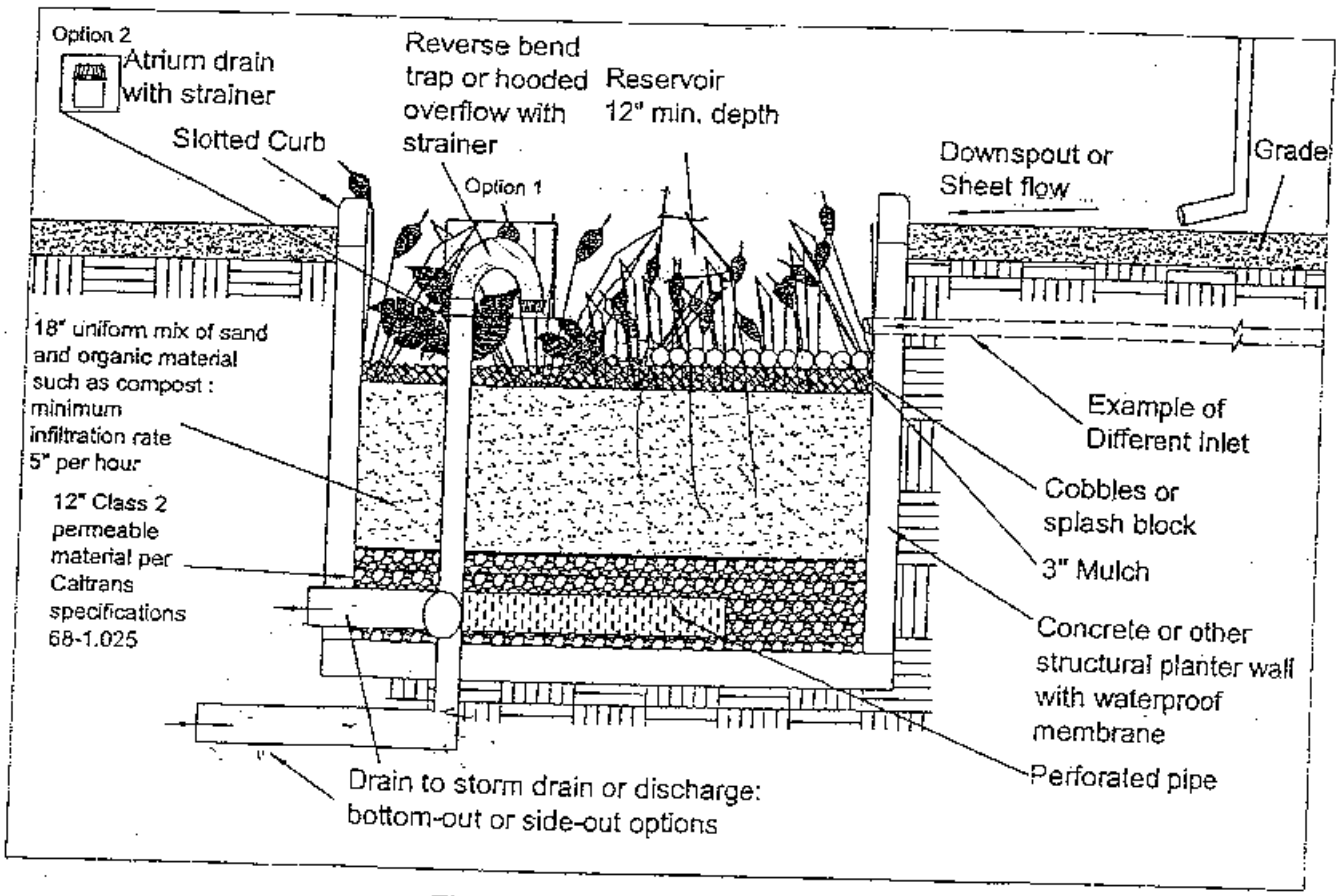
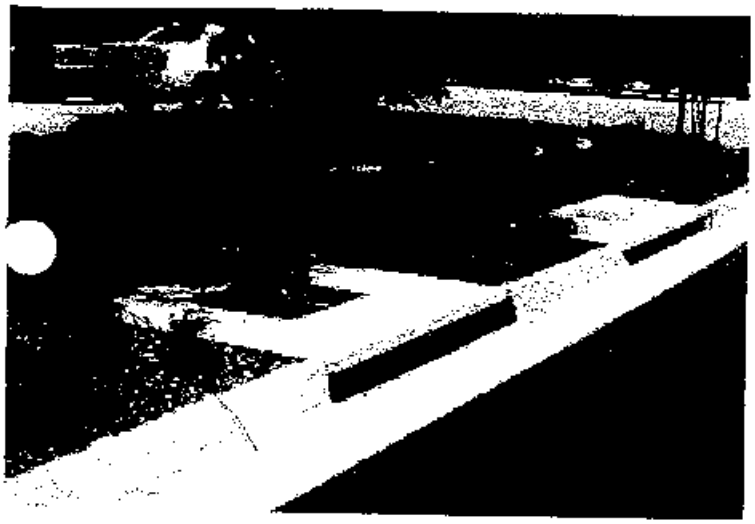


Figure B Planter Box at Grade Illistration

*City of Los Angeles, Bureau of Sanitation offers Free Mulch, pleas call (818) 883-5128 for information



filterra®

A Growing Idea in Stormwater Filtration.

Filterra® Stormwater Bioretention Filtration System

Sizing Made Easy - Mid-Atlantic Region

Filterra® sizing is easy. Since the filter flow rate is known, the annual volume of runoff treated can be calculated based on the relationship of filter surface area to drainage area to rainfall intensity as shown in Figure 1 below.

The target annual volume treated for Filterra® is 90%. The filter surface area (FSA) to drainage area (DA) ratio should always be a minimum of 0.33%. For example, based on this target ratio, a 36-square-foot Filterra® (6' x 6') will treat 0.25 acre of drainage area. Other Filterra® sizes and their corresponding maximum drainage areas are listed in Table 1. Sizing of Filterra® is based on TOTAL contributing drainage areas, regardless of the percent imperviousness.

Mid-Atlantic Filterra® FSA/DA Graph

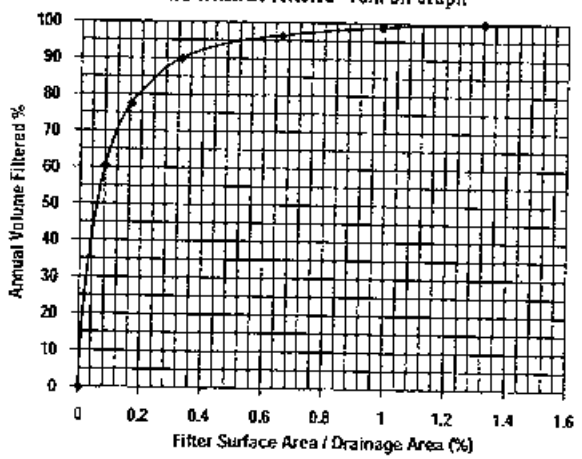


Figure 1

Design Assistance

Phone or email us at design@filterra.com to request your Filterra® DAKit (Design Assistance Kit). This includes placement "Do's and Don'ts," example scenarios, detail drawings, specifications, project information sheet, and other essential design information.

Sizing Procedure

1) Use the Filterra® DAKit (Design Assistance Kit) as a reference
2) Determine Filterra® locations (with effective bypass) in accordance with placement guidelines
3) Determine contributing drainage areas to each Filterra®
4) Choose the corresponding size Filterra® from Table 1
5) Complete the project information sheet
6) For best results, get us involved early in the design process. Send your completed project information sheet along with plans to Americast for placement and application review.

Mid-Atlantic Region Filterra® Sizes

Available Sizes	Total Contributing Drainage Area
4' x 6' or 6' x 4'	0.17 ac
4' x 8' or 8' x 4'	0.22 ac
Standard 6' x 6'	0.25 ac
6' x 8' or 8' x 6'	0.33 ac
6' x 10' or 10' x 6'	0.42 ac
6' x 12' or 12' x 6'	0.50 ac

Table 1

Headquarters & Mid-Atlantic Region Support

AMERICAST

Americast Filterra® Division
11352 Virginia Precast Road, Ashland, Virginia 23005
Toll-free: 1 (866) 349-3458 • Fax: (804) 752-6838
Email: design@filterra.com • Web: www.filterra.com

Filterra® is protected by U.S. Patents #6,277,274 & #6,569,321

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1997-2004 Version 6.4

Study Date : 06/08/09 Input hydrograph file name : 7038P.HYD
Output hydrograph file name: LR.hin

User entry of depth-outflow-storage data

Hydrograph time unit varies
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data @ 1 Min. Intervals:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
4.000	0.190	2.110	0.189	0.191
5.000	0.240	2.360	0.238	0.242

Hydrograph Detention Basin Routing
Hydrograph at 7038 3 A Storm Day: 4 Drainage Area = 0.70
Total flood hydrograph volume this storm day = 2.03 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	0.8	1.5	2.3	3.0	Depth (Ft.)
0	0.0	0.0	0.000	O					0.0
100	1.0	0.5	0.044		O I				0.9
200	1.0	0.9	0.080		OI				1.7
300	1.0	1.0	0.088		O				1.9
400	1.0	1.0	0.090		O				1.9
500	1.0	1.0	0.090		O				1.9
600	1.0	1.0	0.090		O				1.9
700	1.0	1.0	0.090		O				1.9
800	1.0	1.0	0.090		O				1.9
900	1.0	1.0	0.090		O				1.9
1000	1.0	1.0	0.090		O				1.9
1050	1.0	1.0	0.090		O				1.9
1100	1.0	1.0	0.090		O				1.9
1110	1.0	1.0	0.090		O				1.9

$\phi 6''$

$Q = CA\sqrt{2gH}$

$Q_{In} = Q_{1A} + Q_{2B} = 1.68 + 0.36 = 2.04$

$Q_{OUT} = 1.28$ cfs

$Q_{DET.} = 2.04 - 1.28 = 0.76$ (cfs)

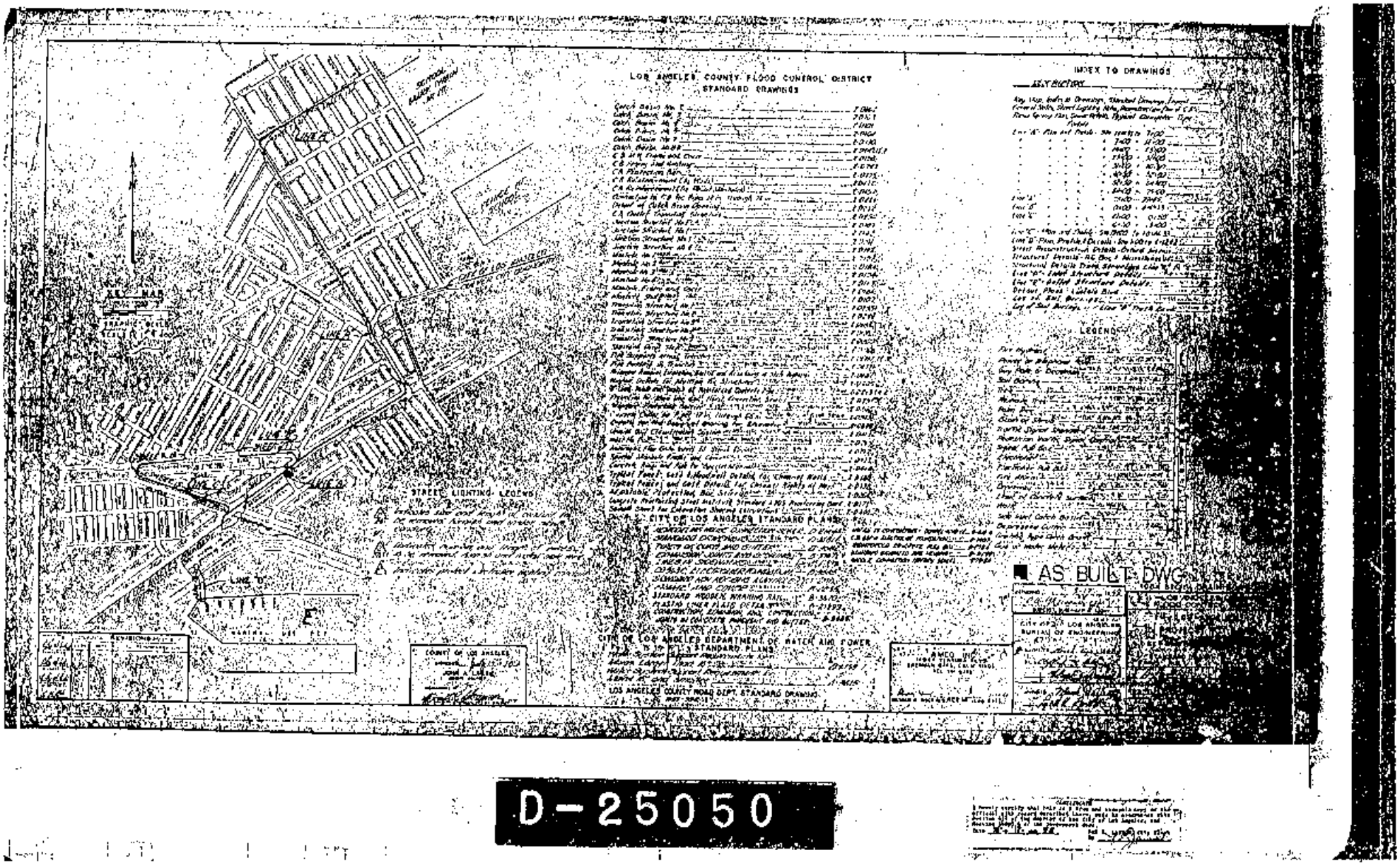
1120	1.0	1.0	0.090	O			1.9
1130	1.0	1.0	0.090	O			1.9
1131	1.0	1.0	0.090	O			1.9
1132	1.0	1.0	0.090	O			1.9
1133	1.0	1.0	0.090	O			1.9
1134	1.0	1.0	0.090	O			1.9
1135	1.0	1.0	0.090	O			1.9
1136	1.0	1.0	0.090	O			1.9
1137	1.0	1.0	0.090	O			1.9
1138	1.0	1.0	0.090	O			1.9
1139	1.0	1.0	0.090	O			1.9
1140	1.0	1.0	0.090	O			1.9
1141	2.0	1.0	0.091	O	I		1.9
1142	2.0	1.0	0.093	O	I		2.0
1143	2.0	1.0	0.094	O	I		2.0
1144	2.0	1.1	0.095	O	I		2.0
1145	2.0	1.1	0.097	O	I		2.0
1146	2.0	1.1	0.098	O	I		2.1
1147	2.0	1.1	0.099	O	I		2.1
1148	2.0	1.1	0.100	O	I		2.1
1149	2.0	1.1	0.102	O	I		2.1
1150	2.0	1.1	0.103	O	I		2.2
1151	2.0	1.2	0.104	O	I		2.2
1152	3.0	1.2	0.107	O		I	2.2
1153	3.0	1.2	0.109	O		I	2.3
1154	3.0	1.2	0.111	O		I	2.3
1155	2.0	1.2	0.112	O	I		2.4
1156	2.0	1.3	0.114	O	I		2.4
1157	2.0	1.3	0.115	O	I		2.4
1158	2.0	1.3	0.116	O	I		2.4
1159	1.0	1.3	0.115	I O			2.4
1160	1.0	1.3	0.115	I O			2.4
1161	1.0	1.3	0.114	I O			2.4
1162	1.0	1.3	0.114	I O			2.4
1163	1.0	1.3	0.114	I O			2.4
1164	1.0	1.3	0.113	I O			2.4
1165	1.0	1.3	0.113	I O			2.4
1166	1.0	1.3	0.113	I O			2.4
1167	1.0	1.2	0.112	I O			2.4
1168	1.0	1.2	0.112	I O			2.4
1169	1.0	1.2	0.112	I O			2.3
1170	1.0	1.2	0.111	I O			2.3
1171	1.0	1.2	0.111	I O			2.3
1172	1.0	1.2	0.111	I O			2.3
1173	1.0	1.2	0.110	I O			2.3
1174	1.0	1.2	0.110	I O			2.3
1175	1.0	1.2	0.110	I O			2.3
1176	1.0	1.2	0.109	I O			2.3
1177	1.0	1.2	0.109	I O			2.3
1178	1.0	1.2	0.109	I O			2.3

1179	1.0	1.2	0.109		I O		2.3
1180	1.0	1.2	0.108		I O		2.3
1181	1.0	1.2	0.108		I O		2.3
1182	1.0	1.2	0.108		I O		2.3
1183	1.0	1.2	0.107		I O		2.3
1184	1.0	1.2	0.107		I O		2.3
1185	1.0	1.2	0.107		I O		2.3
1186	1.0	1.2	0.107		I O		2.2
1187	1.0	1.2	0.106		I O		2.2
1188	1.0	1.2	0.106		I O		2.2
1189	1.0	1.2	0.106		I O		2.2
1190	1.0	1.2	0.106		I O		2.2
1191	1.0	1.2	0.105		I O		2.2
1192	1.0	1.2	0.105		I O		2.2
1193	1.0	1.2	0.105		I O		2.2
1194	1.0	1.2	0.105		I O		2.2
1195	1.0	1.2	0.105		I O		2.2
1196	1.0	1.2	0.104		I O		2.2
1197	1.0	1.2	0.104		I O		2.2
1198	1.0	1.2	0.104		I O		2.2
1199	1.0	1.2	0.104		I O		2.2
1200	1.0	1.1	0.103		I O		2.2
1201	1.0	1.1	0.103		I O		2.2
1202	1.0	1.1	0.103		I O		2.2
1203	1.0	1.1	0.103		I O		2.2
1204	1.0	1.1	0.103		I O		2.2
1205	1.0	1.1	0.102		I O		2.2
1206	1.0	1.1	0.102		I O		2.2
1207	1.0	1.1	0.102		I O		2.1
1208	1.0	1.1	0.102		I O		2.1
1209	1.0	1.1	0.102		I O		2.1
1210	1.0	1.1	0.102		I O		2.1
1211	1.0	1.1	0.101		I O		2.1
1212	1.0	1.1	0.101		IO		2.1
1213	1.0	1.1	0.101		IO		2.1
1214	1.0	1.1	0.101		IO		2.1
1215	1.0	1.1	0.101		IO		2.1
1216	1.0	1.1	0.101		IO		2.1
1217	1.0	1.1	0.100		IO		2.1
1218	1.0	1.1	0.100		IO		2.1
1219	1.0	1.1	0.100		IO		2.1
1220	1.0	1.1	0.100		IO		2.1
1221	1.0	1.1	0.100		IO		2.1
1222	1.0	1.1	0.100		IO		2.1
1223	1.0	1.1	0.099		IO		2.1
1224	1.0	1.1	0.099		IO		2.1
1225	1.0	1.1	0.099		IO		2.1
1226	1.0	1.1	0.099		IO		2.1
1227	1.0	1.1	0.099		IO		2.1
1228	1.0	1.1	0.099		IO		2.1

1229	1.0	1.1	0.099		IO		2.1
1230	1.0	1.1	0.099		IO		2.1
1231	1.0	1.1	0.098		IO		2.1
1232	1.0	1.1	0.098		IO		2.1
1233	1.0	1.1	0.098		IO		2.1
1234	1.0	1.1	0.098		IO		2.1
1235	1.0	1.1	0.098		IO		2.1
1236	1.0	1.1	0.098		IO		2.1
1237	1.0	1.1	0.098		IO		2.1
1238	1.0	1.1	0.098		IO		2.1
1239	1.0	1.1	0.097		IO		2.1
1240	1.0	1.1	0.097		IO		2.0
1241	1.0	1.1	0.097		IO		2.0
1242	1.0	1.1	0.097		IO		2.0
1243	1.0	1.1	0.097		IO		2.0
1244	1.0	1.1	0.097		IO		2.0
1245	1.0	1.1	0.097		IO		2.0
1246	1.0	1.1	0.097		IO		2.0
1247	1.0	1.1	0.097		IO		2.0
1248	1.0	1.1	0.096		IO		2.0
1249	1.0	1.1	0.096		IO		2.0
1250	1.0	1.1	0.096		IO		2.0
1251	1.0	1.1	0.096		IO		2.0
1252	1.0	1.1	0.096		IO		2.0
1253	1.0	1.1	0.096		IO		2.0
1254	1.0	1.1	0.096		IO		2.0
1255	1.0	1.1	0.096		IO		2.0
1256	1.0	1.1	0.096		IO		2.0
1257	1.0	1.1	0.096		IO		2.0
1258	1.0	1.1	0.096		IO		2.0
1259	1.0	1.1	0.095		IO		2.0
1260	1.0	1.1	0.095		IO		2.0
1261	1.0	1.1	0.095		IO		2.0
1262	1.0	1.1	0.095		IO		2.0
1263	1.0	1.1	0.095		IO		2.0
1264	1.0	1.1	0.095		IO		2.0
1265	1.0	1.1	0.095		IO		2.0
1266	1.0	1.1	0.095		IO		2.0
1267	1.0	1.1	0.095		IO		2.0
1268	1.0	1.1	0.095		IO		2.0
1269	1.0	1.1	0.095		IO		2.0
1270	1.0	1.1	0.095		IO		2.0
1271	1.0	1.1	0.095		IO		2.0
1272	1.0	1.0	0.095		IO		2.0
1273	1.0	1.0	0.094		IO		2.0
1274	1.0	1.0	0.094		IO		2.0
1275	1.0	1.0	0.094		IO		2.0
1276	1.0	1.0	0.094		IO		2.0
1277	1.0	1.0	0.094		IO		2.0
1278	1.0	1.0	0.094		IO		2.0

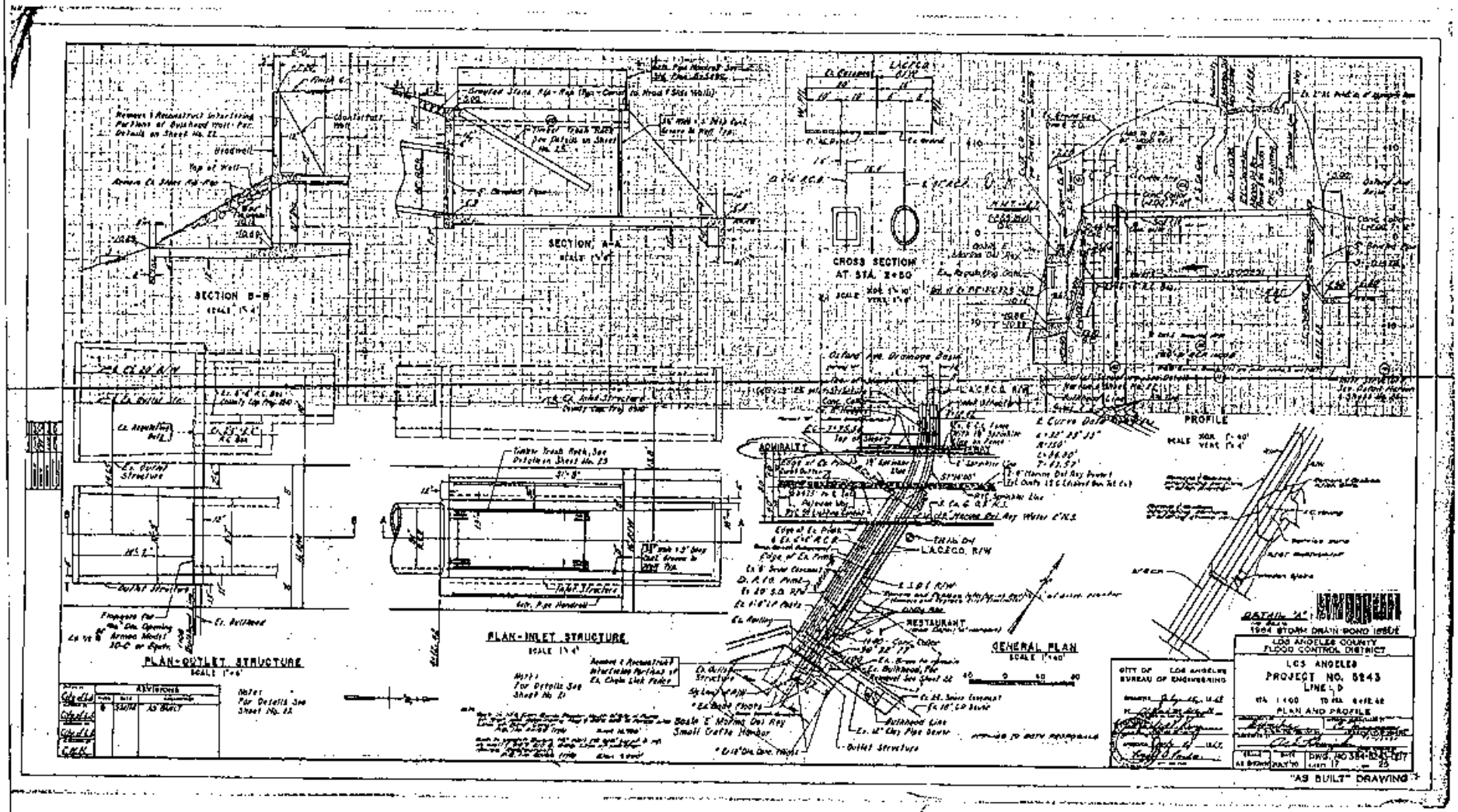
1279	1.0	1.0	0.094		IO		2.0
1280	1.0	1.0	0.094		IO		2.0
1281	1.0	1.0	0.094		IO		2.0
1282	1.0	1.0	0.094		IO		2.0
1283	1.0	1.0	0.094		IO		2.0
1284	1.0	1.0	0.094		IO		2.0
1285	1.0	1.0	0.094		IO		2.0
1286	1.0	1.0	0.094		IO		2.0
1287	1.0	1.0	0.094		IO		2.0
1288	1.0	1.0	0.094		IO		2.0
1289	1.0	1.0	0.093		IO		2.0
1290	1.0	1.0	0.093		IO		2.0
1291	1.0	1.0	0.093		IO		2.0
1292	1.0	1.0	0.093		IO		2.0
1293	1.0	1.0	0.093		IO		2.0
1294	1.0	1.0	0.093		IO		2.0
1295	1.0	1.0	0.093		IO		2.0
1296	1.0	1.0	0.093		IO		2.0
1297	1.0	1.0	0.093		IO		2.0
1298	1.0	1.0	0.093		IO		2.0
1299	1.0	1.0	0.093		IO		2.0
1300	1.0	1.0	0.093		IO		2.0
1310	1.0	1.0	0.093		O		1.9
1320	1.0	1.0	0.092		O		1.9
1330	1.0	1.0	0.092		O		1.9
1340	1.0	1.0	0.092		O		1.9
1350	1.0	1.0	0.091		O		1.9
1360	1.0	1.0	0.091		O		1.9
1370	1.0	1.0	0.091		O		1.9
1380	1.0	1.0	0.091		O		1.9
1390	1.0	1.0	0.091		O		1.9
1400	1.0	1.0	0.091		O		1.9
1420	1.0	1.0	0.091		O		1.9
1440	1.0	1.0	0.090		O		1.9
1460	1.0	1.0	0.090		O		1.9
1500	1.0	1.0	0.089		O		1.9

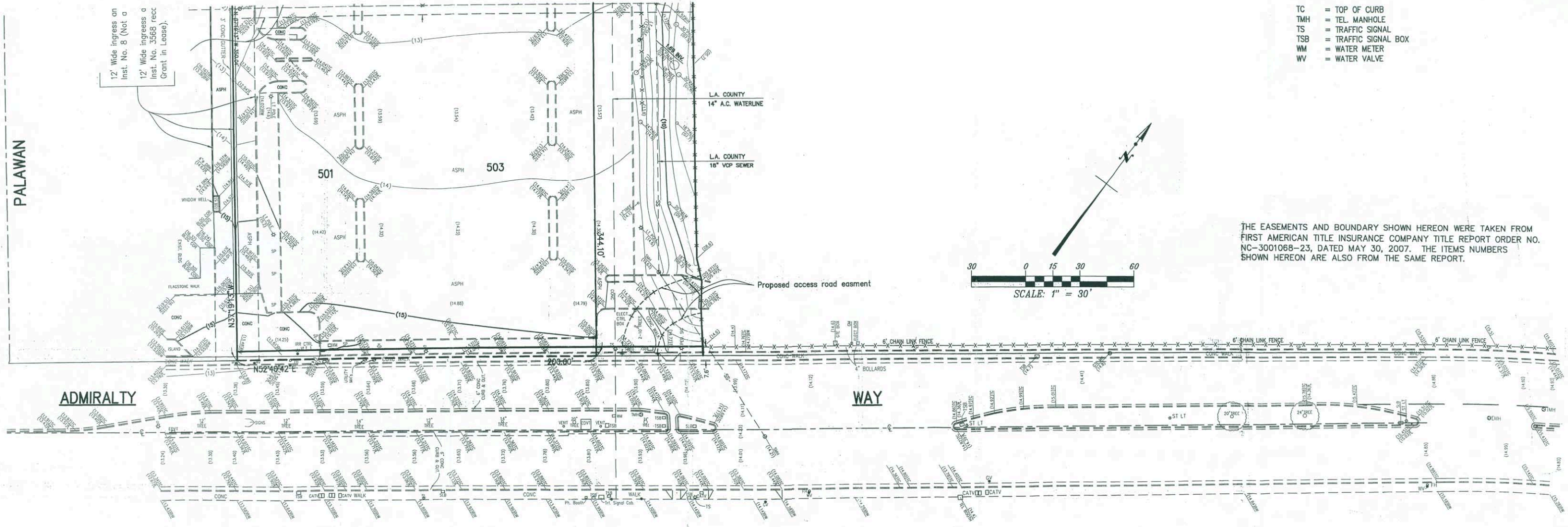
Remaining water in basin = 0.09 (Ac.Ft)
Peak flow out of basin = 1.28(CFS)
Peak flow time = 1158 Min., time interval # = 44
Maximum depth in basin = 2.43(Ft.)



D-25050

Proj. 5243
7038,00
Storm Drain


SECTION A-A
SCALE 1"=4'
SECTION B-B
SCALE 1"=4'
CROSS SECTION AT STA. 2+50
PROFILE
PLAN-OUTLET STRUCTURE
SCALE 1"=4'
PLAN-INLET STRUCTURE
SCALE 1"=4'
GENERAL PLAN
SCALE 1"=100'
RESTAURANT
ADMIRALTY
Small Craft Harbor
Outlet Structure
Inlet Structure
L.A.C.F.C.D. R/W
CITY OF LOS ANGELES
BUREAU OF ENGINEERING
LOS ANGELES COUNTY
FLOOD CONTROL DISTRICT
LOS ANGELES
PROJECT NO. 5243
LINE D
PLAN AND PROFILE
1964 STORM DRAIN BOND ISSUE
"AS BUILT" DRAWING


TC = TOP OF CURB
TMH = TEL. MANHOLE
TS = TRAFFIC SIGNAL
TSB = TRAFFIC SIGNAL BOX
WM = WATER METER
WV = WATER VALVE
12' Wide ingress an Inst. No. 8 (Not a
12' Wide ingress a Inst. No. 3568 rec Grant in Lease).
PALAWAN
ADMIRALTY
WAY
501
503
ASPH
L.A. COUNTY 14" A.C. WATERLINE
L.A. COUNTY 18" VCP SEWER
Proposed access road easement
344.10'
N52°49'42"E
200.00'
6' CHAIN LINK FENCE
4" BOLLARDS
SCALE: 1" = 30'
30 0 15 30 60
THE EASEMENTS AND BOUNDARY SHOWN HEREON WERE TAKEN FROM FIRST AMERICAN TITLE INSURANCE COMPANY TITLE REPORT ORDER NO. NC-3001068-23, DATED MAY 30, 2007. THE ITEMS NUMBERS SHOWN HEREON ARE ALSO FROM THE SAME REPORT.

REVIEWED

WASHINGTON STREET

GRAND CANAL

BANDINI

DELL

GLENN

ALLEY

GRAYSON AVE.

AVE.

City of L.A. Boundary

NOT TO BE MAINTAINED BY LACFCD

Note: Remove Existing Curb, Sidewalk, and Concrete Pan's across Grayson of Glenn Streets, between Washington St. and the Alley. Fill and grade the area to meet existing ground level.

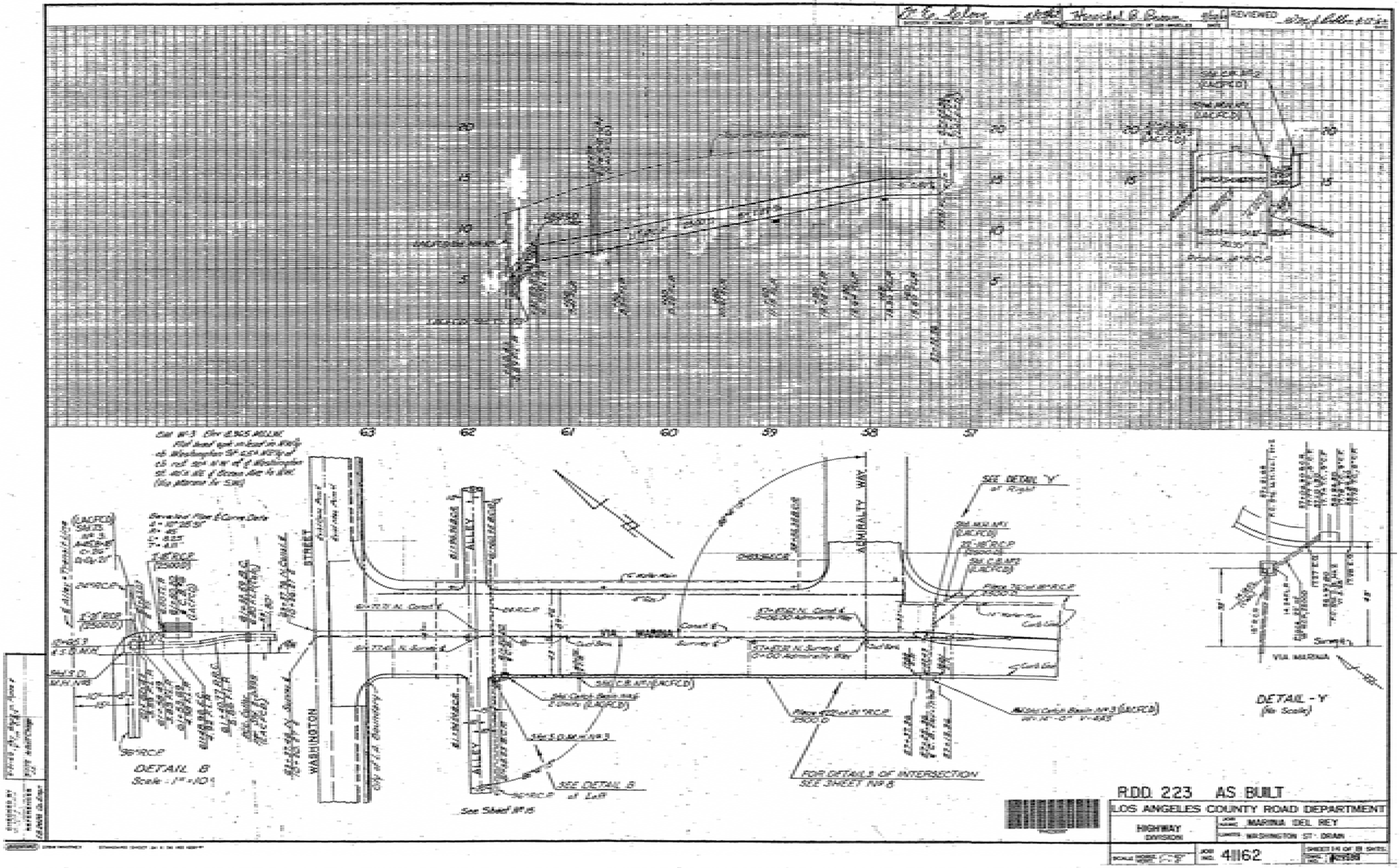
SECTION F-F
No Scale

SECTION A-A
No Scale

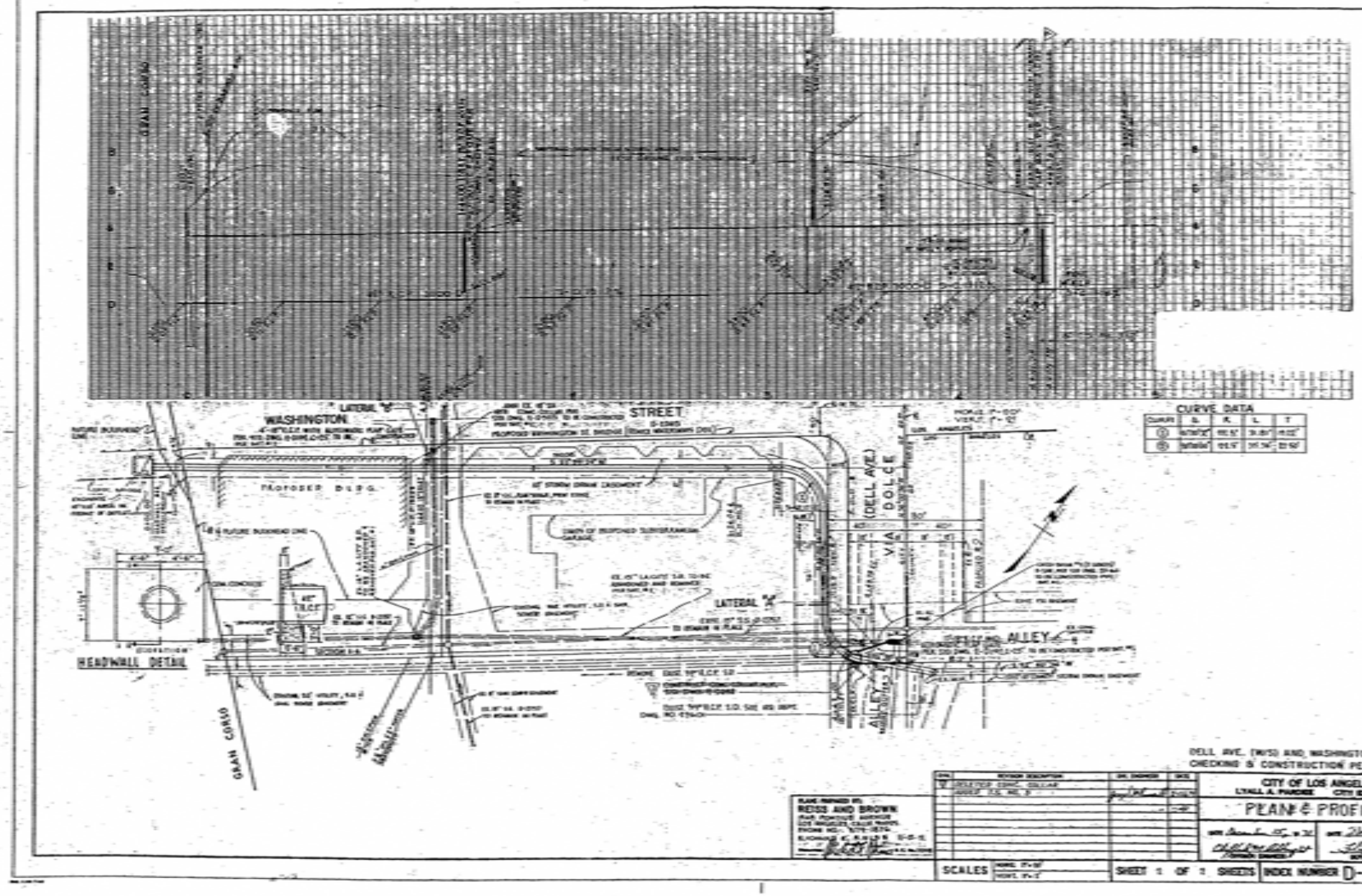
SEE SHEET No. 11

R.D.D. 223 AS BUILT

LOS ANGELES COUNTY ROAD DEPARTMENT
HIGHWAY DIVISION
JOB NAME: MARINA DEL REY
WASHINGTON ST. DRAIN
JOB NO. 41162

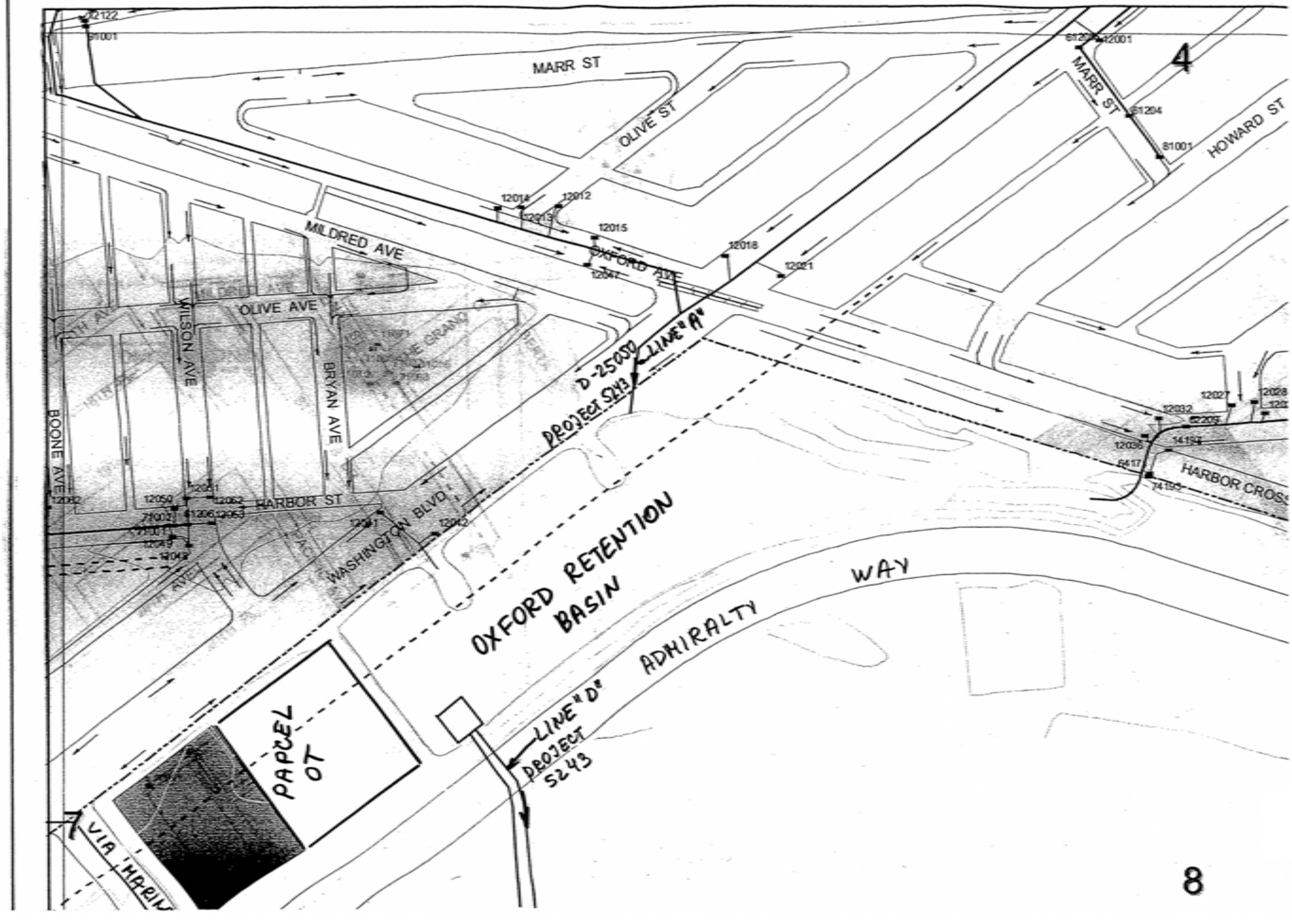

REVIEWED
SEE DETAIL 'Y' at Right
ADMIRALTY WAY
VIA MARINA
ALLEY
WASHINGTON STREET
City of L.A. Boundary
DETAIL B
Scale - 1" = 10'
SEE DETAIL B at Left
See Sheet No 15
FOR DETAILS OF INTERSECTION SEE SHEET No 8
DETAIL - Y
(No Scale)
RDD 223 AS BUILT
LOS ANGELES COUNTY ROAD DEPARTMENT
HIGHWAY DIVISION
MARINA DEL REY
WASHINGTON ST. DRAIN
41162

D-23721



D23721-2

DRAINAGE MAP Nº 561 QUADRANT No 2 GRID No 8



DRAINAGE MAP N 561 QUADRANT N 2 GRID N 7

7

HOWLAND

BELL AVE

SHERMAN CANAL CT

28TH AVE

GRAYSON AVE

CLUNE AVE

SANBORN AVE

GRAND CANAL CT

THE GRAND CL

SOUTH PL

WASHINGTON BLVD

ALLEY R.D.D 223

D23724-2

VIA DOLCE

VIA NA RI NA

ADMIRALTY WAY

PARCEL 8
OT

11055
11057
11064
11065
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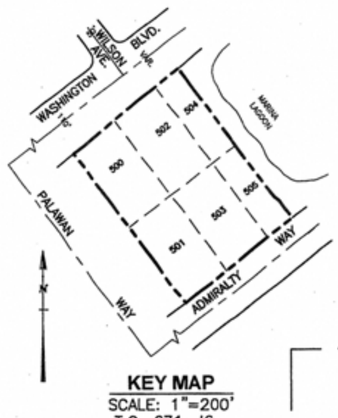
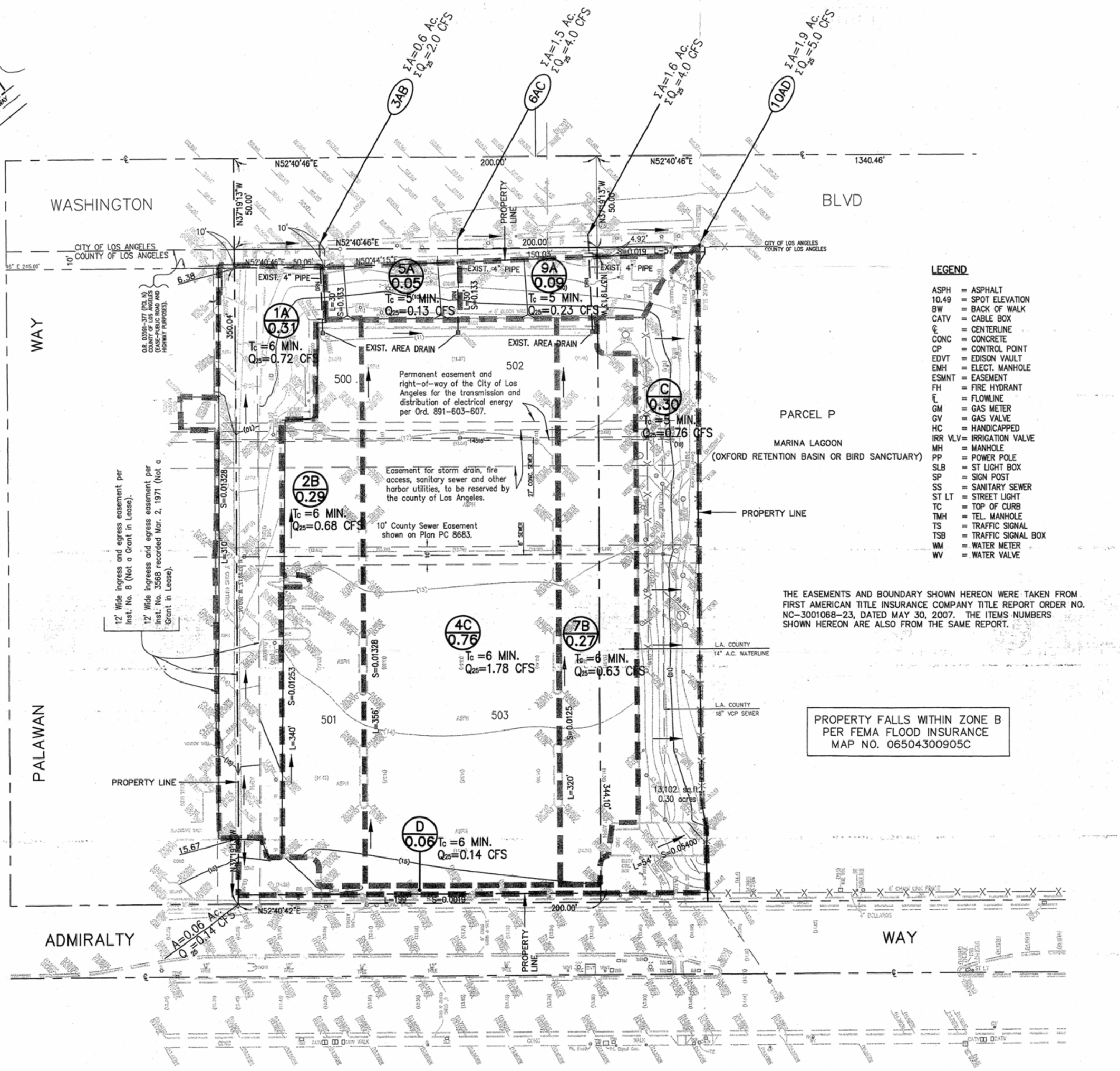
11103

APPENDIX C



KEY MAP
SCALE: 1"=200'
T.G. 671-J6



LEGEND

ASPH	= ASPHALT
10.49	= SPOT ELEVATION
BW	= BACK OF WALK
CATV	= CABLE BOX
℄	= CENTERLINE
CONC	= CONCRETE
CP	= CONTROL POINT
EDVT	= EDISON VAULT
EMH	= ELECT. MANHOLE
ESMNT	= EASEMENT
FH	= FIRE HYDRANT
℄	= FLOWLINE
GM	= GAS METER
GV	= GAS VALVE
HC	= HANDICAPPED
IRR VLV	= IRRIGATION VALVE
MH	= MANHOLE
PP	= POWER POLE
SLB	= ST LIGHT BOX
SP	= SIGN POST
SS	= SANITARY SEWER
ST LT	= STREET LIGHT
TC	= TOP OF CURB
TMH	= TEL. MANHOLE
TS	= TRAFFIC SIGNAL
TSB	= TRAFFIC SIGNAL BOX
WM	= WATER METER
WV	= WATER VALVE

THE EASEMENTS AND BOUNDARY SHOWN HEREON WERE TAKEN FROM FIRST AMERICAN TITLE INSURANCE COMPANY TITLE REPORT ORDER NO. NC-3001068-23, DATED MAY 30, 2007. THE ITEMS NUMBERS SHOWN HEREON ARE ALSO FROM THE SAME REPORT.

PROPERTY FALLS WITHIN ZONE B PER FEMA FLOOD INSURANCE MAP NO. 06504300905C

BENCH MARK NO. 17-08650

STD TRAV MON *STMPD VEN F-2B 1951* ON CENTER LINE WASHINGTON STREET; 10 FT WEST OF EAST BUILDING LINE OF MULTIPLE UNIT #591; 35 FT EAST OF EAST CURB LINE PRODUCED OF PALAWAN WAY.

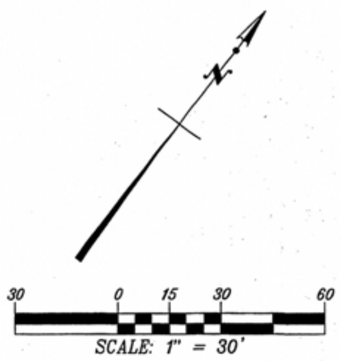
ELEV. 6.224 YEAR ADJ. 1980

NOTE: ADD 2.78' TO THESE ELEVATIONS TO EQUAL DATUM ON P-28658, P.C. 8683, CASH CONT. 8380

LEGAL DESCRIPTION:

PARCELS 500 TO 503 INCLUSIVE, AS SHOWN ON LOS ANGELES COUNTY ASSESSORS MAP NO. 88, AS PER MAP FILED IN BOOK 1 PAGES 53 TO 70 INCLUSIVE OF ASSESSOR'S MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

APN: 4224-006-900



HYDROLOGY LEGEND:

	SUBAREA BOUNDARY
	FLOW LINE
→	DIRECTION OF RUNOFF
A / 1.8	SUBAREA DESIGNATION / SUBAREA AREA (Acres)
T. EL.	TOP ELEVATION
B. EL.	BOTTOM ELEVATION
L	FLOW PATH LENGTH
$S_{ave.}$	FLOW PATH AVERAGE SLOPE
T_c	TIME OF CONCENTRATION
Q_{25}	25-YEAR DISCHARGE

DESIGN CRITERIA:

SOIL TYPE	17
C_{50} ISOHYET	5.4"
FREQUENCY	25-YR
IMPERVIOUSNESS	0.90

DRAINAGE CONCEPT/HYDROLOGY STUDY/SUSMP
APPROVED FOR AREA AND Q ONLY
APPROVED BY: [signature] RCE NO. C68328 DATE: 6/10/09
CHECKED BY: [signature] DATE: 6/10/09
LAND DEVELOPMENT DIVISION
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

JUN 08 2009

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JOB NO. 7038.00
SCALE: 1"=30'
DATE: OCT. 2008
REVISION:
REVISION:

REGISTERED PROFESSIONAL ENGINEER RONALD W. SPINDLER No. 13194 Exp. 3-31-11 CIVIL STATE OF CALIFORNIA

S.E.C. CIVIL ENGINEERS, INC.
16823 SATICOY STREET VAN NUYS, CA. 91406
(818) 782-2788 (323) 873-1788 FAX:(818) 782-0111
RONALD W. SPINDLER R.C.E. 13194

CLIENT: PRESTIGE HOMES

PROJECT: PRE-IMPROVEMENT HYDROLOGY DRAINAGE CONCEPT/STUDY SUSMP FOR CUP NO. 200600115

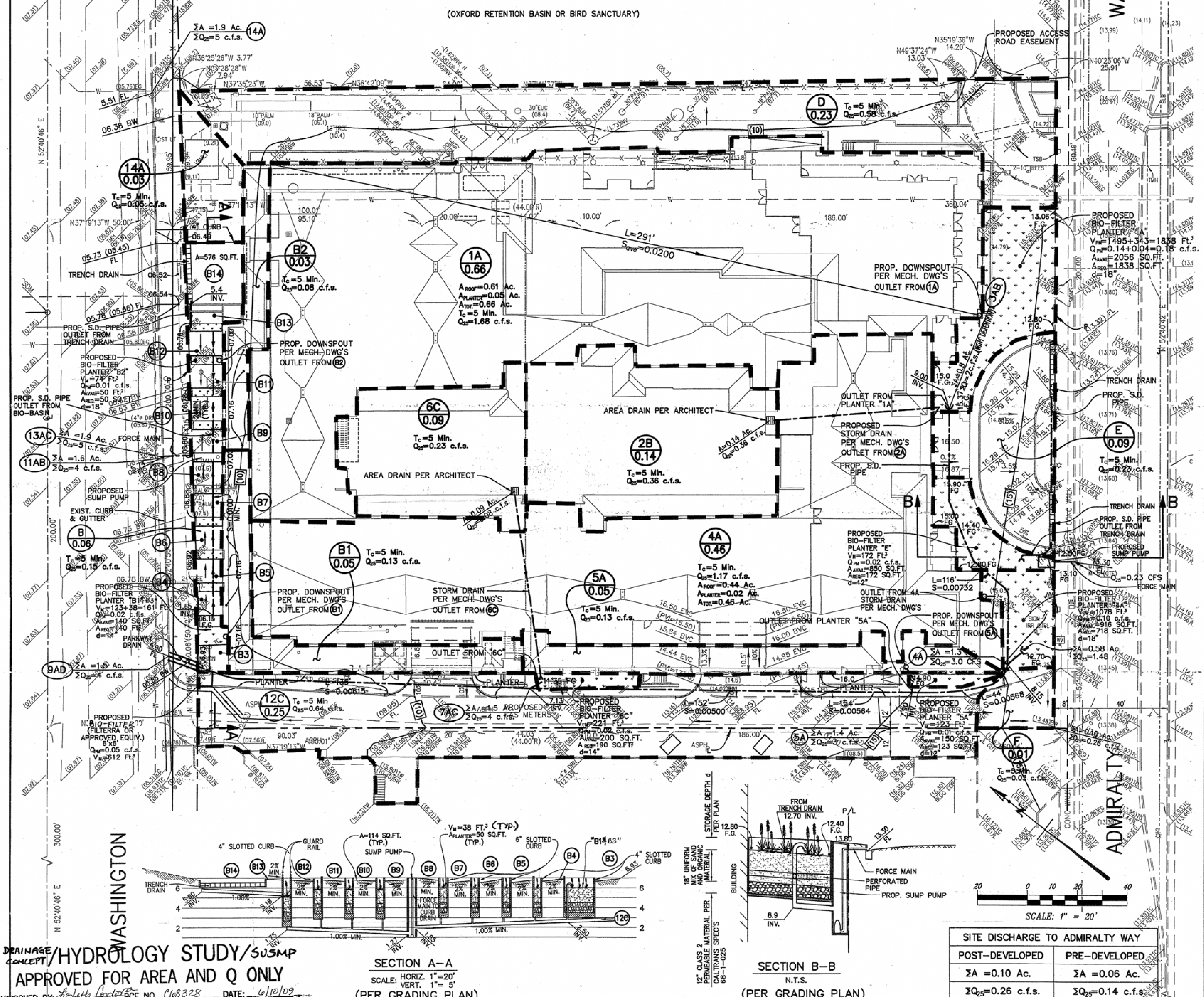
SHEET 1 OF 2

F:\History\7038.00 Prestige Homes\3 Engineering\3-01-01 Calcs\Hydrology\Pre-Improvement.Hydro Map.dwg 4/30/2009 7:48:04 AM PDT

SITE DISCHARGE TO WASHINGTON BLVD.	
POST-DEVELOPED	PRE-DEVELOPED
ΣA =1.9 Ac.	ΣA =1.9 Ac.
ΣQ_{25}=5 c.f.s.	ΣQ_{25}=5 c.f.s.

DRAINAGE CONCEPT NOTES:

1. HYDROLOGY INFORMATION AND STORM DRAIN ALIGNMENTS SHOWN ARE NOT NECESSARILY APPROVED.
2. COMPLIANCE OF ALL STREET DRAINAGE REQUIREMENTS WILL BE MET TO THE SATISFACTION OF THE DEPARTMENT OF PUBLIC WORKS/CITY ENGINEER.
3. A NOTE OF FLOOD HAZARD WILL BE REQUIRED WHERE INDICATED ON THIS PLAN.
4. ALL PROPOSED DRAINAGE AND WATER QUALITY DEVICES TO BE PRIVATELY MAINTAINED BY OWNER.



SITE DISCHARGE TO ADMIRALTY WAY	
POST-DEVELOPED	PRE-DEVELOPED
ΣA =0.10 Ac.	ΣA =0.06 Ac.
ΣQ_{25}=0.26 c.f.s.	ΣQ_{25}=0.14 c.f.s.

DRAINAGE CONCEPT/HYDROLOGY STUDY/SUSMP
APPROVED FOR AREA AND Q ONLY
APPROVED BY: [signature] RCE NO. C68328 DATE: 6/10/09
CHECKED BY: [signature] DATE: 6/10/09
LAND DEVELOPMENT DIVISION
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

HYDROLOGY LEGEND:

▬ ▬ ▬	SUBAREA BOUNDARY
——	FLOW LINE
→	DIRECTION OF RUNOFF
A	SUBAREA DESIGNATION
1.8	SUBAREA AREA (Acres)
T. EL.	TOP ELEVATION
B. EL.	BOTTOM ELEVATION
L	FLOW PATH LENGTH
$S_{ave.}$	FLOW PATH AVERAGE SLOPE
T_c	TIME OF CONCENTRATION
Q_{25}	25-YEAR DISCHARGE
▥	AREA DRAIN PER ARCH.
o	DOWNSPOUTS PER ARCH.
⬚	BIO-FILTER PLANTER

DESIGN CRITERIA:

SOIL TYPE	17
Q_{50} ISOHYET	5.4"
FREQUENCY	25-YR
IMPERVIOUSNESS	0.90

PROPERTY FALLS WITHIN ZONE B PER FEMA FLOOD INSURANCE MAP NO. 06504300905C

LEGAL DESCRIPTION:

PARCELS 500 TO 503 INCLUSIVE, AS SHOWN ON LOS ANGELES COUNTY ASSESSORS MAP NO. 88, AS PER MAP FILED IN BOOK 1 PAGES 53 TO 70 INCLUSIVE OF ASSESSOR'S MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

APN: 4224-006-900

THE EASEMENTS SHOWN HEREON WERE TAKEN FROM FIRST AMERICAN TITLE INSURANCE COMPANY TITLE REPORTS: ORDER NO. NC-3001068-23, DATED MAY 30, 2007, AND ORDER NO. NCS-251703-LA1, DATED AUGUST 27, 2007. THE ITEM NUMBERS SHOWN HEREON ARE ALSO FROM THOSE SAME REPORTS.

BENCH MARK NO. 17-08650

STD TRAV MON "STMPD VEN F-2B 1951" ON CENTER LINE WASHINGTON STREET; 10 FT WEST OF EAST BUILDING LINE OF MULTIPLE UNIT #591; 35 FT EAST OF EAST CURB LINE PRODUCED OF PALAWAN WAY.

ELEV. 6.224 YEAR ADJ. 1980

NOTE: ADD 2.78' TO THESE ELEVATIONS TO EQUAL DATUM ON P-28658, P.C. 8683, CASH CONT. 8380

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JOB NO. 7038.00
SCALE: 1" = 20'
DATE: JUNE 2009
REVISION:
REVISION:

REGISTERED PROFESSIONAL ENGINEER RONALD W. SPINDLER No. 13194 Exp. 3-31-11 CIVIL STATE OF CALIFORNIA

S.E.C. CIVIL ENGINEERS, INC.
16823 SATICOY STREET VAN NUYS, CA. 91406
(818) 782-2788 (323) 873-1788 FAX:(818) 782-0111
RONALD W. SPINDLER R.C.E. 13194

CLIENT: PRESTIGE HOMES, INC.

PROJECT: POST-IMPROVEMENT DRAINAGE CONCEPT/HYDROLOGY STUDY/SUSMP FOR CUP NO. 200600115

SHEET 2 OF 2

F:\History\7038.00 Prestige Homes\3 Engineering\3-01-01 Calcs\Hydrology\Post-Improvement.Hydro Map 05-22- 09.dwg 6/2/2009 8:56:22 AM PST

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION
ENGINEERING AND SURVEY BRANCH
STORM DRAIN AND HYDROLOGY SECTION

TO: S.E.C. Civil Engineers, Inc.

DATE 6/03/09

Attention Ronald Spindler

REVIEW OF DRAINAGE CONCEPT / HYDROLOGY STUDY / SUSMP

CUP NO. 200600223
SUBMITTAL DATE 6/02/09

We have reviewed your Drainage Concept / Hydrology Study / SUSMP.

[X] The drainage concept / hydrology study / SUSMP has been approved for Area and Q only.

COMMENTS:

APPROVED BY Lizbeth Córdova

LIZBETH CORDOVA
(626) 458-4921

Drainage Concept/Hydrology Study/SUSMP

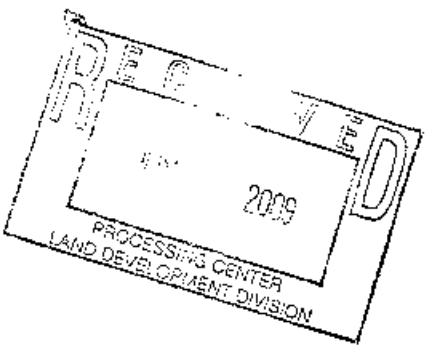
For

CUP 200600223

HOLIDAY HARBOR

Project Site:

14025 Panay Way
Marina Del Ray, Ca 90292

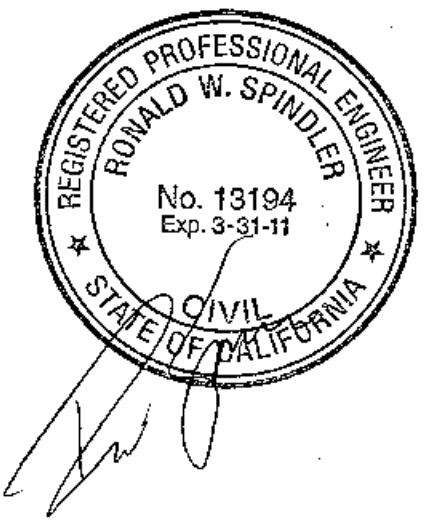


Prepared By:

S.E.C. Civil Engineers, Inc.
16823 Saticoy Street
Van Nuys, Ca 91406
(818) 782-2788

For;

Prestige Homes, Inc.
5150 Overland Avenue
Culver City, Ca 90230



DRAINAGE CONCEPT/HYDROLOGY STUDY /SUSMP
APPROVED FOR AREA AND Q ONLY
APPROVED BY: _____ RCE NO. 48328 DATE: 6/03/09
CHECKED BY: _____ DATE: 6/3/09
LAND DEVELOPMENT DIVISION
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

RCE 13194
EXP. 03-31-11

June 2009

TABLE OF CONTENTS

1. Introduction

2. Existing Conditions

3. Proposed Development

4. SUSMP/TMDL

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& Discharge (Q) Calculations

Pre – Development (25-YR)
Post –Development (25-YR)
SUSMP/Q_{PM} calculations

Appendix B – Supporting Data

Appendix C -Hydrology Maps (Map Pocket)

Introduction

This "Drainage Concept" addresses the hydrological issues associated with the proposed development of a commercial center with offices, stores and multi level parking structures. The project site encompasses A=1.87 acres of land.

Existing Conditions

The project site presently consists of offices, stores and parking lots on the same total area of A=1.87 acres. The site in its existing condition has an imperviousness of about 100%, and Northern portion of the lot with total area at 1.77 it sheet flows northerly where the discharges are picked up by a number of grating basins about 60' apart along its northerly side and are outletted into the Harbor Basin D via storm drain pipes. The total area of A=1.77 acres generates a 25-YR discharge of Q_{25} = 4.34 cfs. The Southern portion with area = 0.1 acres represents by the planted area sheet flowing to the Panay Way and generates Q_{25} = 0.22 cfs.

Proposed Development

The proposed development actually reduces the imperviousness of the site to about 91% due to the proposed park. The area of A=1.78 acres will generate a 25-YR discharge of Q_{25} = 4.36cfs. The Southern Portion, which will be with area of 0.09 acres planted sheet flows to Panay Way.

SUSMP/TMDL

The discharge generated from the developed portion of the site with area of 1.78 acre will be directed toward proposed Bio-filter planters to provide mitigation for SUSMP and bacteria and toxic pollutants TMDLs and discharge into Basin D through existing drains in the sea wall. The size for the Bio-filters was obtained using method of calculation described in "Storm best management practice design and maintenance manual," February 2009. The southern portion of the lot will be planted.

APPENDIX A

parameters

AREA "A" PREDEVELOPED 25 YEAR

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet
A	0.29	1	25	17	142	0.034	4.56

Equation, given parameters above:
Developed subarea coeff. (.68<%Imp<1):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135
0	0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Undeveloped subarea coeff. (%Imp=0)		Undeveloped subarea coeff. (0<%Imp<.21)		Developed subarea coeff. (.21<%Imp<.68).		Developed subarea coeff. (.68<%Imp<1)	
bo=	-0.507	bo=	-0.507	bo=	-0.507	bo=	-0.507
b1=	-0.519	b1=	-0.519	b1=	-0.519	b1=	-0.519
b2=	0.483	b2=	0.483	b2=	0.483	b2=	0.483
b3=	-0.135	b3=	-0.135	b3=	-0.135	b3=	-0.135

Equations for Tc: Tc=(10)^bo*(Cd*I)^b1*(L)^b2*(S)^b3

I1440=Isohyet/24hrs: 0.190
It=I1440*Ib/I1440: 2.721

Iterations		Tc estimate:	Tc calc:	Diff:		Cu	Cd	Ix=Cd*I	II
2	RESET	3.38	3.38	0.00	RUN	0.88	0.90	2.450	2.72

Tolerance (min)	Interpolated value for I:	Tc high	Tc low	I@Tc low	I@Tc high	Interpolated I@Tc	(1440/Tc)^0.47
0.5		4.00	3.00	14.32	14.32	14.32	14.32

Use Tc value: 5.00 minutes

Intensity: 2.72 Cu: 0.88 Cd: 0.90 Flowrate: 0.71

parameters

AREAS: "B", "C", "D", "E", "F", "G" PREDEVELOPED

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet
"B"	0.2	1	25	17	132	0.036	4.56

Undeveloped subarea coefficients (%imp=0): b0= -0.507, b1= -0.519, b2= 0.483, b3= -0.135

Undeveloped subarea coefficients (0<%imp<.21): b0= -0.507, b1= -0.519, b2= 0.483, b3= -0.135

Developed subarea coefficients (.21<%imp<.68): b0= -0.507, b1= -0.519, b2= 0.483, b3= -0.135

Developed subarea coefficients (.68<%imp<1): b0= -0.507, b1= -0.519, b2= 0.483, b3= -0.135

Equation, given parameters above:

Developed subarea coeff. (.68<%imp<1):

b0= -0.507
b1= -0.519
b2= 0.483
b3= -0.135
0 0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Equations for Tc: Tc=(10)^b0*(Cd*I)^b1*(L)^b2*(S)^b3

I1440=Isohyet/24hrs: 0.190

II=I1440*Ix/I1440: 2.721

Iterations: 2

RESET

Tc estimate: 3.24

Tc calc: 3.24

Diff: 0.00

RUN

Cu: 0.88

Cd: 0.90

Ix=Cd*I: 2.450

II: 2.72

Tolerance (min): 0.5

Interpolated value for I:

Tc high	Tc low	I/I1440 low	I/I1440 high	Interpolated I/I1440	[1440/Tc]^0.47
4.00	3.00	14.32	14.32	14.32	14.32

Use Tc value: 5.00 minutes

Intensity: 2.72 Cu: 0.88 Cd: 0.90 Flowrate: 0.49

parameters

AREA "H" PREDEVELOPED

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet
H	0.28	1	25	17	142	0.034	4.56

Equation, given parameters above:
Developed subarea coeff. (.68<%imp<1):

b0= -0.507
b1= -0.519
b2= 0.483
b3= -0.135
0 0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Undeveloped subarea coeff. (%imp=0):
b0= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Undeveloped subarea coeff. (0<%imp<.21):
b0= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Developed subarea coeff. (.21<%imp<.68):
b0= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Developed subarea coeff. (.68<%imp<1):
b0= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Equations for Tc: Tc=(10)^b0*(Cd*I)^b1*(L)^b2*(S)^b3

I1440=Isohyet/24hrs: 0.190
Ix=I1440*Ix/I1440: 2.721

Iterations		Tc estimate:	Tc calc:	Diff:		Cu	Cd	Ix=Cd*I	I
2	RESET	3.38	3.38	0.00	RUN	0.88	0.90	2.450	2.72

Tolerance (min)	Interpolated value for I:	Tc high	Tc low	I@1440 low	I@1440 high	Interpolated I@1440	(1440/Tc)^0.47
0.5		4.00	3.00	14.32	14.32	14.32	14.32

Use Tc value: 5.00 minutes

Intensity: 2.72 Cu: 0.88 Cd: 0.90 Flowrate: 0.69

parameters

AREA "J" PREDEVELOPED

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet
J	0.1	0.01	25	17	10	0.02	4.56

Equation, given parameters above:
Undeveloped subarea coefficient (0<%imp<.21).

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135
0	0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Undeveloped subarea coefficient (%imp=0):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Undeveloped subarea coefficient (0<%imp<.21):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Developed subarea coefficient (.21<%imp<.68):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Developed subarea coefficient (.68<%imp<1):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Equations for Tc: Tc=(10)^bo*(Cd*I)^b1*(L)^b2*(S)^b3

I1440=Isohyet/24hrs: 0.190
I=I1440*Io/I1440: 2.721

Iterations		Tc estimate:	Tc calc:	Diff:		Cu	Cd	Ix=Cd*I	It
1	RESET	1.31	1.02	0.29	RUN	0.88	0.88	2.390	2.72

Tolerance (min)	Interpolated value for I:	Tc high	Tc low	I@Tc low	I@Tc high	Interpolated I@1440	(1440/Tc)^0.47
0.5		2.00	1.00	14.32	14.32	14.32	14.32

Use Tc value: 5.00 minutes

Intensity: 2.72 Cu: 0.88 Cd: 0.88 Flowrate: 0.24

parameters

POST-DEVELOPED AREA "A" 25 YEAR STORM

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet
A	0.42	1	50	17	152	0.02	4.56

Undeveloped subarea coeff. (%Imp<0):
bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Undeveloped subarea coeff. (0<%Imp<.21):
bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Developed subarea coeff. (.21<%Imp<.68):
bo= -0.507
b1= 0.519
b2= 0.483
b3= -0.135

Developed subarea coeff. (.68<%Imp<1):
bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Equation, given parameters above:
Developed subarea coeff. (.68<%Imp<1):

bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135
0 0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Equations for Tc: Tc=(10)^bo*(Cd*I)^b1*(L)^b2*(S)^b3

I1440=Isohyet/24hrs: 0.190
It=I1440*Ix/I1440: 2.721

Iterations		Tc estimate:	Tc calc:	Diff.		Cu	Cd	Ix=Cd*I	It
2	RESET	3.75	3.75	0.00	RUN	0.88	0.90	2.450	2.72

Tolerance (min)	Interpolated value for I:	Tc high	Tc low	I@1440 low	I@1440 high	Interpolated I@1440	(1440/Tc)^0.47
0.5		4.00	3.00	14.32	14.32	14.32	14.32

Use Tc value: 5.00 minutes

Intensity: 2.72 Cu: 0.88 Cd: 0.90 Flowrate: 1.03

AREA "A" FIRST FLUSH

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet
A	0.42	1	F.F.	17	152	0.02	0.75

Equation, given parameters above;
Developed subarea coeff. (.68<%imp<1)

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135
0	0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Undeveloped subarea coeff. (%imp=0):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Undeveloped subarea coeff. (0<%imp<.21)

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Developed subarea coeff. (.21<%imp<.68)

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Developed subarea coeff. (.68<%imp<1)

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Equations for Tc: Tc=(10)^bo*(Cd*I)^b1*(L)^b2*(S)^b3

I1440=Isohyet/24hrs: 0.031
It=(1440*Ix)/1440: 0.297

Iterations RESET | Tc estimate: 12.00 | Tc calc: 11.78 | Diff: 0.22 | RUN

Cu	Cd	Ix=Cd*I	It
0.10	0.90	0.270	0.30

Tolerance (min)
0.5

Interpolated value for I:

Tc high	Tc low	It1440 low	It1440 high	Interpolated It1440	(1440/Tc)^0.47
12.00	12.00	#N/A	#N/A	#N/A	9.49

Use Tc value: 12.00 minutes

Intensity: 0.30 Cu: 0.10 Cd: 0.90 Flowrate: 0.11

$I_{comp.} = 0.52$

parameters

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet
B	0.35	0.52	5025	17	245	0.020	4.56

Equation given parameters above:
Developed subares coeff. (.21<%imp<.68):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135
0	0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Undeveloped subares coeff. (%imp=0).

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Undeveloped subares coeff. (0<%imp<.21).

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Developed subares coeff. (.21<%imp<.68):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Developed subares coeff. (.68<%imp<1).

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Equations for Tc: Tc=(10)^bo*(Cd*I)^b1*(L)^b2*(S)^b3

I1440=Isohyet/24hrs:	0.190
I=I1440*Ix/I1440:	2.721

Iterations		Tc estimate:	Tc calc:	Diff:		Cu	Cd	Ix=Cd*I	It
2	RESET	4.76	4.59	0.17	RUN	0.88	0.89	2.420	2.72

Tolerance (min)	Interpolated value for I:	Tc high	Tc low	I@1440 low	I@1440 high	Interpolated I@1440	(1440/Tc)^0.47
0.5		5.00	4.00	14.32	14.32	14.32	14.32

Use Tc value: 5.00 minutes

Intensity: 2.72 Cu: 0.88 Cd: 0.89 Flowrate: 0.85

AREA "B" FIRST FLUSH

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet
B	0.35	1	F.F.	17	245	0.026	0.75

Equation, given parameters above:
Developed subarea coeff. (.68<%Imp<1):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135
0	0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Undeveloped subarea coeff. (%Imp=0):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Undeveloped subarea coeff. (0<%Imp<.21):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Developed subarea coeff. (.21<%Imp<.68)

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Developed subarea coeff. (.68<%Imp<1):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Equations for Tc: Tc=(10)^bo*(Cd*I)^b1*(L)^b2*(S)^b3

I1440=Isohyet/24hrs: 0.031
It=I1440*It/I1440: 0.268

Iterations		Tc estimate:	Tc calc:	Diff:		Cu	Cd	Ix=Cd*I	It
2	RESET	14.91	15.23	0.32	RUN	0.10	0.90	0.240	0.27

Tolerance (min)	Interpolated value for I:	Tc high	Tc low	It1440 low	It1440 High	Interpolated It1440	(1440/Tc)^0.47
0.5		15.00	14.00	#N/A	#N/A	#N/A	8.57

Use Tc value: 15.00 minutes

Intensity: 0.27 Cu: 0.10 Cd: 0.90 Flowrate: 0.09

POST- DEVELOP. AREA "C" 25 YEAR.

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet
C	0.15	1	25	17	141	0.02	4.56

Equation, given parameters above:
Developed subarea coeff. (.68<%imp<1).

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135
Q	0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Undeveloped subarea coeff. (%imp=0)		Undeveloped subarea coeff. (0<%imp<.21)		Developed subarea coeff. (.21<%imp<.68)		Developed subarea coeff. (.68<%imp<1)	
bo=	-0.507	bo=	-0.507	bo=	-0.507	bo=	-0.507
b1=	-0.519	b1=	-0.519	b1=	-0.519	b1=	-0.519
b2=	0.483	b2=	0.483	b2=	0.483	b2=	0.483
b3=	-0.135	b3=	-0.135	b3=	-0.135	b3=	-0.135

Equations for Tc: Tc=(10)^bo*(Cd*I)^b1*(L)^b2*(S)^b3

I1440=Isohyet/24hrs: 0.190
I=I1440*Ix/I1440: 2.721

Iterations		Tc estimate:	Tc calc:	Diff:		Cu	Cd	Ix=Cd*I	I
2	RESET	3.62	3.62	0.00	RUN	0.88	0.90	2.460	2.72

Tolerance (min)	Interpolated value for I:	Tc high	Tc low	I@1440 low	I@1440 high	Interpolated I@1440	(1440/Tc)^0.47
0.5		4.00	3.00	14.32	14.32	14.32	14.32

Use Tc value: 5.00 minutes

Intensity: 2.72 Cu: 0.88 Cd: 0.90 Flowrate: 0.37

$A_{TOT} = A_C + A_{planter\ "C"} = 0.14 + 0.01 = 0.15(ac)$

AREA "C" FIRST FLUSH

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet
C	0.15	1	F.F.	17	141	0.02	0.75

Equation, given parameters above:
Developed subarea coefficients (.68<%imp<1):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135
0	0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Undeveloped subarea coefficients (%imp=0):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Undeveloped subarea coefficients (0<%imp<.21):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Developed subarea coefficients (.21<%imp<.68):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Developed subarea coefficients (.68<%imp<1):

bo=	-0.507
b1=	0.519
b2=	0.483
b3=	-0.135

Equations for Tc: Tc=(10)^bo*(Cd*I)^b1*(L)^b2*(S)^b3

I1440=Isohyet/24hrs: 0.031
It=I1440*Ix/I1440: 0.304

Iterations		Tc estimate	Tc calc:	Diff:		Cu	Cd	Ix=Cd*I	It
1	RESET	11.36	11.15	0.21	RUN	0.12	0.90	0.280	0.31

Tolerance (min)	Interpolated value for I: Tc high	Tc low	I@1440 low	I@1440 high	Interpolated I@1440	(1440/Tc)^0.47
0.5	12.00	11.00	#N/A	#N/A	#N/A	0.73

Use Tc value: 11.00 minutes

Intensity: 0.31 Cu: 0.12 Cd: 0.90 Flowrate: 0.04

$A_{TOT} = A_C + A_{planter\ C} = 0.14 + 0.01 = 0.15 (ac)$

POST- DEVELOPED AREA "D" 25 YEAR STORM

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet
D	0.25	1	25	17	184	0.004	4.56

Equation, given parameters above:
Developed subarea coeff. (.88<%imp<1):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135
0	0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Undeveloped subarea coeff. (%imp=0):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Undeveloped subarea coeff. (0<%imp<.21)

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Developed subarea coeff. (.21<%imp<.88)

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Developed subarea coeff. (.88<%imp<1)

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Equations for Tc: Tc=(10)^bo*(Cd*I)^b1*(L)^b2*(S)^b3

1440=Isohyet/24hrs: 0.190
II=I1440*Ix/I1440. 2.620

Iterations		Tc estimate:	Tc calc:	Diff:		Cu	Cd	Ix=Cd*I	II
2	RESET	5.42	5.11	0.31	RUN	0.88	0.90	2.450	2.72

Tolerance (min)	Interpolated value for I:	Tc high	Tc low	I@Tc low	I@Tc high	Interpolated I@Tc	(1440/Tc)^0.47
0.5		6.00	5.00	13.14	14.32	13.83	13.79

Use Tc value: 5.00 minutes

Intensity: 2.72 Cu: 0.88 Cd: 0.90 Flowrate: 0.61

parameters

AREA "D" FIRST FLUSH

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet
D	0.25	1	F.F.	17	184	0.004	0.75

Equation, given parameters above:
Developed subarea coeff. (.68<%imp<1):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135
0	0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Undeveloped subarea coeff. (%imp=0):		Undeveloped subarea coeff. (0<%imp<.21):		Developed subarea coeff. (.21<%imp<.68):		Developed subarea coeff. (.68<%imp<1):	
bo=	-0.507	bo=	-0.507	bo=	-0.507	bo=	-0.507
b1=	-0.519	b1=	-0.519	b1=	-0.519	b1=	-0.519
b2=	0.483	b2=	0.483	b2=	0.483	b2=	0.483
b3=	-0.135	b3=	-0.135	b3=	-0.135	b3=	-0.135

Equations for Tc: Tc=(10)^bo*(Cd*I)^b1*(L)^b2*(S)^b3

I1440='isohyet/24hrs: 0.031
It=I1440*Ix/I1440: 0.249

Iterations		Tc estimate:	Tc calc:	Diff:		Cu	Cd	Ix=Cd*I	It
2	RESET	17.45	17.45	0.00	RUN	0.10	0.90	0.230	0.25

Tolerance (min)	Interpolated value for I:	Tc high	Tc low	I@1440 low	I@1440 high	Interpolated I@1440	(1440/Tc)^0.47
0.5		18.00	17.00	#N/A	#N/A	#N/A	7.96

Use Tc value: 17.00 minutes

Intensity: 0.25 Cu: 0.10 Cd: 0.90 Flowrate: 0.06

parameters

POST DEVELOPED AREA "E" 25 YEAR STORM

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet
E	0.61	1	25	17	137	0.02	4.56

Equation, given parameters above:
Developed subarea coeff. (.68<%Imp<1):

bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135
0 0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Undeveloped subarea coeff. (%Imp=0):
bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Undeveloped subarea coeff. (0<%Imp<.21):
bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Developed subarea coeff. (.21<%Imp<.68):
bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Developed subarea coeff. (.68<%Imp<1):
bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Equations for Tc: Tc=(10)^bo*(Cd*I)^b1*(L)^b2*(S)^b3

I1440=Isohyet/24hrs: 0.190
It=I1440*Ix/I1440^ 2.721

Iterations		Tc estimate:	Tc calc:	Diff.		Cu	Cd	Ix=Cd*I	It
2	RESET	3.57	3.57	0.00	RUN	0.86	0.90	2.450	2.72

Tolerance (min)	Interpolated value for I:	Tc high	Tc low	I@1440 low	I@1440 high	Interpolated I@1440	(1440/Tc)^0.47
0.5		4.00	3.00	14.32	14.32	14.32	14.32

Use Tc value: 5.00 minutes

Intensity: 2.72 Cu: 0.86 Cd: 0.90 Flowrate: 1.49

parameters

AREA "E" FIRST FLUSH

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet
E	0.61	1	F.F.	17	137	0.02	0.75

Undeveloped subarea coeff. (%imp<0):
bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Undeveloped subarea coeff. (0<%imp<.21):
b0= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Developed subarea coeff. (.21<%imp<.68):
bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Developed subarea coeff. (.68<%imp<1):
bo= 0.507
b1= -0.519
b2= 0.483
b3= -0.135

Equation, given parameters above:
Developed subarea coeff. (.68<%imp<1):

bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135
0 0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Equations for Tc: Tc=(10)^bo*(Cd*I)^b1*(L)^b2*(S)^b3

I1440=Isohyet/24hrs: 0.031
fi=I1440*Ix/I1440: 0.306

Iterations: 1

RESET

Tc estimate: 11.21
Tc calc: 11.00
Diff: 0.21

RUN

Cu: 0.12
Cd: 0.90
Ix=Cd*I: 0.280
II: 0.31

Tolerance (min): 0.5

Interpolated value for II: Tc high: 12.00 | Tc low: 11.00 | I@1440 low: #N/A | I@1440 high: #N/A | Interpolated I@1440: #N/A | (1440/Tc)^0.47: 9.80

Use Tc value: 11.00 minutes

Intensity: 0.31 Cu: 0.12 Cd: 0.90 Flowrate: 0.17

parameters

POST-DEV. AREA "F" 25 YEAR.

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet
F	0.09	0.01	25	17	10	0.02	4.56

Undeveloped subarea coeff. (%imp=0)
bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Undeveloped subarea coeff. (0<%imp<.21)
bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Developed subarea coeff. (.21<%imp<.69)
bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Developed subarea coeff. (.69<%imp<1)
bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135

Equation, given parameters above:
Undeveloped subarea coeff. (0<%imp<.21):

bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135
0 0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Equations for Tc: Tc=(10)^bo*(Cd*I)^b1*(L)^b2*(S)^b3

I1440=Isohyet/24hrs: 0.190
It=I1440*tx/1440: 2.721

Iterations: 1

RESET

Tc estimate:	Tc calc:	Diff:
1.31	1.02	0.29

RUN

Cu	Cd	Ix=Cd*I	It
0.88	0.88	2.390	2.72

Tolerance (min): 0.5

Interpolated value for It:

Tc high	Tc low	It/I1440 low	It/I1440 high	Interpolated It/I1440	(1440/Tc)^0.4/
2.00	1.00	14.32	14.32	14.32	14.32

Use Tc value: 5.00 minutes

Intensity: 2.72 Cu: 0.88 Cd: 0.88 Flowrate: 0.22

AREA (A)

DETERMINE SUSMP VOLUME:

A = 0.40

Imp = 1 (all roof)

C = 0.9 × Imp + 0.05 (FROM STORMWATER BEST MANAGEMENT PRACTICE DESIGN & MAINTENANCE MANUAL, FEB. 2009) APPENDIX B: BIORETENTION AREA WORKSHEET.

C = 0.9 × 1 + 0.05 = 0.95

P = 0.75 in

$V_m = 43560 \times \frac{P}{12} * A * C = 43560 \times \frac{0.75}{12} \times 0.40 \times 0.95 = 1035\ ft^3$

CALCULATIONS BIORETENTION FOOTPRINT AREA

$A = V_m / t \cdot P_{design}$

t = 48 hours

$P_{design} = 0.375\ in/hr = \frac{0.375}{12}\ ft/hr$

$A_{req} = 1035 / \frac{0.375}{12} \times 48 = 690\ ft^2$

$A_{prov.} = 1043\ ft^2$

$A_{TOT} = 0.4 + 0.02 = 0.42\ (ac)$

SPINDLER ENGINEERING CORPORATION

7120 HAYVENHURST AVENUE #200 VAN NUYS, CA. 91406
(818) 782-2788 (213) 873-1788 FAX:(818) 782-0111
RONALD W. SPINDLER R.C.E. 13194

JOB NO. 7547.00	
FUNCTION	CLIENT
DATE 4/29/09	PRESTIGE HOMES
SCALE p.1	PROJECT: HOLIDAY HARBOR

AREA (B)

DETERMINE SUSMP VOLUME

$A = 0.33 ac$

$A_I = 0.17 ac \quad I = 1.00$

$A_P = 0.16 \quad I = 0.01$

$$I_{COMPOSITE} = \frac{0.17 \times 1.00 + 0.16 \cdot 0.01}{(0.17+0.16)} = 0.52; \quad C = 0.9 \times 0.52 + 0.05 = 0.52$$

$$V_m = 43560 \times \frac{P}{12} \times A \times C = 43560 \times \frac{0.75}{12} \times 0.33 \cdot 0.52 = 467 \text{ FT}^3$$

CALCULATE BIORETENTION FOOTPRINT AREA

$A = V_m / t \cdot p_{design}$

$t = 48$ hours

$p_{design} = 0.375 \text{ in/hr} = 0.375/12 \text{ FT/hr}$

$$A_{req} = 467 / \frac{0.375}{12} \cdot 48 = 311 \text{ FT}^2$$

$A_{PROV} = 562 \text{ FT}^2 = (124.9' \times 4.5')$

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(818) 782-2788 (213) 873-1788 FAX:(818) 782-0111
RONALD W. SPINDLER R.C.E. 13194

JOB NO. 7547.00
FUNCTION
DATE 4/29/09
SCALE p.2

CLIENT: PRESTIGE HOMES

PROJECT: HOLIDAY HARBOR

AREA Ⓒ + AREA Ⓓ

$A = 0.14 + 0.25 = 0.39 (ac)$

$Imp = 1.0$ (all parking lot)

$C = 0.9 \times Imp + 0.05$

$C = 0.9 \cdot 1.0 + 0.05 = 0.95$

$p = 0.75$ in

$Vm = 43560 \cdot \frac{p}{12} \cdot A \cdot C = 43560 \times \frac{0.75}{12} \cdot 0.39 \cdot 0.95 = 1009 \text{ FT}^3$

CALCULATION BIORETENTION FOOTPRINT AREA

$A = Vm/t \cdot P_{design}$

$t = 48$ hours

$P_{design} = 0.375 \text{ in/hr} = 0.375/12 \text{ FT/hr}$

$A_{req} = 1009 / \frac{0.375}{12} \cdot 48 = 673 \text{ FT}^2$

$A_{prov} = (15.1' \times 4.5') = 679.5 \text{ FT}^2 = 0.01 ac$

SPINDLER ENGINEERING CORPORATION

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(818) 782-2788 (213) 873-1788 FAX:(818) 782-0111
RONALD W. SPINDLER R.C.E. 13194

JOB NO. 7547.00	
FUNCTION	CLIENT
DATE 4/29/09	PRESTIGE HOMES
SCALE p.3	PROJECT: HOLIDAY HARBOR

AREA (E)

$A = 0.58$ ac

$I_{MP} = 1$ (all roof & parking lot)

$C = 0.9 * I_{MP} + 0.05$

$C = 0.9 \times 1 + 0.05 = 0.95$

$p = 0.75$ in

$V_m = 43560 \times \frac{p}{12} \times A \times C = 43560 \times \frac{0.75}{12} \times 0.58 \times 0.95 = 1500\ ft^3$

CALCULATION BIORETENTION FOOTPRINT AREA.

$A = V_m / t \cdot p_{design}$

$t = 48$ hours

$p_{design} = 0.375\ in/hr = 0.375/12\ FT/hr$

$A_{req} = 1500 / \frac{0.375}{12} \times 48 = 1000\ ft^2$

$A_{PROV.} = (264' \times 4.5') = 1188\ ft^2$

SPINDLER ENGINEERING CORPORATION

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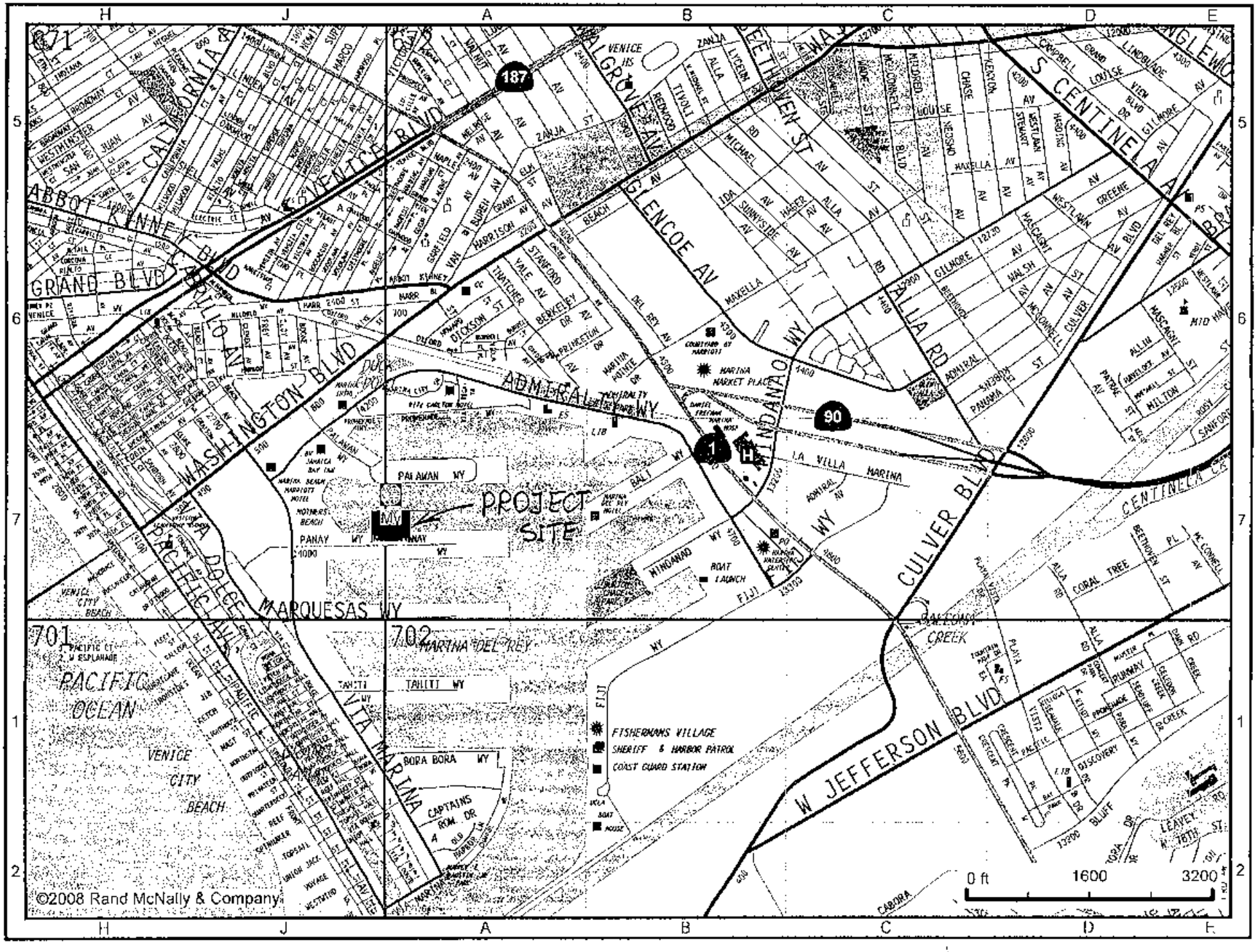
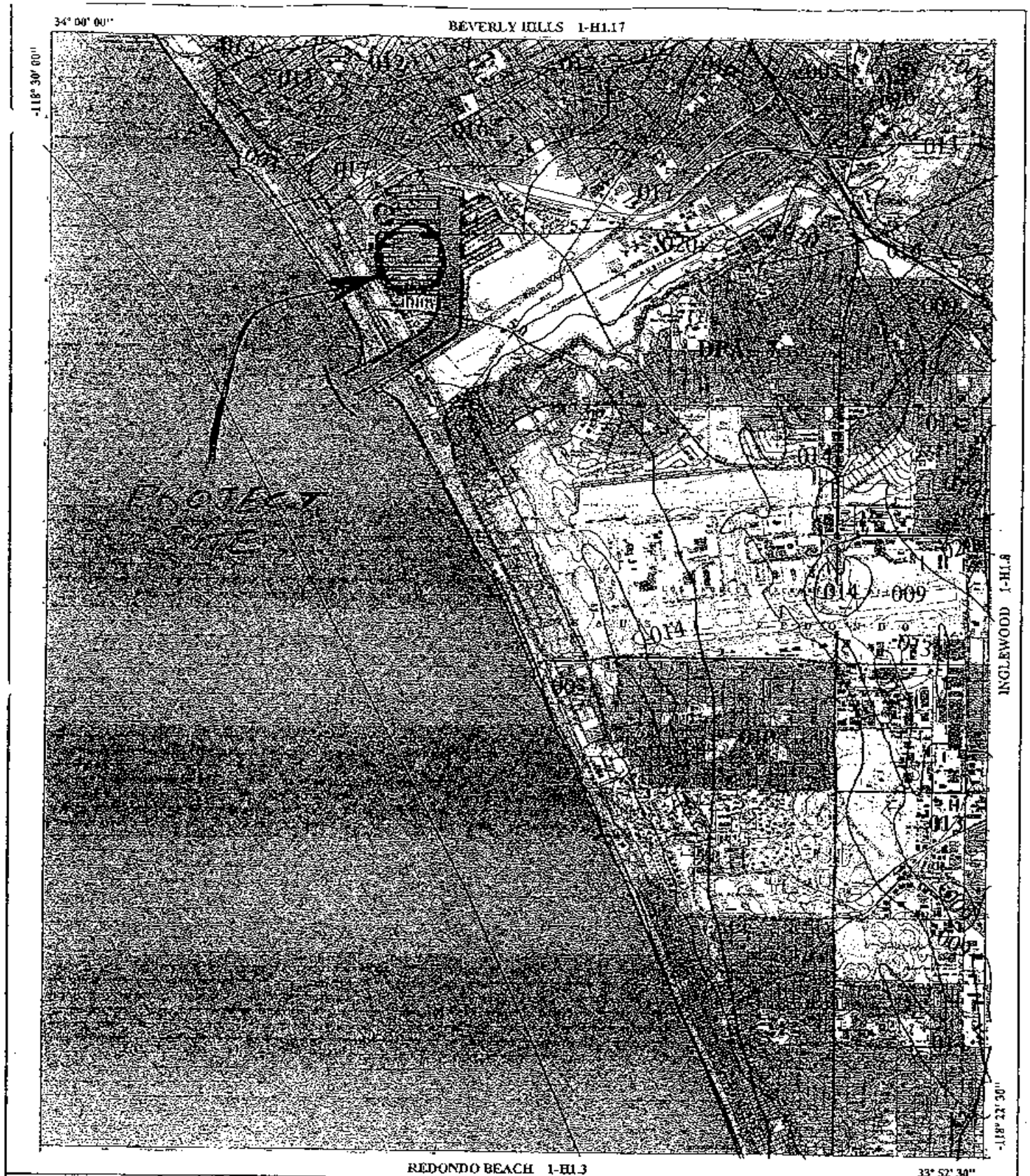
(818) 782-2788 (213) 873-1788 FAX:(818) 782-0111
RONALD W. SPINDLER R.C.E. 13194

JOB NO. 1547.00	
FUNCTION	CLIENT
DATE 4/29/09	PRESTIGE HOMES
SCALE p.4	PROJECT: HOLIDAY HARBOR

APPENDIX B



My Point: 672 - A7



ISO. 5.2" 50-YR JOB # 7547.00

SOIL TYPE 017

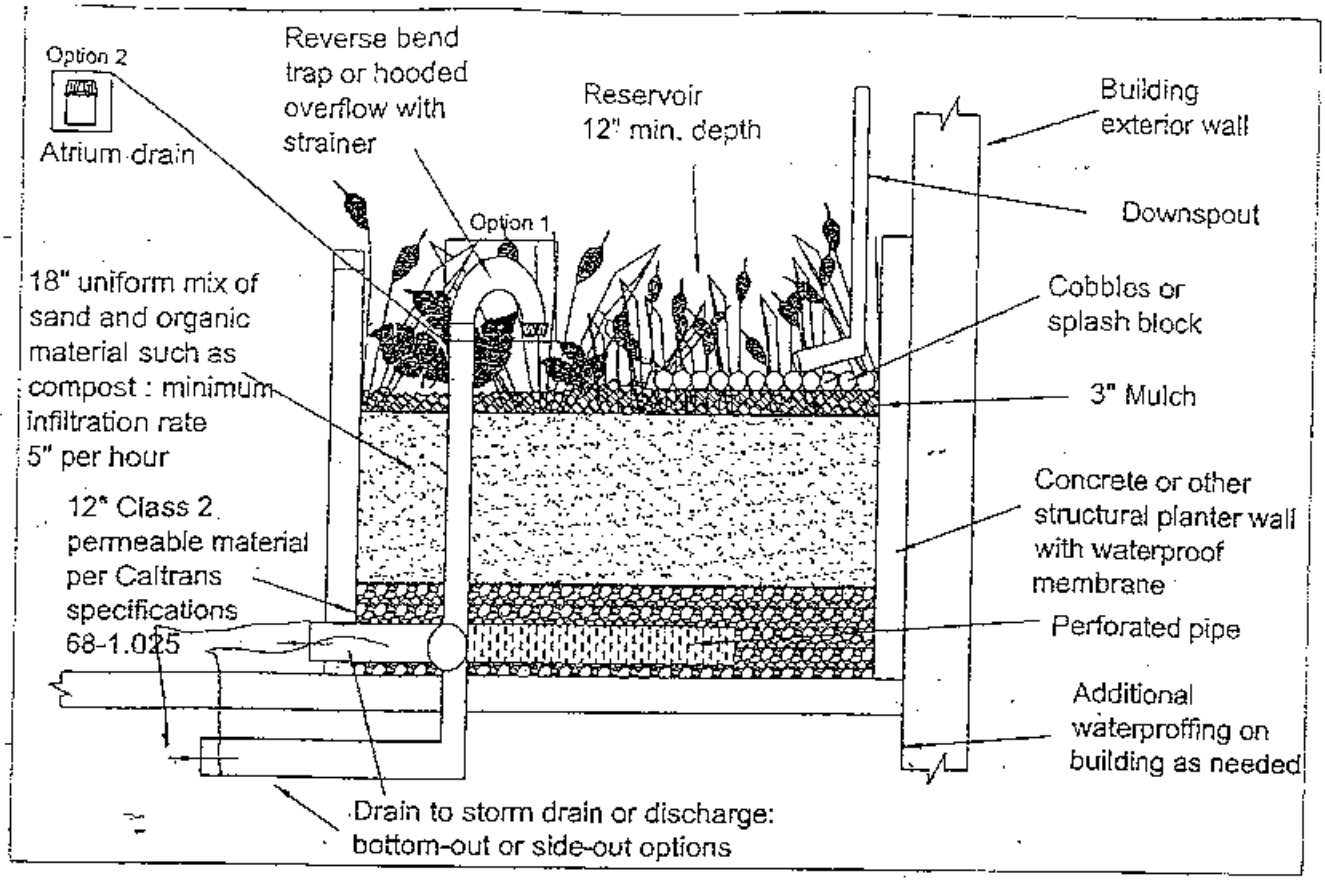


Figure A Planter Box Above Grade Illistration

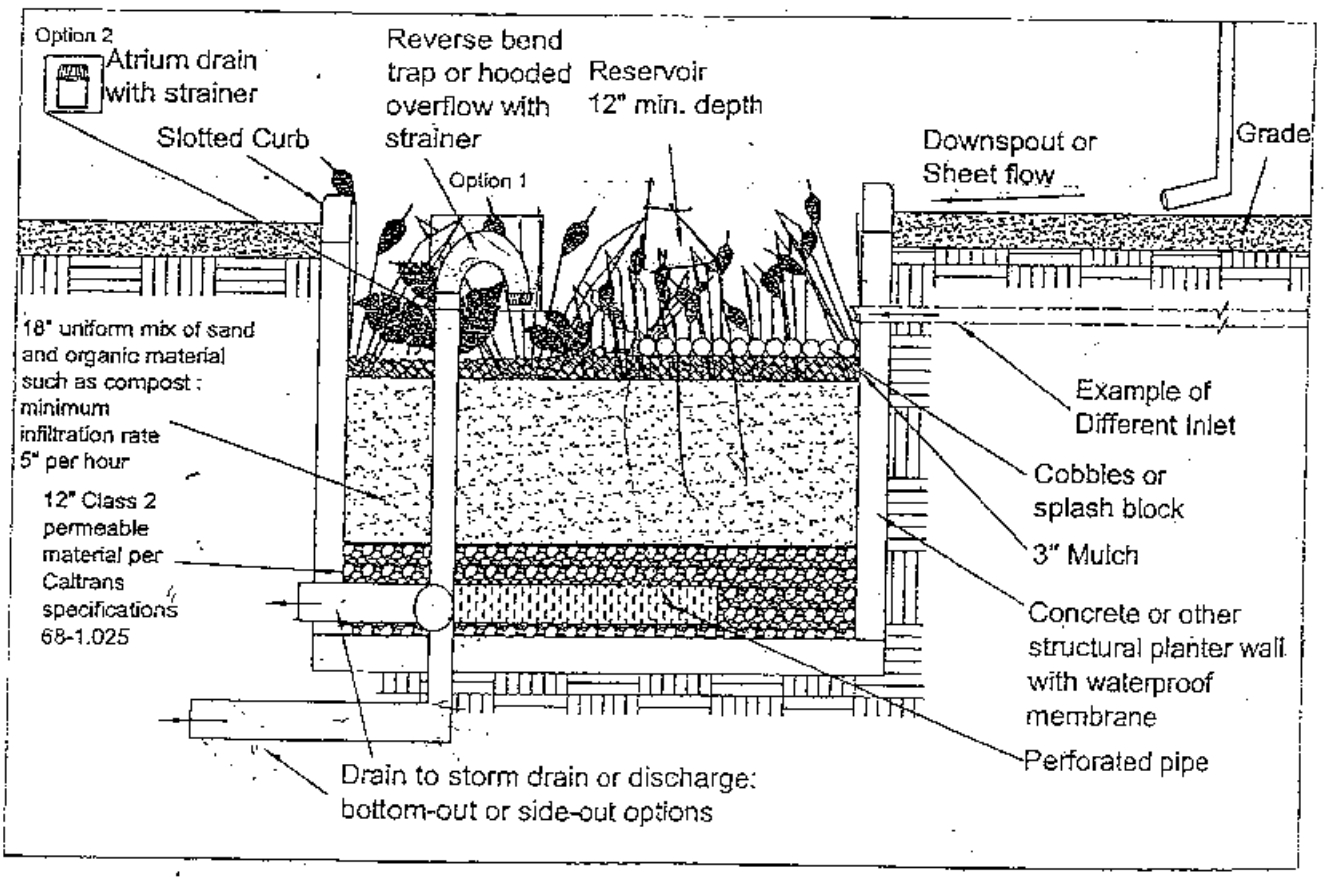


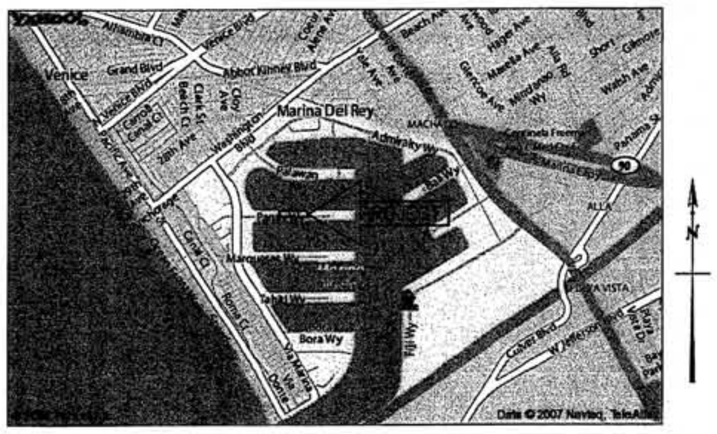
Figure B Planter Box at Grade Illistration

*City of Los Angeles, Bureau of Sanitation offers Free Mulch, pleas call (818) 883-5128 for information

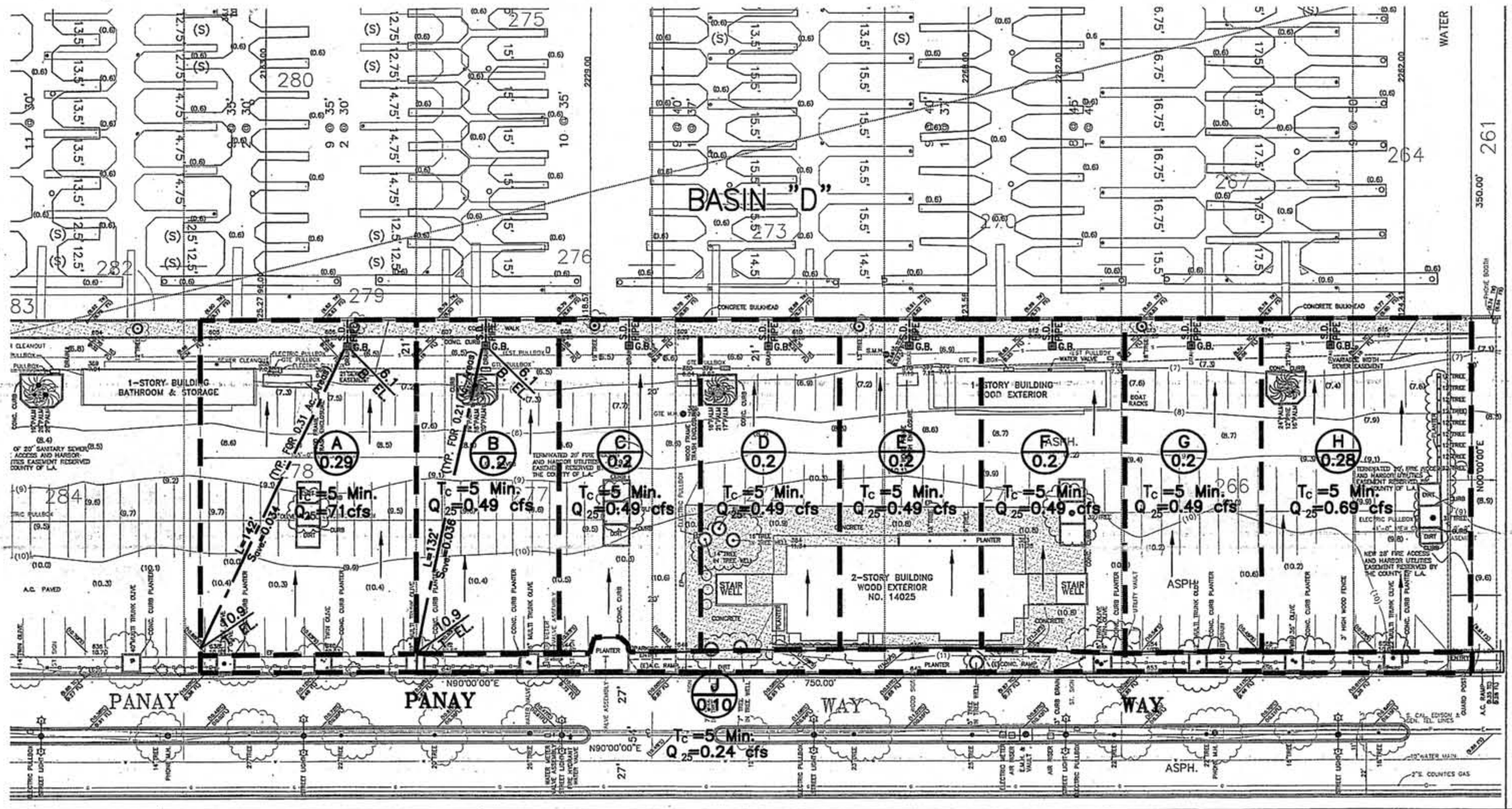
Bioretention Area Worksheet

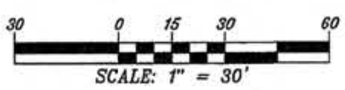
Step 1: Determine SUSMP volume		
1-1. Enter drainage area, A	A =	acres
1-2. Enter impervious fraction, Imp	Imp =	
1-3. Calculate runoff coefficient, C = 0.9•Imp + 0.05	C =	
1-4. Enter design rainfall depth of the storm, (see A Manual for the Standard Urban Storm Water Mitigation Plan, LACDPW, September 2002 (or as amended) for volume-based controls sizing methods), P_i	P_i =	in
1-5. Calculate rainfall depth, P = P_i/12	P =	ft
1-6. Calculate SUSMP volume, V_{wq}=43560•P*A*C	V_{wq} =	ft^3
Step 2: Pretreatment		
2-1. If required please go to filter strips worksheet		
Step 3: Calculate bioretention area		
3-1. Enter thickness of planting mix (min. 24"), t	t =	in
3-2. Enter storage depth (max. 18") above the filter, d	d =	in
3-3. Enter design percolation rate (with an underdrain, assume 0.375"/hr min.; without an underdrain, use measured percolation rate x 0.25), P_{design}	P_{design} =	in/hr
3-4. Enter drawdown time (48 hrs. max.), t	t =	hr
3-5. Calculate bioretention area necessary, $A_{sf} = V_{wq}/t\ P_{design}$	A_{sf} =	ft^2

APPENDIX C



VICINITY MAP
N.T.S.





HYDROLOGY LEGEND:

	SUBAREA BOUNDARY
	FLOW LINE
	DIRECTION OF RUNOFF
A / 0.31	SUBAREA DESIGNATION / SUBAREA AREA (Acres)
T. EL.	TOP ELEVATION
B. EL.	BOTTOM ELEVATION
L	FLOW PATH LENGTH
$S_{ave.}$	FLOW PATH AVERAGE SLOPE
T_C	TIME OF CONCENTRATION
Q_{25}	25-YEAR DISCHARGE

DESIGN CRITERIA:

SOIL TYPE	1.7
Q_{50} ISOHYET	5.2"
FREQUENCY	25-YR
IMPERVIOUSNESS	0.90

LEGEND:

C/L	=	CENTERLINE FINISH SURFACE
F/L	=	FLOWLINE
TC	=	TOP OF CURB
BW	=	BACK OF WALK
FS	=	FINISH SURFACE
GS	=	GROUND SHOT

SURVEYOR'S NOTES:

1. DATE OF SURVEY: NOVEMBER/DECEMBER 2000, UPDATED 10/25/02.
2. BENCHMARK: COUNTY OF LOS ANGELES BENCHMARK NO. 48-56, NAIL IN LEAD, MARINA DEL REY AREA, AT VIA MARINA AND MARQUESAS WAY, 80.5 FEET EASTERLY OF CENTERLINE INTERSECTION. SET IN NORTHERLY CURB OF CENTER DIVIDER, 5 FEET NORTHWEST FROM LIGHT POST 8/6. ELEV.= 14.654 (1977 ADJ.)
3. UTILITY INFORMATION SHOWN HEREON WAS TAKEN FROM RECORDED DATA AND IS ONLY AS ACCURATE AS SAID DATA.
4. CONTOUR INTERVAL = 1 FOOT.
5. MAP COMPILED BY PHOTOGRAMMETRIC METHODS.
6. THIS SURVEY IS BASED ON FIRST AMERICAN TITLE INSURANCE COMPANY TITLE REPORT NO. 9809238-8 DATED JUNE 25, 1998.

DRAINAGE CONCEPT/HYDROLOGY STUDY/SUSMP
APPROVED FOR AREA AND Q ONLY
APPROVED BY: Elizabeth Cordova RCE NO. C68328 DATE: 6/03/09
CHECKED BY: _____ DATE: 6/3/09
LAND DEVELOPMENT DIVISION
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

JUN 02 2009

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JOB NO. 7547.00
SCALE: 1"=30'
DATE: JUNE. 2009
REVISION:
REVISION:

REGISTERED PROFESSIONAL ENGINEER
RONALD W. SPINDLER
No. 13194
Exp. 3-31-11
CIVIL
STATE OF CALIFORNIA

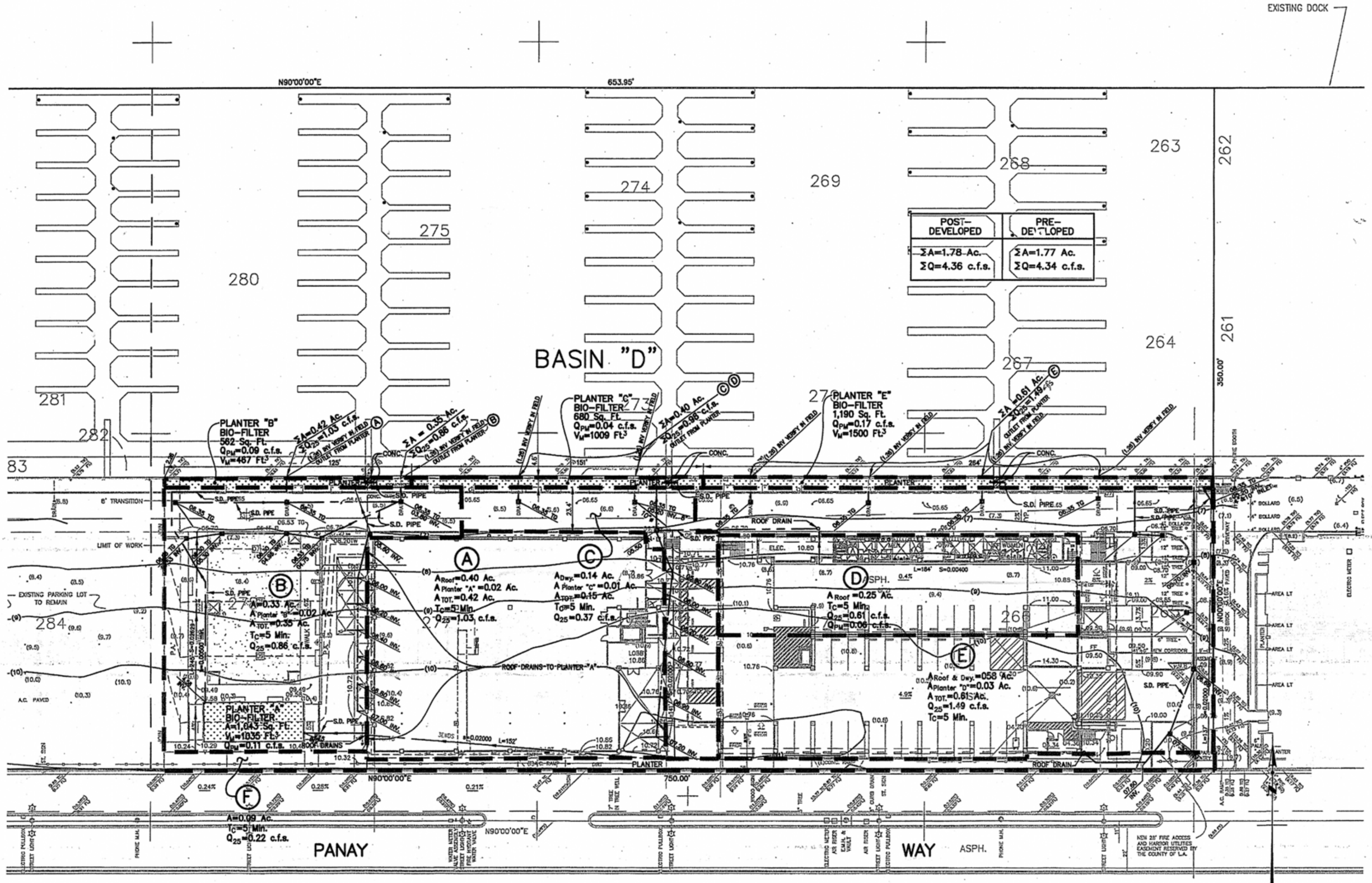
S.E.C. CIVIL ENGINEERS, INC.
16823 SATICOY STREET VAN NUYS, CA. 91406
(818) 782-2788 (323) 873-1788 FAX:(818) 782-0111
RONALD W. SPINDLER R.C.E. 13194

CLIENT: PRESTIGE HOMES

PROJECT: DRAINAGE CONCEPT/HYDROLOGY STUDY/SUSMP FOR CUP 200600223
HOLIDAY HARBOR PRE-IMPROVEMENT HYDROLOGY MAP

SHEET 1 OF 2

F:\History\7547.00 Prestige Homes - Panay Way\3 Engineering\3-01-01 Calcs\HYDROLOGY\Pre Hydro Map.dwg 5/27/2009 1:46:13 PM PST

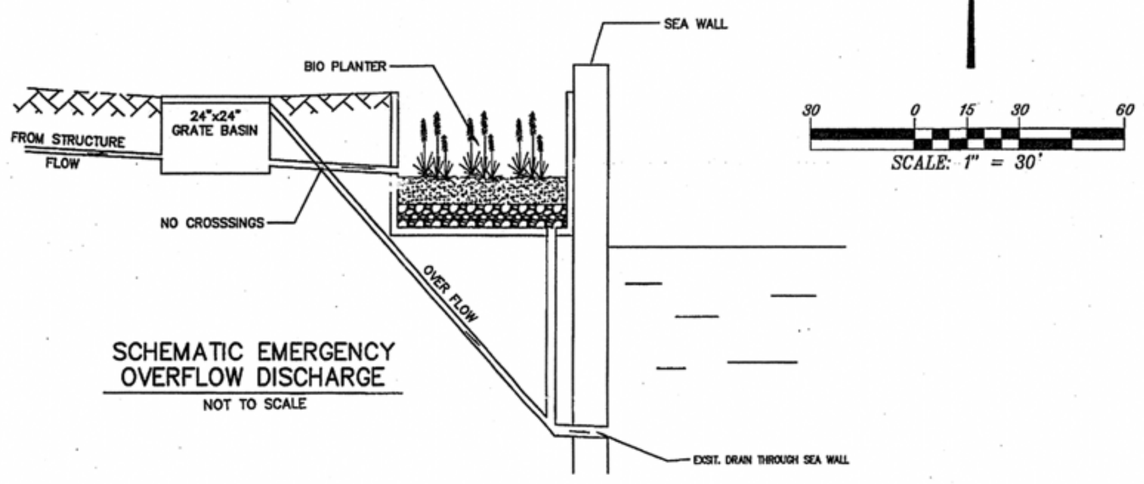


30 0 15 30 60

SCALE: 1" = 30'

DRAINAGE CONCEPT NOTES

1) Hydrology information and storm drain alignments shown are not necessarily approved.
2) Compliance of all street drainage requirements will be met to the satisfaction of the Department of Public Works.
3) All existing and proposed drainage and water quality devices to be maintained by owner.



SCHEMATIC EMERGENCY OVERFLOW DISCHARGE
NOT TO SCALE

LEGEND:

C/L	=	CENTERLINE FINISH SURFACE
F/L	=	FLOWLINE
TC	=	TOP OF CURB
BW	=	BACK OF WALK
FS	=	FINISH SURFACE
GS	=	GROUND SHOT

SURVEYOR'S NOTES:

1. DATE OF SURVEY : NOVEMBER/DECEMBER 2000, UPDATED 10/25/02 BY FINE LINE SYSTEMS (323) 726-3388
2. BENCHMARK: COUNTY OF LOS ANGELES BENCHMARK NO. 48-56, NAIL IN LEAD, MARINA DEL REY AREA, AT VIA MARINA AND MARQUESAS WAY, 80.5 FEET EASTERLY OF CENTERLINE INTERSECTION. SET IN NORTHERLY CURB OF CENTER DIVIDER, 5 FEET NORTHWEST FROM LIGHT POST 8/6. ELEV. = 14.654 (1977 ADJ.)
3. UTILITY INFORMATION SHOWN HEREON WAS TAKEN FROM RECORDED DATA AND IS ONLY AS ACCURATE AS SAID DATA.
4. THIS SURVEY IS BASED ON FIRST AMERICAN TITLE INSURANCE COMPANY TITLE REPORT NO. 9809238-8 DATED JUNE 25, 1998.

HYDROLOGY LEGEND:

▬ ▬ ▬ ▬	SUBAREA BOUNDARY
— - — - —	FLOW LINE
→	DIRECTION OF RUNOFF
Ⓐ ←	SUBAREA DESIGNATION
T. EL.	TOP ELEVATION
B. EL.	BOTTOM ELEVATION
L	FLOW PATH LENGTH
$S_{ave.}$	FLOW PATH AVERAGE SLOPE
T_c	TIME OF CONCENTRATION
Q_{25}	25-YEAR DISCHARGE

DESIGN CRITERIA:

SOIL TYPE	17
Q_{50} ISOHYET	5.2"
FREQUENCY	25-YR
IMPERVIOUSNESS	0.83

LEGAL DESCRIPTION:

PARCEL 21

LOTS 263 TO 282 INCLUSIVE, ALL OF L.A.C.A. MAP NO. 88, AS PER MAP RECORDED IN BOOK 1 PAGES 53 TO 70 INCLUSIVE OF ASSESSOR'S MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPT THEREFROM THE WESTERLY 7 FEET, MORE OR LESS, OF SAID LOT 278.

NOTE:

1. NOT WITHIN COUNTY ADOPTED FLOODWAY
2. NOT WITHIN FEMA FLOOD ZONE "A".

DRAINAGE CONCEPT/HYDROLOGY STUDY/SUSMP
APPROVED FOR AREA AND Q ONLY
APPROVED BY: Tim Lutz Condors RCE NO. C68328 DATE: 6/03/09
CHECKED BY: DATE: 6/3/09
LAND DEVELOPMENT DIVISION
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

JUN 02 2009

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DATE: JUNE, 2009
REVISION:
REVISION:

REGISTERED PROFESSIONAL ENGINEER
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RONALD W. SPINDLER R.C.E. 13194

CLIENT: PRESTIGE HOMES

PROJECT: DRAINAGE CONCEPT/HYDROLOGY STUDY/SUSMP FOR CUP 200600223
HOLIDAY HARBOR POST-IMPROVEMENT HYDROLOGY MAP

SHEET 2 OF 2

F:\History\7547.00 Prestige Homes - Panay Way\3 Engineering\3-01-01 Calcs\HYDROLOGY\Post Hydro Map 5-5-09.dwg 5/28/2009 8:31:22 AM PST

URBEMIS 2007 Model Output (Air Quality Analysis)

APPENDIX D

10/16/2008 1:55:59 PM

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: C:\Documents and Settings\Sara\Application Data\Urbemis\Version9a\Projects\Marina OT and 21 w Grading and Demo 8-16-08.urb924

Project Name: Marina OT and 21

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

10/16/2008 1:55:59 PM

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2009 TOTALS (lbs/day unmitigated)	9.76	97.31	45.19	0.05	36.99	4.53	41.52	7.75	4.16	11.91	10,230.81
2009 TOTALS (lbs/day mitigated)	9.76	93.35	45.19	0.05	14.19	3.39	14.96	2.96	3.12	4.53	10,230.81
2010 TOTALS (lbs/day unmitigated)	10.40	20.05	22.69	0.02	0.07	1.43	1.45	0.03	1.32	1.32	3,260.26
2010 TOTALS (lbs/day mitigated)	9.78	17.99	22.69	0.02	0.07	0.59	0.66	0.03	0.54	0.56	3,260.26

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	6.42	1.21	3.73	0.00	0.01	0.01	1,490.31

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	2.31	2.31	21.37	0.03	4.72	0.92	2,836.78

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	8.73	3.52	25.10	0.03	4.73	0.93	4,327.09

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

10/16/2008 1:55:59 PM

Time Slice 10/1/2009-10/9/2009 Active Days: 7	2.47	24.19	12.04	0.02	14.19	1.31	15.50	2.96	1.21	4.17	2,803.83
Demolition 10/01/2009-10/09/2009	2.47	24.19	12.04	0.02	14.19	1.31	15.50	2.96	1.21	4.17	2,803.83
Fugitive Dust	0.00	0.00	0.00	0.00	14.12	0.00	14.12	2.94	0.00	2.94	0.00
Demo Off Road Diesel	1.23	8.15	4.78	0.00	0.00	0.64	0.64	0.00	0.59	0.59	700.30
Demo On Road Diesel	1.20	15.97	6.13	0.02	0.07	0.67	0.73	0.02	0.61	0.64	1,979.10
Demo Worker Trips	0.04	0.07	1.13	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.43
Time Slice 10/12/2009-11/6/2009 Active Days: 20	9.76	**97.31**	**45.19**	**0.05**	**36.99**	**4.53**	**41.52**	**7.75**	**4.16**	**11.91**	**10,230.81**
Fine Grading 10/12/2009-11/06/2009	6.54	70.79	31.09	0.05	18.59	3.19	21.78	3.90	2.93	6.84	7,859.06
Fine Grading Dust	0.00	0.00	0.00	0.00	18.40	0.00	18.40	3.84	0.00	3.84	0.00
Fine Grading Off Road Diesel	3.18	26.46	12.98	0.00	0.00	1.33	1.33	0.00	1.23	1.23	2,247.32
Fine Grading On Road Diesel	3.33	44.27	16.99	0.05	0.18	1.85	2.03	0.06	1.70	1.76	5,487.32
Fine Grading Worker Trips	0.04	0.07	1.13	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.43
Mass Grading 10/12/2009-12/31/2009	3.22	26.52	14.10	0.00	18.41	1.34	19.74	3.84	1.23	5.08	2,371.75
Mass Grading Dust	0.00	0.00	0.00	0.00	18.40	0.00	18.40	3.84	0.00	3.84	0.00
Mass Grading Off Road Diesel	3.18	26.46	12.98	0.00	0.00	1.33	1.33	0.00	1.23	1.23	2,247.32
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.04	0.07	1.13	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.43

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Time Slice 11/9/2009-12/31/2009 Active Days: 39	3.22	26.52	14.10	0.00	18.41	1.34	19.74	3.84	1.23	5.08	2,371.75
Mass Grading 10/12/2009-12/31/2009	3.22	26.52	14.10	0.00	18.41	1.34	19.74	3.84	1.23	5.08	2,371.75
Mass Grading Dust	0.00	0.00	0.00	0.00	18.40	0.00	18.40	3.84	0.00	3.84	0.00
Mass Grading Off Road Diesel	3.18	26.46	12.98	0.00	0.00	1.33	1.33	0.00	1.23	1.23	2,247.32
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.04	0.07	1.13	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.43
Time Slice 1/1/2010-6/30/2010 Active Days: 129	4.19	20.03	22.42	0.02	0.07	1.34	1.41	0.02	1.23	1.26	3,228.26
Building 01/01/2010-11/30/2010	4.19	20.03	22.42	0.02	0.07	1.34	1.41	0.02	1.23	1.26	3,228.26
Building Off Road Diesel	3.65	16.55	11.20	0.00	0.00	1.19	1.19	0.00	1.10	1.10	1,621.20
Building Vendor Trips	0.26	2.96	2.28	0.01	0.02	0.12	0.14	0.01	0.11	0.12	546.23
Building Worker Trips	0.28	0.53	8.94	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,060.84
Time Slice 7/1/2010-11/30/2010 Active Days: 109	**10.40**	20.05	22.69	0.02	0.07	1.35	1.42	0.03	1.24	1.26	3,260.26
Building 01/01/2010-11/30/2010	4.19	20.03	22.42	0.02	0.07	1.34	1.41	0.02	1.23	1.26	3,228.26
Building Off Road Diesel	3.65	16.55	11.20	0.00	0.00	1.19	1.19	0.00	1.10	1.10	1,621.20
Building Vendor Trips	0.26	2.96	2.28	0.01	0.02	0.12	0.14	0.01	0.11	0.12	546.23
Building Worker Trips	0.28	0.53	8.94	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,060.84
Coating 07/01/2010-12/31/2010	6.21	0.02	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.00
Architectural Coating	6.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.00

Time Slice 12/1/2010-12/31/2010 Active Days: 23	9.20	17.00	11.89	0.00	0.02	1.43	1.45	0.01	1.32	1.32	1,674.54
Asphalt 12/01/2010-12/31/2010	2.98	16.99	11.62	0.00	0.02	1.43	1.45	0.01	1.31	1.32	1,642.54
Paving Off-Gas	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.64	15.97	9.18	0.00	0.00	1.39	1.39	0.00	1.27	1.27	1,272.04
Paving On Road Diesel	0.07	0.89	0.34	0.00	0.00	0.04	0.04	0.00	0.03	0.04	121.72
Paving Worker Trips	0.07	0.12	2.10	0.00	0.01	0.01	0.02	0.00	0.01	0.01	248.79
Coating 07/01/2010-12/31/2010	6.21	0.02	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.00
Architectural Coating	6.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.00

Phase Assumptions

Phase: Demolition 10/1/2009 - 10/9/2009 - Demo

Building Volume Total (cubic feet): 335400

Building Volume Daily (cubic feet): 33620

On Road Truck Travel (VMT): 466.94

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 10/12/2009 - 11/6/2009 - Grading Trucks

Total Acres Disturbed: 7.35

Maximum Daily Acreage Disturbed: 1.84

Fugitive Dust Level of Detail: Default

10 lbs per acre-day

On Road Truck Travel (VMT): 1294.67

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 10/12/2009 - 12/31/2009 - Default Demolition Description

Total Acres Disturbed: 7.35

Maximum Daily Acreage Disturbed: 1.84

Fugitive Dust Level of Detail: Default

10 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 12/1/2010 - 12/31/2010 - Default Paving Description

Acres to be Paved: 1.84

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 1/1/2010 - 11/30/2010 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

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1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 7/1/2010 - 12/31/2010 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 10/1/2009-10/9/2009 Active Days: 7	2.47	22.96	12.04	0.02	14.19	0.77	14.96	2.96	0.71	3.67	2,803.83
Demolition 10/01/2009-10/09/2009	2.47	22.96	12.04	0.02	14.19	0.77	14.96	2.96	0.71	3.67	2,803.83
Fugitive Dust	0.00	0.00	0.00	0.00	14.12	0.00	14.12	2.94	0.00	2.94	0.00
Demo Off Road Diesel	1.23	6.93	4.78	0.00	0.00	0.10	0.10	0.00	0.09	0.09	700.30
Demo On Road Diesel	1.20	15.97	6.13	0.02	0.07	0.67	0.73	0.02	0.61	0.64	1,979.10
Demo Worker Trips	0.04	0.07	1.13	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.43

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Time Slice 10/12/2009-11/6/2009 Active Days: 20	9.76	93.35	**45.19**	**0.05**	6.63	3.39	10.02	1.41	3.12	4.53	**10,230.81**
Fine Grading 10/12/2009-11/06/2009	6.54	66.82	31.09	0.05	1.89	2.05	3.95	0.42	1.89	2.31	7,859.06
Fine Grading Dust	0.00	0.00	0.00	0.00	1.71	0.00	1.71	0.36	0.00	0.36	0.00
Fine Grading Off Road Diesel	3.18	22.49	12.98	0.00	0.00	0.20	0.20	0.00	0.18	0.18	2,247.32
Fine Grading On Road Diesel	3.33	44.27	16.99	0.05	0.18	1.85	2.03	0.06	1.70	1.76	5,487.32
Fine Grading Worker Trips	0.04	0.07	1.13	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.43
Mass Grading 10/12/2009-12/31/2009	3.22	26.52	14.10	0.00	4.73	1.34	6.07	0.99	1.23	2.22	2,371.75
Mass Grading Dust	0.00	0.00	0.00	0.00	4.73	0.00	4.73	0.99	0.00	0.99	0.00
Mass Grading Off Road Diesel	3.18	26.46	12.98	0.00	0.00	1.33	1.33	0.00	1.23	1.23	2,247.32
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.04	0.07	1.13	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.43
Time Slice 11/9/2009-12/31/2009 Active Days: 39	3.22	26.52	14.10	0.00	4.73	1.34	6.07	0.99	1.23	2.22	2,371.75
Mass Grading 10/12/2009-12/31/2009	3.22	26.52	14.10	0.00	4.73	1.34	6.07	0.99	1.23	2.22	2,371.75
Mass Grading Dust	0.00	0.00	0.00	0.00	4.73	0.00	4.73	0.99	0.00	0.99	0.00
Mass Grading Off Road Diesel	3.18	26.46	12.98	0.00	0.00	1.33	1.33	0.00	1.23	1.23	2,247.32
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.04	0.07	1.13	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.43
Time Slice 1/1/2010-6/30/2010 Active Days: 129	4.19	17.98	22.42	0.02	0.07	0.59	0.66	0.02	0.54	0.56	3,228.26
Building 01/01/2010-11/30/2010	4.19	17.98	22.42	0.02	0.07	0.59	0.66	0.02	0.54	0.56	3,228.26
Building Off Road Diesel	3.65	14.49	11.20	0.00	0.00	0.43	0.43	0.00	0.40	0.40	1,621.20
Building Vendor Trips	0.26	2.96	2.28	0.01	0.02	0.12	0.14	0.01	0.11	0.12	546.23
Building Worker Trips	0.28	0.53	8.94	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,060.84

Time Slice 7/1/2010-11/30/2010 Active Days: 109	9.78	17.99	22.69	0.02	0.07	0.59	0.66	0.03	0.54	0.56	3,260.26
Building 01/01/2010-11/30/2010	4.19	17.98	22.42	0.02	0.07	0.59	0.66	0.02	0.54	0.56	3,228.26
Building Off Road Diesel	3.65	14.49	11.20	0.00	0.00	0.43	0.43	0.00	0.40	0.40	1,621.20
Building Vendor Trips	0.26	2.96	2.28	0.01	0.02	0.12	0.14	0.01	0.11	0.12	546.23
Building Worker Trips	0.28	0.53	8.94	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,060.84
Coating 07/01/2010-12/31/2010	5.59	0.02	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.00
Architectural Coating	5.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.00
Time Slice 12/1/2010-12/31/2010 Active Days: 23	8.58	14.61	11.89	0.00	0.02	0.25	0.27	0.01	0.23	0.24	1,674.54
Asphalt 12/01/2010-12/31/2010	2.98	14.59	11.62	0.00	0.02	0.25	0.27	0.01	0.23	0.24	1,642.54
Paving Off-Gas	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.64	13.58	9.18	0.00	0.00	0.21	0.21	0.00	0.19	0.19	1,272.04
Paving On Road Diesel	0.07	0.89	0.34	0.00	0.00	0.04	0.04	0.00	0.03	0.04	121.72
Paving Worker Trips	0.07	0.12	2.10	0.00	0.01	0.01	0.02	0.00	0.01	0.01	248.79
Coating 07/01/2010-12/31/2010	5.59	0.02	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.00
Architectural Coating	5.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.00

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Demolition 10/1/2009 - 10/9/2009 - Demo

For Concrete/Industrial Saws, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Concrete/Industrial Saws, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Rubber Tired Dozers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Rubber Tired Dozers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Tractors/Loaders/Backhoes, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Tractors/Loaders/Backhoes, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

The following mitigation measures apply to Phase: Fine Grading 10/12/2009 - 11/6/2009 - Grading Trucks

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Graders, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Graders, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Rubber Tired Dozers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Rubber Tired Dozers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Tractors/Loaders/Backhoes, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Tractors/Loaders/Backhoes, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

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For Water Trucks, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Water Trucks, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

The following mitigation measures apply to Phase: Mass Grading 10/12/2009 - 12/31/2009 - Default Demolition Description

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

The following mitigation measures apply to Phase: Paving 12/1/2010 - 12/31/2010 - Default Paving Description

For Cement and Mortar Mixers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Cement and Mortar Mixers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Pavers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Pavers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Paving Equipment, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Paving Equipment, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Rollers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Rollers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Tractors/Loaders/Backhoes, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Tractors/Loaders/Backhoes, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

The following mitigation measures apply to Phase: Building Construction 1/1/2010 - 11/30/2010 - Default Building Construction Description

For Cranes, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Cranes, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Forklifts, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Forklifts, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Generator Sets, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Generator Sets, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Tractors/Loaders/Backhoes, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Tractors/Loaders/Backhoes, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

The following mitigation measures apply to Phase: Architectural Coating 7/1/2010 - 12/31/2010 - Default Architectural Coating Description

For Residential Architectural Coating Measures, the Residential Exterior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 10%

For Residential Architectural Coating Measures, the Residential Interior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 10%

For Nonresidential Architectural Coating Measures, the Nonresidential Exterior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 10%

For Nonresidential Architectural Coating Measures, the Nonresidential Interior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 10%

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.09	1.17	0.52	0.00	0.00	0.00	1,484.81
Hearth - No Summer Emissions							
Landscape	0.26	0.04	3.21	0.00	0.01	0.01	5.50
Consumer Products	5.85						
Architectural Coatings	0.22						
TOTALS (lbs/day, unmitigated)	6.42	1.21	3.73	0.00	0.01	0.01	1,490.31

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Congregate care (Assisted Living) Facility	1.92	1.77	16.55	0.02	3.62	0.71	2,180.04
Strip mall	0.39	0.54	4.82	0.01	1.10	0.21	656.74
TOTALS (lbs/day, unmitigated)	2.31	2.31	21.37	0.03	4.72	0.92	2,836.78

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2014 Temperature (F): 80 Season: Summer

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Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Congregate care (Assisted Living) Facility	7.12	1.82	dwelling units	114.00	207.48	2,096.13
Strip mall		14.20	1000 sq ft	5.00	71.00	637.08
					278.48	2,733.21

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	51.1	0.4	99.4	0.2
Light Truck < 3750 lbs	7.3	1.4	95.9	2.7
Light Truck 3751-5750 lbs	23.1	0.4	99.6	0.0
Med Truck 5751-8500 lbs	10.8	0.9	99.1	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.7	0.0	82.4	17.6
Lite-Heavy Truck 10,001-14,000 lbs	0.5	0.0	60.0	40.0
Med-Heavy Truck 14,001-33,000 lbs	0.9	0.0	22.2	77.8
Heavy-Heavy Truck 33,001-60,000 lbs	0.6	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	2.8	50.0	50.0	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	0.9	0.0	88.9	11.1

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Strip mall				2.0	1.0	97.0

Operational Changes to Defaults

Heron Assessment for Marina del Rey Lease Parcel OT & Vicinity

APPENDIX E

CALIFAUNA

JEFFREY B. FROKE, PH.D.
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PEBBLE BEACH, CA 93953

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Tuesday, 11 August 2009

To: Mr. Travis Cullen
ENVICOM Corporation, Agoura Hills, CA
for Prestige Homes, Culver City, CA

Copy: M. Andriette Culbertson
Culbertson & Associates California, LLC
for The County of Los Angeles

Subject: Heron Assessment for Marina del Rey Lease Parcels OT & P

Place: lat 33.984331° | lon - 118.457025° / 15 ft ASL @ center of Parcel OT (existing).

INTRODUCTION

This report addresses the question of whether the proposed lease parcel adjustment by the County of Los Angeles of a portion of its Marina del Rey Parcel P (the source parcel) to MdR Parcel OT (the target parcel) would create an encroachment onto existing heron habitat; i.e., whether the proposed Oceana retirement facility on Parcel OT and a portion of Parcel P would adversely affect local herons, whether nesting or foraging.

The findings and biological evaluation of this report are based on a recent field assessment of MdR parcels OT and P, multiple surveys of herons, and a review of appropriate environmental materials.

NOTICE: Added to original field work, ground photographs, and recent aerial imagery (31 July 2007), this report benefited from access to the following documents:

1. Draft EIR for the *Oceana Retirement Facility and Holiday Harbor Courts*, ch. IV.E (Biota), prepared for Prestige Homes by ENVICOM Corp. (June 2009);

2. Drawings prepared by S.E.C. Civil Engineers (R.W. Spindler) for Prestige Homes (each dated 07 Aug 2009) including:

   (a) Existing Parcel 'P' Projections;
   (b) Proposed Parcel 'P' Projections (revised); and,

3. Albert, K. 2009. *Results of the Baseline Breeding Bird Nesting Survey and Noise Assessment for the Los Angeles County Department of Public Works Oxford Basin Low Flow Diversion Project Site in the City of Marina del Rey, Los Angeles County, California*, a contract report prepared for LACo Department of Public Works by Chambers Group (29 July).

SETTING

Parcel OT is located in Marina del Rey, California between Washington Boulevard and Admiralty Way near Palawan Way, and between MdR Parcels 145 (Marina International Hotel) and MdR Parcel P, which encompasses the LACo Oxford Flood Control Basin ('Oxford Lagoon'; Figure 1). Primary observations inside both lease parcels were made on two consecutive days: 31 July and 01 August 2009. Added to a current understanding of onsite bird use, I have made frequent if incidental surveys of bird activity inside the two parcels while studying the entire MdR heronry for the past 5-6 years.

Presently, Parcel OT is employed by LACo Beaches & Harbors as a parking lot. A portion of the parcel's periphery is occupied by transient ('homeless') members of the public as a daytime and occasional nighttime encampment. The existing parking lot measures approximately 1.65 acres (220 x 320 ft). There are eight curbed islands inside the parking lot area, and these contain an uneven series of exclusively nonnative ground cover, small shrubs, and mature trees including New Zealand Christmas Tree (*Metrosideros excelsa*) and Mexican Fan Palm (*Washingtonia robusta*). At 15 ft ASL, the parking lot sits ± 13 ft above the surface level Oxford Lagoon (± 02 ft ASL; during observations). The short slope (± 45º) separating the parking and lagoon areas is sparsely covered with nonnative forbs and grasses, and trees and shrubs (see Findings, below). Also, see Figure 2 for a plan view of the site.

Parcel P, which in total measures approximately 11 acres, includes all of the Oxford Lagoon including its aquatic and terrestrial habitats. The transfer portion of the source parcel, however, excludes all of the lagoon-level habitat, i.e., none of the aquatic and shoreline habitat will be included in the proposed transfer of land to the target parcel. Nonofficial human access is effectively controlled by a 6-8-foot chain-link fence that surrounds the site, completely.

Figure 1. Map of Marina del Rey featuring Los Angeles County MdR Lease Parcels, and specifically Parcels OT and P (Oxford Flood Control Basin). Marina del Rey, Los Angeles County, California.

Figure 2. A summary view of the study area including a projection (proposed) over a recent aerial image (31 July 2007). The yellow rectangle indicates the approximate boundary of Parcel OT (existing); and, the violet rectangle indicates the approximate boundary of the portion of Parcel P that is proposed for union with Parcel OT. The overlay drawing is taken from the "Proposed Parcel P Projections (revised)," (SEC Engineers). Marina del Rey, Los Angeles Co., CA.

PROJECT

The proposed project will involve a lease parcel adjustment by the County of Los Angeles, which owns the lease parcels, for a limited portion of Parcel P (see the drawing, "Proposed Parcel 'P' Projections (revised)", to the existing Parcel OT, and construction and operation of the proposed Oceana retirement facility. The source and target transfer sites are illustrated by Figure 2 of this report.

FINDINGS

Onsite Observations - Parcel OT

As noted, the landscape and ruderal vegetation of Parcel OT includes a mixed series of nonnative ground covers, small shrubs and mature trees that include the nonnative New Zealand Christmas Tree (*Metrosideros excelsa*) and Mexican Fan Palm (*Washingtonia robusta*).

The OT site provides only a trace amount of useful cover for birds; and no evidence of bird nesting was found or visualized thereon. Expected foraging species include House Sparrow (*Passer domesticus*), House Finch (*Carpodacus mexicanus*), Rock Pigeon (*Columba livia*), and potentially Northern Mockingbird (*Mimulus polyglottos*) and American Crow (*Corvus brachyrhynchos*). Altogether, Parcel OT is composed of an insignificant quantity and quality of wildlife habitat. Specifically, the site is not suitable for heron use, nor do any appreciable or accessible heron prey populations (e.g., Botta's Pocket Gopher [*Thomomys bottae*] and common murid rodents) occupy the site, with the possible exception of ground along the extreme NE band of the project boundary.

Onsite Findings - Parcel P

Similar to Parcel OT, cover present on the transfer portion of Parcel P is dominated by planted and ruderal vegetation composed of nonnative plant species. The principal plant species growing between the NE edge of Parcel OT and Parcel P (existing) include ivy (*Hedera* sp.), fig (*Ficus* sp.), Blue Gum (*Eucalyptus globulus*), Brazilian Pepper (*Schinus terebrinthifolius*), cherry (*Prunus* sp.), Indian Hawthorn (*Rhaphiolepis indica*), Natal Plum, or Amatungulu (*Carissa macrocarpa*), and Scarlet Firethorn (*Pyracantha coccinea*). The principal heron resource within the whole of Parcel P is the water body (habitat for aquatic prey) and the nearshore, which provides standing and wading habitat for foraging herons. Both areas are excluded from the proposed transfer from Parcel P to Parcel OT.

As is documented in several recent reports, e.g., Froke 2007 [1], Oxford Lagoon is occupied by foraging herons, and yet certain arboreal sites inside the fenced area appear suitable for

[1] Froke, J.B. 2007. Marina del Rey Heronry: Report for 2005-2006. Contract report for Lyon Apartment Advisors, Newport Beach, CA (01 February).

limited nesting. At one time, ± 12 herons may be seen foraging over the entire lagoon. Heron species that were observed inside the entire Parcel P during both field days included Great Blue Heron (*Ardea herodias*), Great Egret (*Ardea alba*), Snowy Egret (*Egretta thula*), and Black-crowned Night-Heron (*Nycticorax nycticorax*). Additionally, the Green Heron (*Buteroides virescens*) is suspected to nest in overwater arboreal cover inside the basin area, but outside the transfer part of Parcel P.

BIOLOGICAL EVALUATION & STATEMENTS

(1) Herons do not occupy Parcel OT; and, except for the possibility of Green Herons, none of the birds are known to nest inside Parcel P: The possibility of nesting Green Herons would likely take place in heavier cover stands in central portions of the basin, i.e., outside of the transfer portion of Parcel P.

(2) The level surface area of Parcel OT, where the majority of new development will occur, is not contiguous with the adjacent lagoon habitat. The proposed extension of OT from the partial transfer of Parcel P is sufficiently separated from the lagoon habitat by ± 25 ft; and once completed, the sidewalk that is proposed for the same NE edge of the extended Parcel OT will be separated from the lagoon edge by approximately the same distance, plus a barrier similar to the existing chain-link fence that currently surrounds the entire lagoon area. Finally, and even though foraging herons occupy Oxford Lagoon throughout the year, the physical separation between extended Parcel OT (sidewalk and fence barrier) and intact aquatic habitat (inside the adjusted Parcel P) will effectively reduce or remove potential adverse influences on the herons' use of the remaining, unchanged lagoon habitat.

(3) Based on more than five years of local heron surveys, e.g., in Admiralty Park, along the MdR Bike trail, and in adjacent urban and residential areas, it is known that local herons both nesting (outside the project area) and foraging (inside the greater lagoon area, and outside the project/transfer area, are not stressed or otherwise disturbed by the <u>regular</u> presence and actions of human workers and passersby. <u>Irregular</u> activities, such as the presence of humans <u>inside</u> the fenced portion of Parcel P, have not been observed. Nevertheless, herons inside the fenced site display a limited "tolerance" of humans on the other side of the fence that befits birds observed in other fenced-in segments of the

overall heronry, i.e., locked boat docks and landings marina-wide, Ballona Wetland Preserve Area A, and along the waterside of the MdR bike and pedestrian trail next to Area A and Ballona Creek.

(4) Considering the same experience and observations referred to above (item 3), it is evident that locally nesting and foraging herons are not affected by ambient sounds generated by regular and even irregular/eventful conditions, i.e., 'unexpected' sudden and/or loud noises. For example, besides ongoing (ambient) traffic sounds generated along Admiralty Way and Washington Boulevard, observed sudden and irregular (eventful) sounds produced by exceptionally fast and loud motorcycles and automobiles traveling on Admiralty Way do not seem to upset the subject herons, whether foraging or nesting.

Recent (2009) findings and conclusions of biologist K. Alberts (Chambers Group), who observed the reaction (0+) of Black-crowned Night-Herons, Snowy Egrets and Great Egrets nesting near Oxford Lagoon to quantitatively measured sounds are consistent with and support the preceding statement: Herons that nest near the proposed transfer location are tolerant of existing ambient noises, including those that exceed 110 dB. Alberts concluded that noise generated by proposed construction that is ≥ 300 ft from active heron nests need not be mitigated; but closer sources (< 300 ft) ought to be mitigated to prevent potential disturbance to nesting herons, whether expected. However, a determination of mitigation based on distance-from-source ought best be made in the field and based on actual habitat conditions. Otherwise, the report by Alberts is based on field work that appears to have been properly conducted; and its conclusions, though untested, are plausible and reasonable.

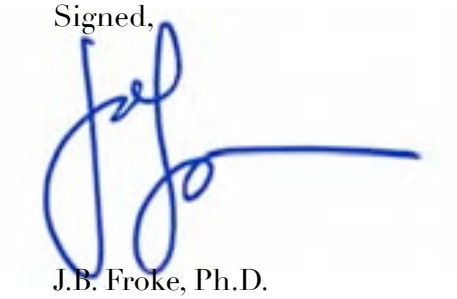
CONCLUSION

It is my professional opinion that the proposed extension of Parcel OT that would result from a boundary adjustment of Parcel P will not significantly or appreciably disturb present or future heron resources within the Marina del Rey heronry, and specifically the available heron habitat inside Oxford Lagoon.

Finally, the presence of both eventful and regular sounds related to the construction and operation of the project, as would be located or generated from the proposed extension area, will not disturb foraging and/or nesting herons in the Oxford Lagoon neighborhood, including the present mixed-species colony that is established along the MdR bike trail and Admiralty Park.

Thank you for this opportunity to provide a professional evaluation of the herons in Marina del Rey and their specific relationship to the proposed transfer of a portion of Parcel P to the adjacent MdR Parcel OT.

Signed,



J.B. Froke, Ph.D.
Ornithologist & Ecologist

APPENDIX F

Cultural Resources Investigations and Letter from the Native American Heritage Commission

RESULTS OF A PHASE I CULTURAL RESOURCES INVESTIGATION OF THE MARINA DEL REY "PARCEL OT", APPROXIMATELY 2.11 ACRES IN MARINA DEL REY, LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

ENVICOM CORPORATION
Attn: Laura Kaufman
28328 Agoura Road
Agoura Hills, California 91301

Prepared by:

McKENNA et al.
6008 Friends Avenue
Whittier, California 90601-3724
(562) 696-3852
(562) 693-4059 FAX

Author and Principal Investigator: Jeanette A. McKenna, M.A., RPA

Job No. 03-06-05-1198
May 3, 2006

RESULTS OF A PHASE I CULTURAL RESOURCES INVESTIGATION OF THE MARINA DEL REY "PARCEL OT", APPROXIMATELY 2.11 ACRES IN MARINA DEL REY, LOS ANGELES COUNTY, CALIFORNIA

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RESULTS OF A PHASE I CULTURAL RESOURCES INVESTIGATION OF THE MARINA DEL REY "PARCEL OT", APPROXIMATELY 2.11 ACRES IN MARINA DEL REY, LOS ANGELES COUNTY, CALIFORNIA

by,

Jeanette A. McKenna, Principal
McKenna et al., Whittier, CA.

INTRODUCTION

McKenna et al. (Appendix A) initiated this Phase I cultural resources investigation of the Marina Del Rey "Parcel OT" property at 4445 Admiralty Way in Marina Del Rey, Los Angeles County, at the request of Envicom Corporation, Agoura Hills, California. This property, a 2.11 acre property, is cross-referenced as Assessor Parcel No. 4224-006-900. This study has been prepared in compliance with the California Environmental Quality Act (CEQA), as amended.

PROJECT DESCRIPTION

The proposed project involves the development of the 2.11 acre property at 4445 Admiralty Way, Marina Del Rey, as the Marina retirement Facility. The property is currently owned by Los Angeles County and leased to the developer as a parking area. The proposed development will consist of a 114-unit residential facility with associated retail space, lobby, lounges, offices, dining room, library, arts and crafts room, laundry room, trash and mail rooms, kitchen, beauty salon, and on-site parking.

LOCATION AND SETTING

The project area is located at 4445 Admiralty Way, Marina Del Rey, Los Angeles County, California. The County Assessor notes that this area is also cross-referenced as Venice. This property is relatively close to the Pacific Ocean frontage and at the western end of the Marina Del Rey waterfront (Figures 1 and 2). The proposed project area is part of a larger parcel (APN 4224-006-900) and bounded by Washington (west), Admiralty Way (east), and Palawan Way (south). This are is also equated with Township 2 South, Range 15 West, and the equivalent of Section 21(USGS Venice Quadrangle (rev. 1981; Figure 3).

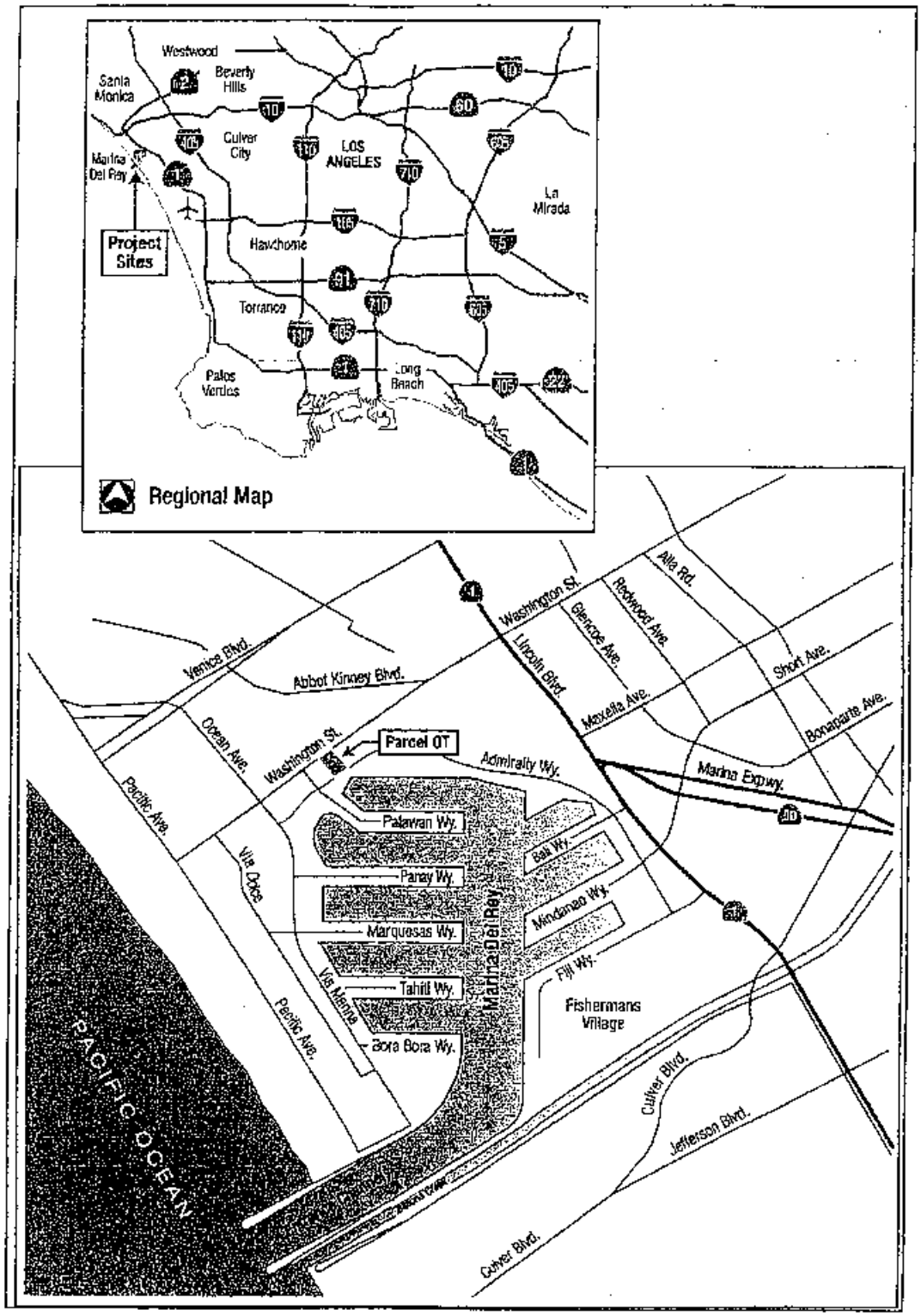

Figure 1. General Location of the Project Area.

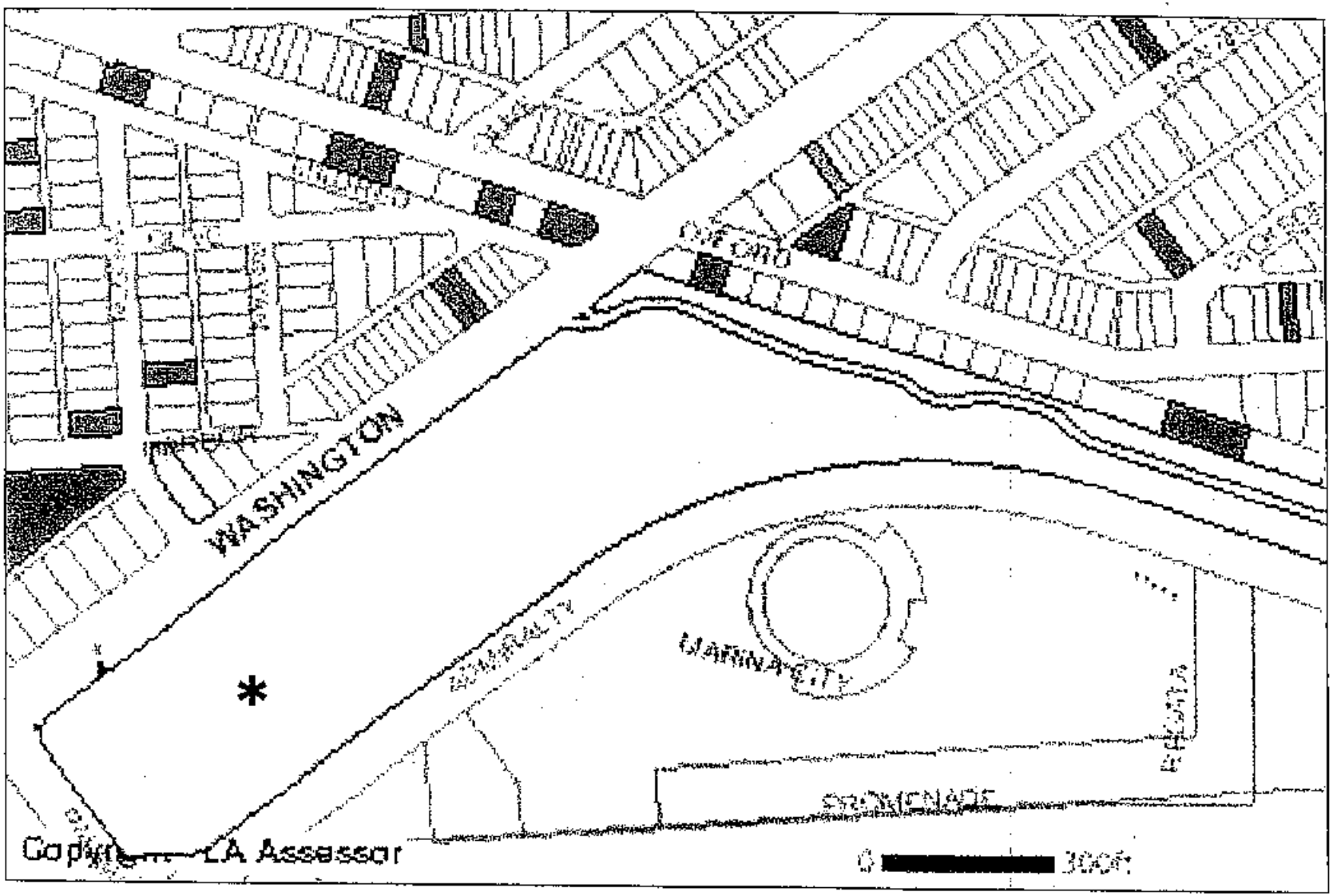

Figure 2. General Location of the Project Area (Co. Assessor Map).

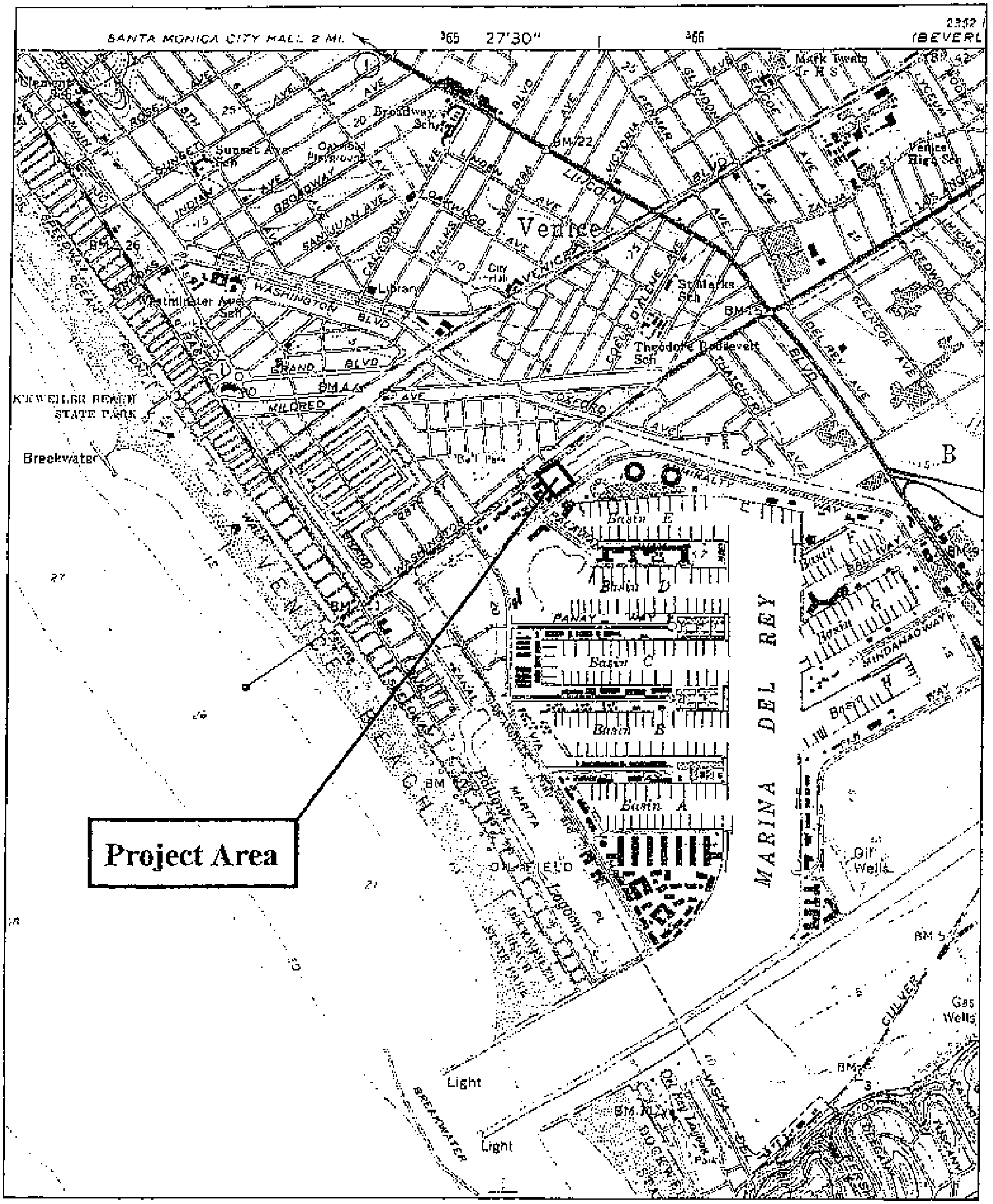

Figure 3. Specific Location of the Project Area (USGS Venice Quadrangle, rev. 1981).

The County Assessor also identifies this property as being illustrated on "... L.A. Co. Assessor Map No. 88 as Bk 1 Pg 53 ..." (Figures 4 and 5). The entire property is currently being used as a parking lot and is covered by asphalt. Consisting of approximately 92,000 square feet, the property measures approximately 260 feet by355 feet. The property is relatively flat and includes some shrubs and trees.

BRIEF CULTURE HISTORY BACKGROUND AND PROPERTY LAND USE

The project area is located within the Marina Del Rey area of unincorporated Los Angeles County, a geographical area ethnographically associated with the Gabrielino/Tongva of Southern California (McCawley 1996; Johnston 1962). Altschul, Homberg, and Ciolek-Torrello (1992) present a detailed discussion of the prehistory of this area of Southern California, suggesting the Chumash may have also occupied the area. Whether Gabrielino or Chumash, the prehistory of the area can be dated back 7500 years with a significant presence of prehistoric populations within coastal areas. Though technically within an urban setting, there is still a potential for the intact and/or undisturbed prehistoric resources within or near the project area. Resources, if identified, may be associated with either the Gabrielino/Tongva or Chumash, depending on the nature of the find.

This project area is located north/northwest of Ballona Creek and south of the City of Venice, within the historic Rancho Ballona (Paso de las Carretas Grant), a grant of 1839. Citing Gudde (1969:20):

> The name is derived from the Ballona or Paso de las Carretas grant, dated November 27, 1839. According to the tradition of the Talamantes family, co-grantees of the rancho, the place was named after the city of Bayona in northern Spain, the home of one o fhteir ancestors ...

With respect to the Rancho Ballona, Avina (1932:58) describes the rancho:

> One square league in Los Angeles county, November 1839 by Alvarado to Agustin Machado and probably to Ignacio Machado, Felipe and Tomas Talamantes. Approved May 1845 as Terreno en las cercanias de Los Angeles. The claimants stated that the grant was made to them after 18 or 19 years possession. Witnesses said they had three houses, land under cultivation and cattle and horses there in 1832. There was a grant of Rancho de los Quintos granted to Talamantes and Machado in 1819, later claimed by the pueblos.

The Thompson and West History of Los Angeles County, California (1880:135-137; reprinted) identifies the project area as being within the La Ballona Township within Los Angeles County and on the southern boundary of the community of Venice. Historically, the area now known as Venice

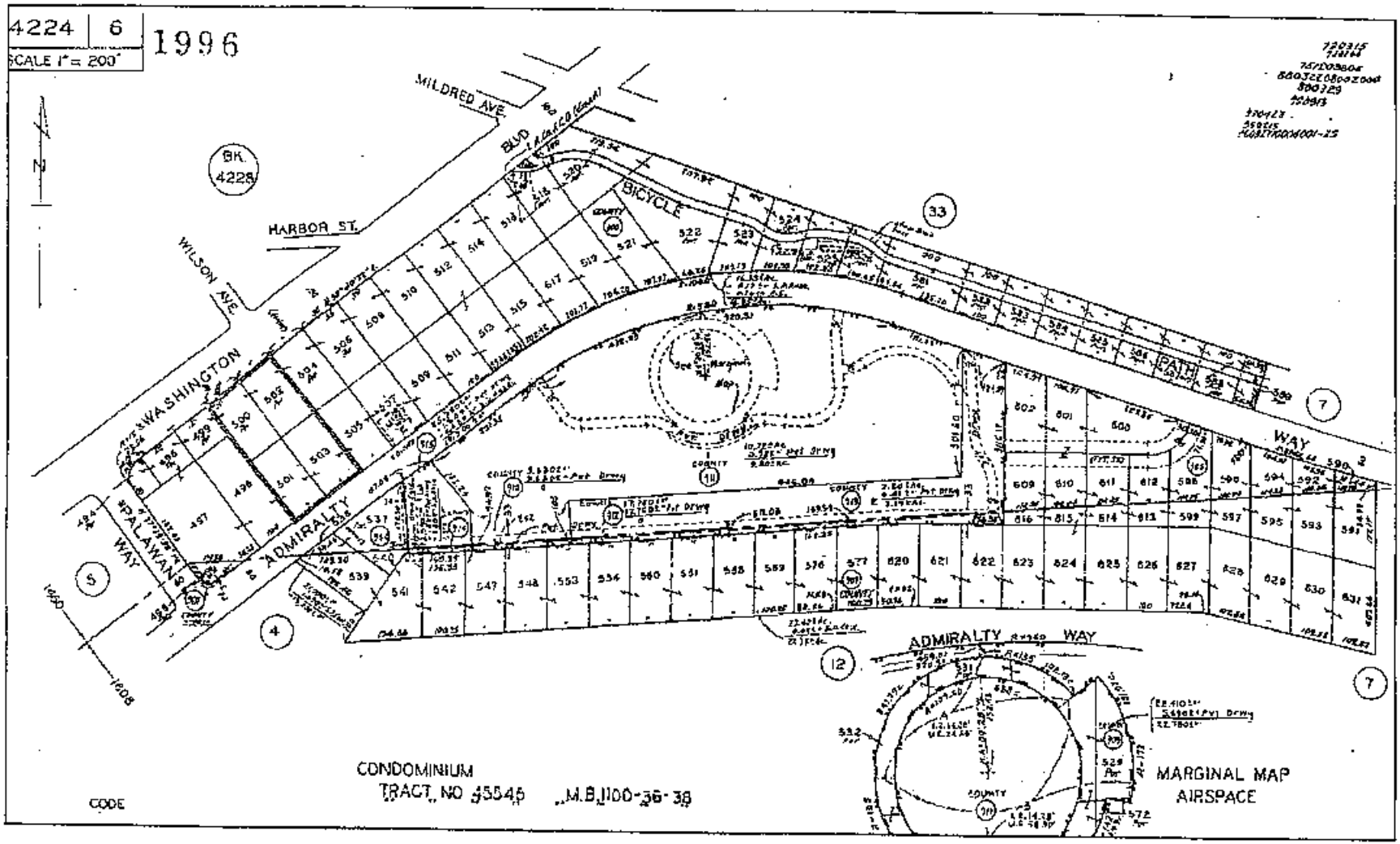

Figure 4. Assessor Parcel Map Identifying Project Area.

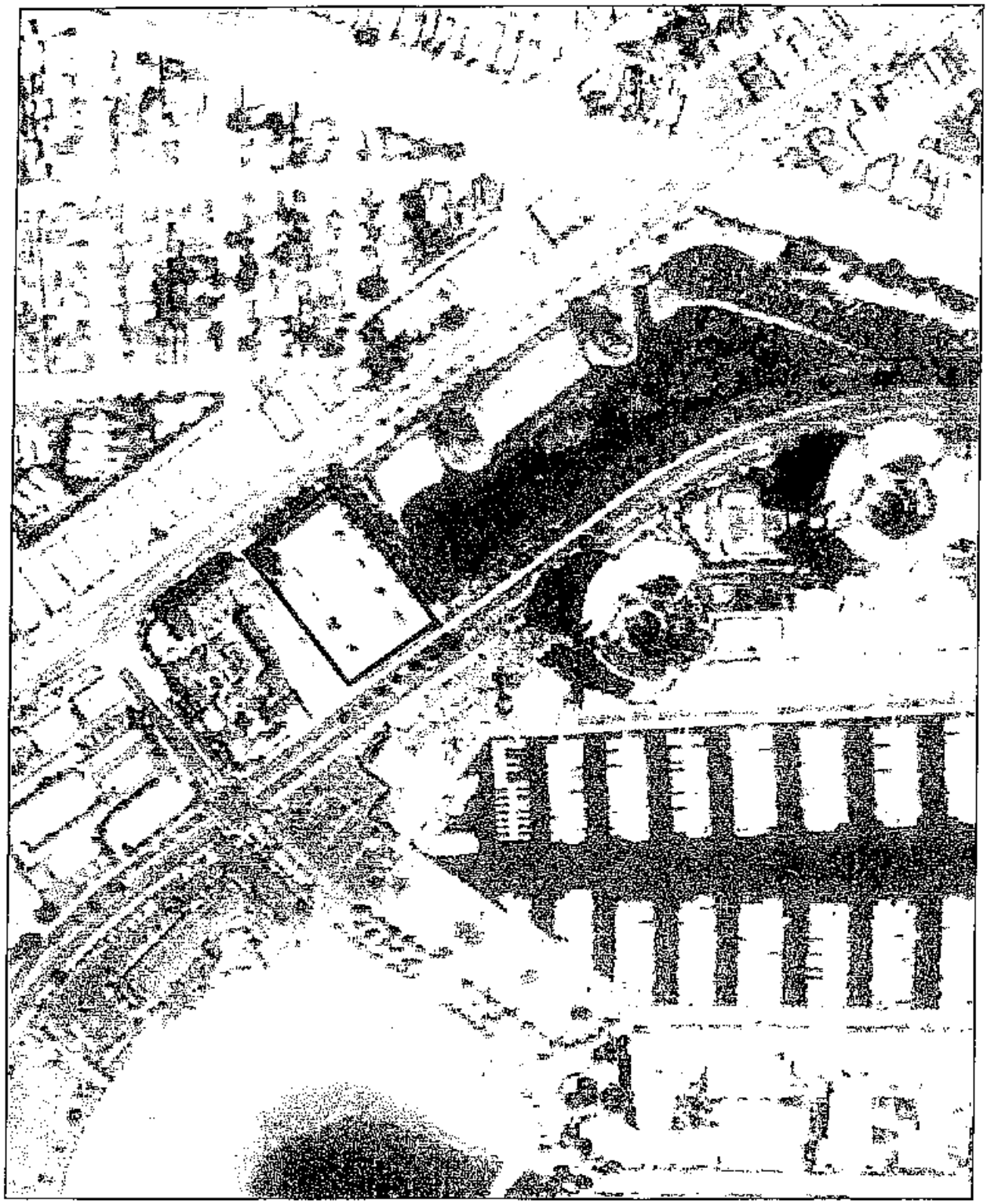

Figure 5. Aerial Photograph Illustrating Project Area.

was realized in ca. 1890 and a brief history of the community (http://www.westland.net/venice/history.htm) breaks the history of the area into three periods of significance: 1890 to 1906; 1907 to 1929; and 1930 to Present). This history reads:

Birth of "Venice of American" (1890-1906)

In the 1890's, one man's dream of a renaissance resort and amusement park transformed a deteriorating marshland west of Los Angeles, California, into the "Coney Island of the Pacific". Despite disbelief and opposition, the dreams of Abbot Kinney materialized in grand style. The vision of Abbott Kinney, a wealthy tobacco mogul, world traveler and co-owner of the Ocean Park Casino and Resort, was to turn the land south of Ocean Park through the Del Rey peninsula into a "Venice of American." He envisioned a resort town culturally reminiscent of Venice, Italy, complete with canals, gondolas, amusement piers, hotels, and Venetian-style structures. With the Casino thriving, Kinney and his partners purchased all the land south of Ocean Park. After the partnership was dissolved, the split was determined by a flip of a coin and Kinney won the toss. He chose the marshy southern half of the property. With his family by his side, Kinney set out to accomplish his goal.

In 1904, Kinney sent his building superintendent to the East Coast to visit various seaside resorts. Acquiring a landscape architect and town planner from Boston, Kinney and his staff drew up preliminary plans in June. Contracts were signed to dig up the half mile long, seventy foot wide Grand Canal and build the 900 foot long, 30 foot wide amusement pier at Windward Avenue. Construction began shortly thereafter. He then hired architects to design all the town buildings in "Venetian Renaissance" style.

In September, The Los Angeles Pacific Co. Enabled inland LA residents to visit Venice by completing the first electric trolley line. By the year's end, construction of the Ship Café and Auditorium, located on the Abbott Kinney Pier, the Venice Canals, and the St. Mark's Hotel on Windward were well underway.

All was running smoothly until two disastrous winter storms in February and March of 1905 demolished the newly built pier. As a result, the grand opening date was pushed back from May to July. Over 1000 workers worked around the clock to rebuild the pier, auditorium and Pavilion in time for the July 4th weekend rescheduled openings.

On June 30, ocean water, streaming in through two huge pipes, began flowing at a rate of 500 gallons a second thus filling the canal's central lagoon ...

Venice, The Coney Island of the Pacific (1907-1929)

As the town was taking shape, Kinney felt the need to consolidate power and gain control of many of the concessions. And as expected, lawsuits followed, but Kinney persevered and won the majority of the cases. In 1907, Kinney faced a new battle when the Trustees who owned the rival Ocean Park Pier refused to issue him a building permit for his proposed ocean front bathhouse and Plunge. An outraged Kinney took matters into his own hands and began pouring the concrete foundations. The Sheriff attempted to dynamite the concrete foundation, but succumbed to the pressures of the woman's Pick and Shovel Club when they picnicked on the site. The pool eventually opened in August and was free to the public ...

For the next few years construction of new attractions and theaters vitalized the area. A Scenic Railroad ride beside the Abbot Kinney Pier was built where the riders were surrounded by mountainous terrain and rode through a scenic tunnel. The Pier was widened and Kinney added a Dentzel carousel, a Japanese Tea House and an Ocean Inn Restaurant. Other new rides included a Ferris wheel and a Rapid's ride where a dozen people at a time made their way in a boat through a serpentine canal. The surrounding walls depicted scenes from an Irish castle, the Panama Canal and a view of the western frontier.

The Fraser's Million Dollar amusement pier also opened claiming to be the largest in the world at 1250 feet long and 300 feet wide. The pier housed a spacious dance hall, two carousels, the Crooked House fun house, the Grand Electric Railroad, the Starland Vaudeville Theater, Breaker's Restaurant and a Panama Canal model exhibit.

Business was booming until a fire ravaged the Fraser Pier and five square blocks of Ocean Park's business district. 700 fire fighters from 12 companies did all they could but were unable to contain the flames. The winds finally shifted and nearby Venice was spared. It was a 2.5 million dollar loss and a major setback for the area. Unfortunately, nearly all of the loss was uninsured.

During the teens, Venice obtained a professional baseball franchise, built a new Fraser Pier, hosted a Grand Prix automobile race, and formed an aerial police force. The first bathing beauty contest, sponsored by the Los Angeles Examiner took place in 1912. By 1920, Venice's population reached 10,385 residents. Despite Prohibition, Venice increased it's growth with new and improved attractions on both the Abbot Kinney Pier and the Ocean Park Pier. Speakeasies also emerged in basements of businesses along Windward Avenue. Liquor supplies were smuggled through tunnels leading from the beaches to hotel basements.

Sadly, on November 4, 1920, tobacco baron, Abbot Kinney died of lung cancer from years of heavy smoking, leaving his eldest son, Thornton, to take over the business.

One month later, his amusement pier burned to the ground. The only attractions spared by the fire were a new roller coaster and the bandstand tower. Six months later, the pier was rebuilt and operating. In 1924, the Ocean Park Pier experienced yet another devastating fire that destroyed the entire complex and the adjacent Licks Pier. Both piers reopened in 1926.

Annexation, Depression, Ruin and Rebirth (1930-Present)

Distraught by the inability of the City Council to adequately govern Venice, the residents held an election and the voters decided that Venice be officially annexed to the City of Los Angeles. It was like Los Angeles annexing Disneyland. The city, which never cared for Venice's honky tonk atmosphere, started to dismantle the amusement industry. It began with the removal of the miniature railroad and filled in the majority of the canals to accommodate increased automobile traffic. The canals South of Venice Boulevard remained intact and today they still mirror the scenic beauty of yesteryear. The city converted the bankrupt Sunset Pier into a municipal bathing pavilion.

In 1930, oil was discovered on the Venice Peninsula. Within a year, 148 oil wells were producing over 40,000 barrels of oil daily. Jobs were created, but environmental destruction was wide spread and polluting the surrounding residential area and beaches.

In 1932, the Depression hit hard. Various Venice banks went bankrupt and the Venice Pier went into receivership. However, when liquor consumption became legal again and bingo games were modified into a game of skill, the economy benefited [sic].

When World War II started, it affected Venice and it's seaside amusement centers. A blackout was instilled which allowed only daytime use of the piers and their attractions. National Guardsmen patrolled the beaches in search of enemy submarines and ships. During the daytime, Venice became a major draw for sailors and soldiers on weekend leave. Country Western and Swing music echoed from the dance halls and casino lounges. The evening curfew was eventually lifted in 1944 and life in Venice returned to normal.

When the Kinney Pier's lease expired in 1946, the Los Angeles Parks and Recreation Department declined to renew the lease, although the company had just recently refurbished the pier entrance and repaired the aging deck. Profitable or not, the city's plan was to widen the beaches they removing all piers. Attempts were made to extend the lease for another year, but the Parks department refused and the pier closed on midnight April 20, 1946 and the pier was ordered to be dismantled. The Ocean Park Pier, however, thrived in the late 50's after it was converted to a nautical theme park. It remained in existence until 1967 ...

> Venice was in a severe state of decay and in desperate need for redevelopment. In the early 1960's, the city instituted a policy of "Code Enforcement" where all buildings had to be upgraded to current building standards ...
>
> Venice experience[d] a rebirth in the 70's but not as a major tourist destination. The focal point was not maintaining the character of Venice so as not to chase out the low income population. In 1972, the city constructed an 18 mile bicycle path adjacent to Ocean Front Walk which extends from Torrence to Santa Monica ...

The area now referenced as Marina Del Rey was summarized by the Marina del Rey Convention & Visitors Bureau and "The History of Marina del Rey," and provided by Chesler (2006):

> Marina Del Rey has been a long time in the making. Construction of the jetties for the present entrance channel began in December 1957, but efforts towards a harbor at this location actually began some seventy years earlier, sponsored, ironically, by a railroad.
>
> In 1887, a far-sighted man, named M.C. Wicks, organized the Port Ballona Development Company under the auspices of the Santa Fe Railroad. Wicks dreamed of developing the Playa del Rey estuary and inlet into a major commercial harbor to serve the Los Angeles area. He managed to raise $300,000, all of which went for construction work over a three-year period. However, Wicks went bankrupt and the area was eventually taken over by duck hunters.
>
> Another quarter of a century passed without action, but the dream kept recurring. In 1916, the U.S. Army Corps of Engineers reports to Congress that a new proposal to develop the Playa del Rey Inlet and basin as a major harbor was impractical ...
>
> Twenty year later, in 1936, Congress authorized reconsideration of the negative 1916 report and the Country Board of Supervisors ordered another study in 1937. This time there was competition, and the decision went to San pedro, where major expansion had been approved to form the present Los Angeles Harbor.
>
> From this point on, the dream focused with increasing clarity on a harbor for small craft. World War II caused a temporary halt to planning, but on September 7, 1949, the U.S. Army Corps of Engineers submitted a report indicating the feasibility of construction of a pleasure craft harbor for 8,000 boats at a total estimated cost of $23,603,000 ...
>
> In 1953, the County Board of Supervisors sponsored State legislation which eventually granted the County a $2 million loan frm State tidelands oil revenues to assist in purchase of the new harbor site. In 1954, President Eisenhower signed Public Law

780, making the Martina del Rey harbor an authorized federal project and planning moved into high gear. The federal commitment, however, was limited to the "main navigational features" and involved a 50-50 sharing of these costs by the local sponsor; in this case, the County of Los Angeles.

On November 6, 1956, a general election resulted in County voter approving the revenue bond method of financing the remainder of the project, and in December 1959, a $13 million revenue bond issue was sold to provide funds for much of the actual construction. Meanwhile, in December 1957, construction of the "main Navigational features: began as a joint Federal-County project; by November 1958, the entrance channel jetties were completed and the first tangible facilities had emerged from the long-standing dream.

Big projects have big problems, and Marina del Rey had its share; construction delays plagued the early development. Shortly after the harbor finally opened for operation, it suffered storm damage so severe in the winter of 1962-63 that an emergency program was initiated to provide protection from wave action. Fortunately, based on early indications of excessive vulnerability of the harbor to wave action, a model study was already well under way at the U.S. Army Corps of Engineers Waterways Experiment Station at Vicksburg, MS.

With the cooperation of the Federal Government, this study program was expedited on the "crash" basis; the model was used to arrive at a feasible interim solution, and the County proceeded to immediately construct temporary protective sheet-pile baffles in the entrance to the channel to give vital protection pending the completion of permanent protective works by the U.S. Corps of Engineers ...

Meanwhile, the results of the model study indicated a requirement for a permanent off-shore breakwater. The County Board of Supervisors promptly appropriated $2.1 million of the estimated cost of $4.2 million for this project as the sponsoring agency's share, and a concerted effort by the County's legislators in Congress was successful in securing the matching Federal appropriation in the 1963-64 budget.

Construction of the breakwater began on October 15, 1963, and was completed in January 1965. The dispatch with which this major point project was planned, funded and constructed reflected a healthy working relationship between County and Federal governments and particularly indicated the effective representation enjoyed by the County in Congress ...

Marina del Rey successfully surmounted its major development problems and was progressing steadily toward complete fulfillment of its destiny. Formal dedication of the Marina de Rey Harbor was held on April 10, 1965 ...

> Today, Marina del Rey is an indispensable social, environmental and economic success, and has become a role model for other urban marinas throughout the world. As the Marina heads into the next century, considerations for future planning and design are underway. Marina del Rey will never be thought of as a finished product, but instead as a constantly evolving Marina "new town" with an inherent capacity to accept change. Currently, the County continues to strive for an optimum balance between public and private interests, as economic and recreational needs reinforce the Marina's role as a multifunctional activity center for the Los Angeles metropolitan area.

Illustrated in 1887 (Figure 6), the Ballona Lagoon is still in it's natural state, but the "New Piers" are present. Between 1887 and 1964, improvements were limited to the ocean frontage and not within the lagoon, itself. In 1964 (Figure 7), the Lagoon is still intact and accessed from the strand between the developed coastline and the interior region.

As illustrated in Figures 1 through 3, the marina is developed with the various slips and basins. All improvements are denoted as post-1964 improvements, rendering them less than 40 years of age. The current configuration is illustrated in the Department of Conservation map of 2001 (Figure 8) and identifies the ocean frontage as part of Venice which the interior is identified as Marina Del Rey. In more detail, Figure 9 illustrates the area's oil wells, oil fields, and landfill sites. Specifically, the Marina Del Rey area is identified as Playa Del Rey and the historic Venice Landfill is identified as being located near Washington Street, just northeast of the current project area boundary. The areal extent of the landfill is not known and, given the entire area is built on fill over the lagoon, there is a potential for the Venice landfill to extend into the current project area. The project area should be considered sensitive for historic archaeological resources.

METHODOLOGY

To complete this evaluation study, McKenna et al. completed the necessary research and review of documentation to address the requirements of CEQA and local agencies. McKenna et al. conducted the following tasks:

1. **Archaeological Records Check**: Completed through the California State University, Fullerton, South Central Coastal Information Center, Fullerton, California (Appendix B). This repository houses documentation on previous studies, lists of important or significant resources, and historic maps for reference. Data obtained from this repository is used to place the project area in a context for preliminary evaluation.

2. **Historic Research**: Historic research was completed by reviewing files at the County Assessor's Office (Los Angeles County), the City of Los Angeles Public Library (downtown Los Angeles) and Archives (Norwalk), local libraries (Venice and Santa Monica) for address-specific data, historic directories and biographical information, and a search

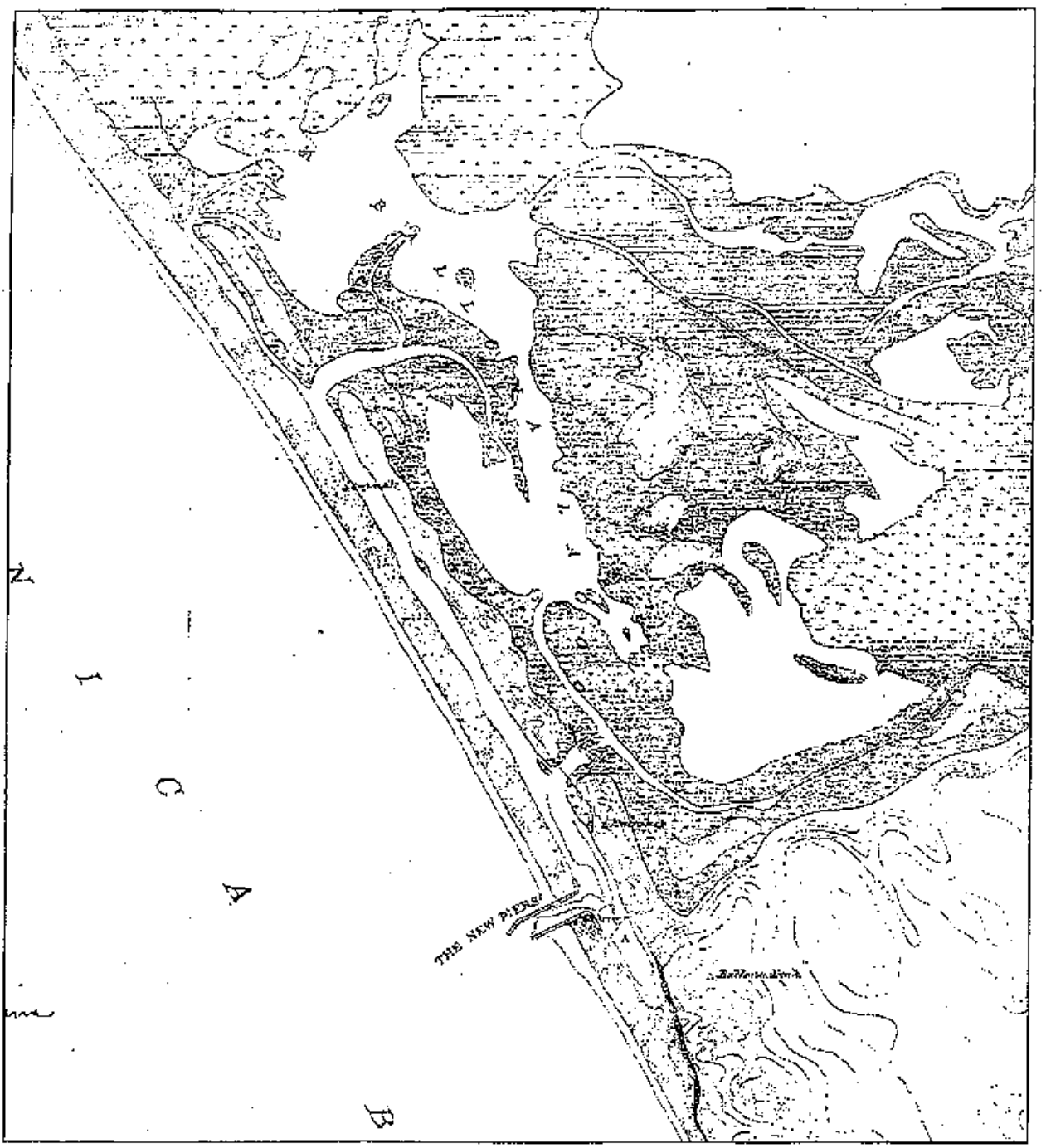

Figure 6. Map of 1887 Illustrating the Ballona Lagoon and Associated Amenities.

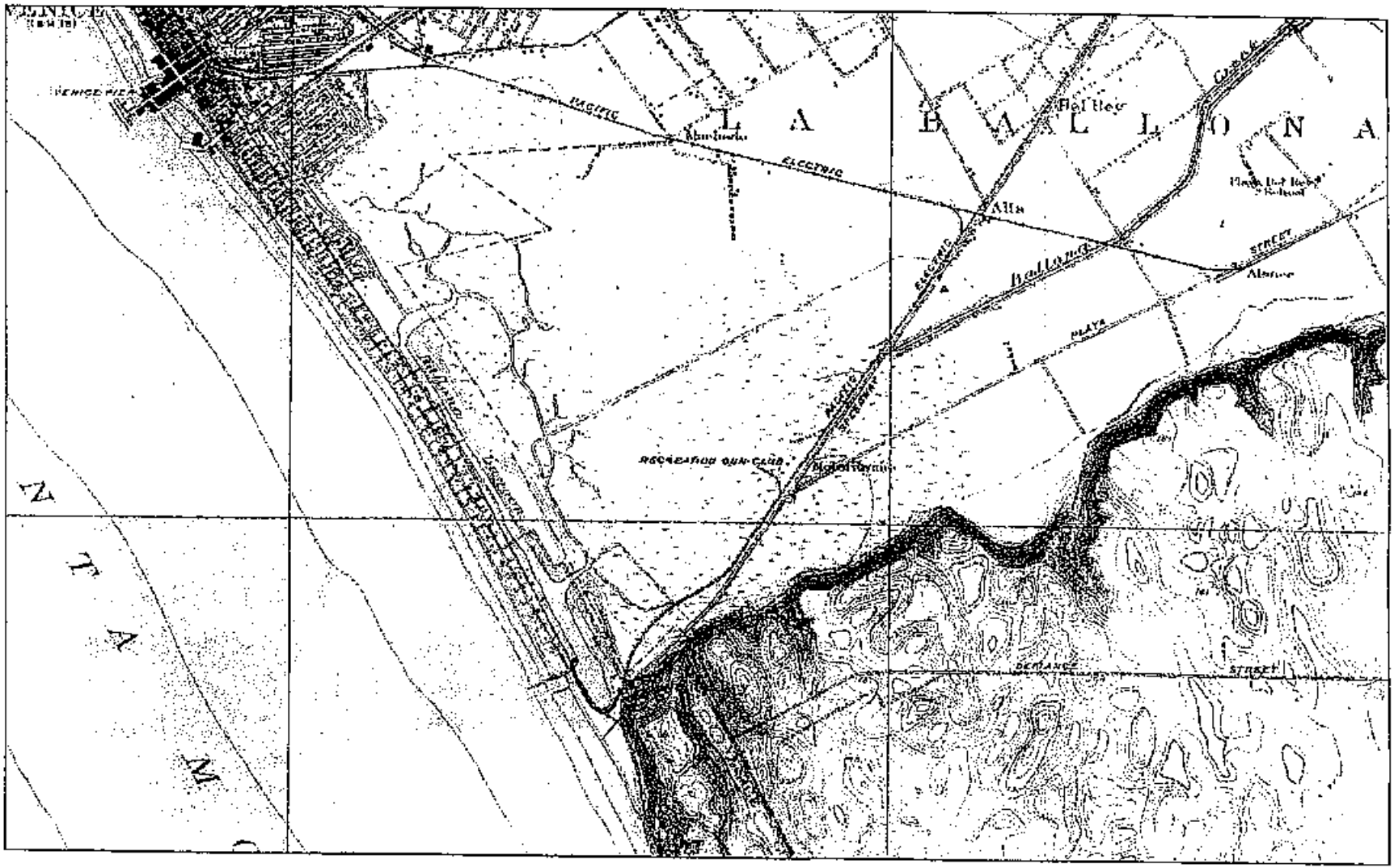

Figure 7. USGS Map of 1964 Illustrating the Pre-Developed Ballona Lagoon/Marina Del Rey Area.

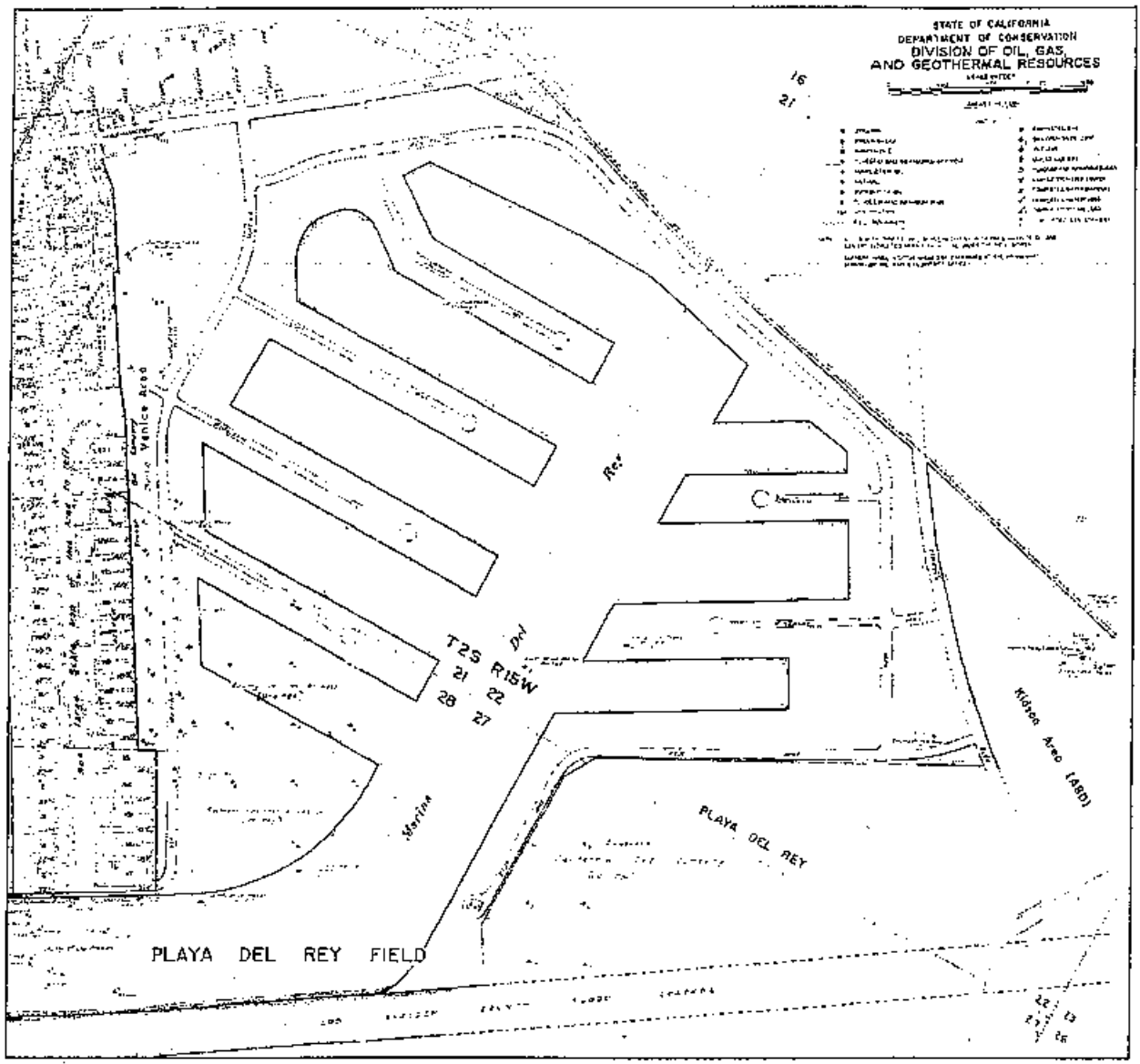

Figure 8. Division of Oil, Gas, and Geothermal Resources (2001).

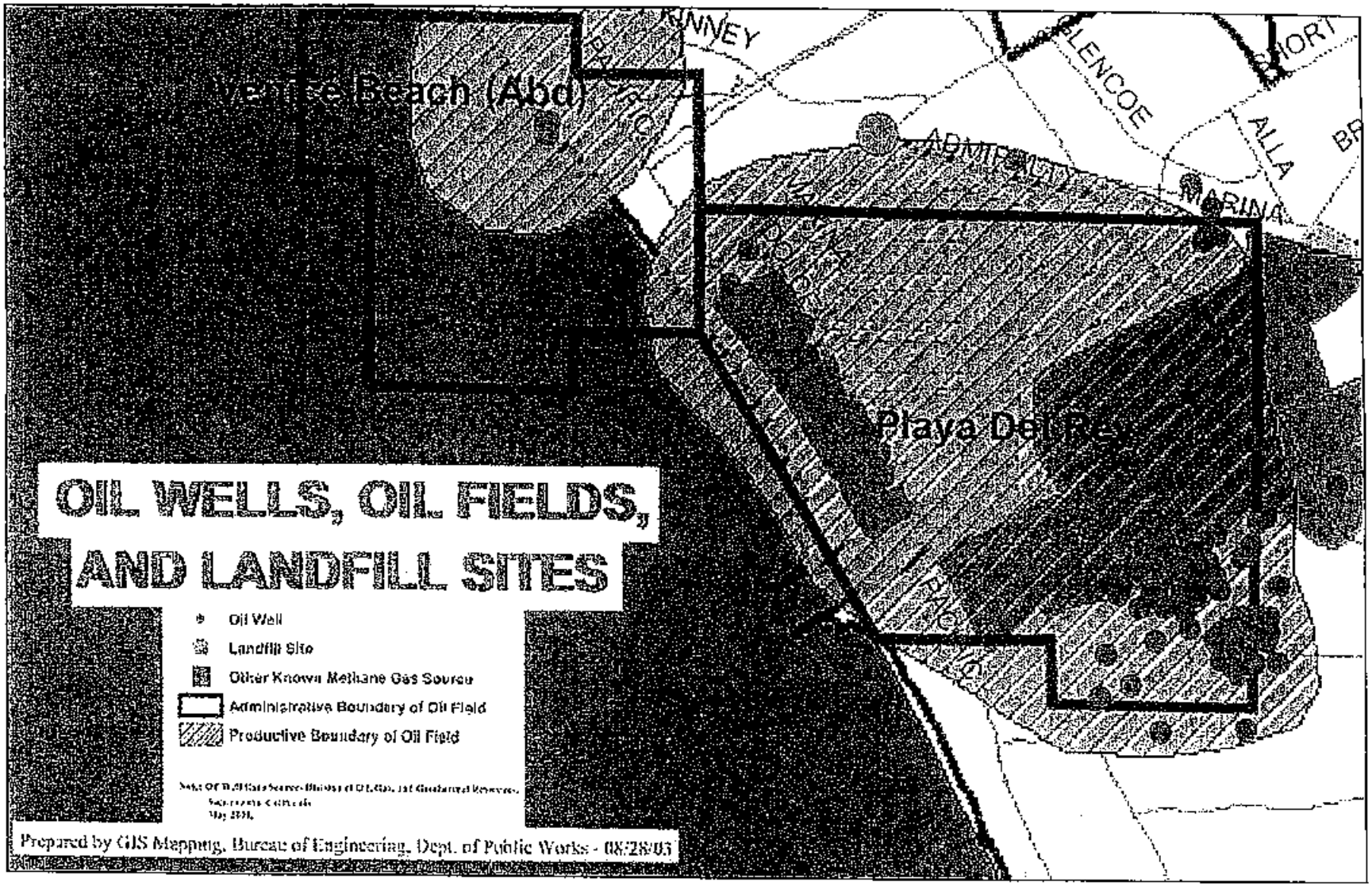

Figure 9. Bureau of Engineering Map of Oil Wells, Oil Fields, and Landfill Sites (2003).

of internet data pertaining to the occupants of the residence. In addition, McKenna et al. researched historic maps and general histories for Venice/Marina Del Rey development history and obtained additional data from the L.A. Co. Department of Beaches & Harbors (Chesler 2006, personal communication). This information was compiled, ordered, and used in the interpretation and evaluation of the property.

3. **Native American Consultation**: McKenna et al. contacted Anthony Morales, Chair of the Gabrielino-Tonga of Los Angeles County, and inquired into the sensitivity for Native American resources in this area. Mr. Morales emphasized the relative sensitivity based on ethnographic data and recently compiled data in Playa Vista, where hundreds of Native American burials have been identified along Ballona Creek. He asked to be kept informed of any findings and, if resources are identified, involve Native Americans in the recovery process.

4. **Field Survey**: The field survey was completed on April 10, 2006, by Kristina Lindgren of the McKenna et al. staff. The field survey confirmed that the project area was a parking lot with no evidence of the natural setting. Research on the property included a survey of the periphery of the property, compilation of a photographic record (Appendix C), and documentation of the surrounding areas. Field notes and the photographic record are on file at McKenna et al., Whittier, California.

5. **Analysis and Recordation**: McKenna et al. completed the required analysis of the property at a level conducive to compliance with the California Environmental Quality Act, as amended.

6. **Report Preparation**: This technical report has been prepared in a manner requested by the Office of Historic Preservation, Sacramento, and the South Central Coastal Information Center for properties located within Los Angeles County. It also conforms to the standard data requests of the City of Los Angeles Cultural Heritage Commission.

PREVIOUS RESEARCH

A standard archaeological records check was completed by McKenna et al. on April 17, 2006. This research resulted in the identification of fourteen cultural resources studies within a one-half mile radius of the current project area, including those of Adams (1974; LA-27, includes a letter report from Rozaire); UCLA (1979; LA-624); Singer (1979;LA-630); Greenwood and Foster (1980;LA-682); Singer (1980;LA-846); Dillon (1982,LA-1157); Tartaglia (1979;LA-2669); Buckman (1974; LA-3583)King (1998;; LA-4052); Duke (1999;LA-4564); [Not in Files (LA-4865)]; National Park Service (1985;LA-5563); Duke (2001;LA-5761); and Foster (2004; LA-7185). Despite the extent of this coverage, none of the project specifically addressed the current project area.

The nearest project was completed to the southwest of the project area - within the City of Venice and just southwest of the Los Angeles Corporate Boundary (Adams 1974). Rozaire (1974), in

summarizing his survey of this property, concluded that disturbances have destroyed the natural setting of the "Silver Strand and Del Rey Beach Tracts" and, therefore, no archaeological resources were identified. Likewise, despite this coverage, no prehistoric or historic archaeological resources have been recorded within one-half mile of the project area. Likewise, no historic resources (structures) have been recorded within one-half mile of the property. Based on these results, it would suggest that the current project area is not sensitive for cultural resources.

Contrary to the findings presented above, recent investigations along Ballona Creek (Statistical Research, Inc., in preparation) have resulted in the identification and removal of hundreds of Native American burials and numerous prehistoric features representing a significant occupation of the area by prehistoric populations. Therefore, there is still a relative level of sensitivity for prehistoric resources within the Ballona Lagoon. Similarly, research resulted in the identification of the project area as part of the landfill area for the City of Venice and the development of the Marina Del Rey facilities. As such, there is a strong potential for buried historic archaeological resources. McKenna et al. recommends that the area be considered sensitive for both prehistoric and historic archaeological resources.

EVALUATION CRITERIA

The previous development of the project area (as a parking lot between other modern developments) dates to the post-1964 era. The modern development is reported to have included areas impacted by the presence of the Venice Landfill and areas of potential prehistoric use. The State's criteria for rendering significance and eligibility for the California Register are detailed in the California Code of Regulations (CCR) Title 14, if:

1. Is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States;

2. Is associated with the lives of persons important to local, California or national history;

3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or

4. It has yielded, or has the potential to yield, information important to the prehistory of the local area, California, or the nation.

Further, the resource must maintain integrity as defined by the seven "qualities of integrity" listed as follows:

1. Location: The place the historic property was constructed or the historic event occurred;

2. Design: The combination of elements creating the property's form, plan, space, structure, and style;

3. Setting: The physical environment of the historic property;

4. Materials: The physical elements combined at a particular period of time and in a particular pattern or configuration to form a historic property;

5. Workmanship: The physical evidence of the craft of a particular culture or people during any given period;

6. Feeling: The property's expression of the aesthetic or historic sense of a particular period of time; and/or

7. Association: The direct link between an important historic event or person and the property.

If resources are present within the project area, evaluation of the find(s) would be completed through analysis and application of the criteria presented above. This level of analysis is generally referred to as a Phase II investigation.

RESULTS OF THE INVESTIGATIONS

As a result of the current investigation, McKenna et al. found no surficial evidence of prehistoric resources within the project area. Despite these negative findings, the proponent should be aware that significant prehistoric resources have been identified in the vicinity of the Ballona Lagoon and there is a potential for buried prehistoric archaeological resources in this particular area.

No historic archaeological resources were identified within the project area. However, the area is peripheral to the reported location of the historic Venice Landfill and there is a possibility that the landfill will extend into the project area. Therefore, the proponent should be aware of this potential and be prepared to deal with historic archaeological issues, should they arise.

There are no standing structures within the project area and the lagoon area is not conducive to paleontological resources. Therefore, neither of these issues need further attention. At this time, no significant resources have been identified within the project area and, therefore, there has been no evaluation of any resources. The project area has a relative sensitivity for both prehistoric and historic archaeological resources.

CONCLUSIONS AND RECOMMENDATIONS

No cultural resources were identified within the current project area. The area is, however, considered sensitive for both prehistoric and historic archaeological resources. Therefore, McKenna et al. is recommending that the removal of the asphalt paving and the subsequent grading of this property be monitored by a qualified archaeological monitor. Should evidence of any prehistoric or historic resources be uncovered, A Phase II evaluation must be conducted in accordance with CEQA requirements.

If, at any time, evidence of human remains are uncovered, the County Coroner must be contacted and permitted access to the site for preliminary identification of the remains. If the remains are found to be of Native American origin, the Native American Heritage Commission must be notified and permitted to identify the Most Likely Descendant (MLD) and, in consultation with the proponent and archaeological monitor, determine the appropriate disposition of the remains.

The extent and duration of the archaeological monitoring program can be determined once the project is approved and the grading plan is defined.

****

CERTIFICATION

CERTIFICATION. I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this archaeological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

5-3-06
Date

Jeanette A. McKenna, Principal Investigator, McKenna et al.

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APPENDIX A:

Professional Qualifications

JEANETTE A. McKENNA

Owner and Principal Investigator
McKenna et al., Whittier CA

Ms. McKenna specializes in the field of Cultural Resource Management: prehistoric archaeology, historic archaeology, and history. She is a past member of the Board of Directors for the Society of Professional Archaeologists (SOPA 1993-97) and is certified by the Society to conduct both prehistoric and historic archaeological studies. With its inception, Ms. McKenna was registered with the Registry of Professional Archaeologists (RPA; 1998- Present). Ms. McKenna has 30 years of professional experience as an archaeologist and has participated on over 1200 projects. The majority of her work has been conducted as a Field Director, Project Manager, and/or Principal Investigator in California and the Greater Southwest.

TECHNICAL CAPABILITIES

- Vast experience in the greater Southwest, Great Basin, and Southern California regions. Familiar with the full range of cultural resource investigations and has completed projects within the public and private sectors, including environmental management firms, planning and engineering firms, and State and federal agencies.
- Active in the discipline of Cultural Resource Management since 1976; over 29 years of experience in Southern California, Arizona, and Nevada.
- Particular interest in the desert regions of California and Arizona, with specializations in the Proto-historic and Historic Contact Periods.
- Considerable experience in dealing with prehistoric cultural remains and working directly with Native American groups in archaeological training programs (through Arizona State University and the Southern California Indian Center, Garden Grove).

EDUCATION AND AFFILIATIONS

B.A., Anthropology, 1977, CSU Fullerton
M.A., Anthropology, 1982, CSU Fullerton
Lambda Alpha Lambda Honors Society
Post Graduate Studies, Arizona State University, 1982-85
Post Graduate Studies, History Department
University of California, Riverside, 1991-92

Certification Program: CEQA, Land Use and Environmental Planning, University of California, Riverside, 1997-98

Society of Professional Archaeologists (SOPA)/Registry of Professional Archaeologists (RPA) Certification: Field/ Prehistoric Archaeology and Historical Archaeology (1984 to Present)

Board of Directors, Society of Professional Archaeologists 1993-1997 (American Society of Conservation Archaeologists Representative)
BLM California Permit No. CA-02-30 (exp. 2005)
BLM Arizona State Permit No. AZ-000107 (renewable)
Arizona State Museum Antiquities Permit (renewal)
Curation Agreement, San Bernardino County Museum

SELECTED PROJECT EXPERIENCE

- Historic Architectural Studies for Renovation and Restoration of the Greek Theatre, Los Angeles CA
- Evaluation of Cultural Resources within the Burbank and West Hollywood Redevelopment Project Areas, Los Angeles County, CA
- Historic Property Survey for the City of Whittier, Los Angeles County, CA.
- Archaeological Investigations and Resource Evaluations for the Proposed Cajon Pipeline, San Bernardino and Los Angeles Counties, CA
- Archaeological Class I Investigations for the Proposed Mojave Pipeline, San Bernardino County, CA
- Cultural Resources Investigations (Phases I, II, III, and Mitigation Monitoring) for the RIX/SARI Projects, Santa Ana Watershed Project Authority (SAWPA), San Bernardino and Riverside Counties, CA
- Phase I, II, and III Archaeological Investigations for the County Sanitation Districts of Los Angeles County, Puente Hills Landfill Solid Waste Management Facility Expansion Project, Whittier, CA
- Archaeological Mitigation Program, The Phoenix Indian School Track Site Project. Arizona State University Office of Cultural Resource Management and the Bureau of Indian Affairs, Phoenix, AZ
- Archaeological and Testing Program for the Hidden Valley Golf Course and Van Buren Golf Course Properties, Riverside County, CA
- Cultural Resources Overview Studies for the Annexation of Unincorporated County Lands to the City of Ontario, CA
- Historic Property Survey Reports: Warner Bros. Main Lot Ranch Lot Properties, Burbank, CA
- Historic Archaeological Investigations for L.A. County Sheriff's Facility, Lancaster, CA.

APPENDIX B:

Archaeological Records Check

McKenna et al.

History/Archaeology/Architecture/Paleontology

Jeanette A. McKenna, M.A.
Owner and Principal Investigator
Reg. Professional Archaeologist

April 17, 2006

RE: Record Search for the Archaeological Survey of Parcel OT on Admiralty Way, Marina del Rey Los Angeles County, CA. on the Venice 7.5' USGS Quadrangle (McKenna et al. Job 06.1198)

A record search was conducted on April 12, 2006, at the South Central Coastal Information Center, for the above referenced project. This search includes a review of all recorded historic and prehistoric archaeological sites within a one-half mile radius of the project area as well as a review of all known cultural resource reports. In addition, the file of historic maps, the California Points of Historical Interest (PHI), the listing of California Historical Landmarks (CHL), the California Register of Historic Resources Inventory (HRI) have been checked for the referenced project. The following is a discussion of the findings for the project area.

Previous Cultural Resources Investigations:

Fourteen studies (LA27, LA624, LA630, LA682, LA846, LA1157, LA2669, LA3583, LA4052, LA4564, LA4865, LA5563, LA5761, and LA7185) have been conducted within a one-half mile radius of the project area. None are located within the project area.

Archaeological Resources:

No recorded prehistoric archaeological sites have been identified within a one-half mile radius of the project area. No prehistoric isolates have been identified within a one-half mile radius of the project area.

No historic archaeological sites have been identified within a one-half mile radius of the project area. No historic isolates have been identified within a one-half mile radius of the project area.

Historic Resources:

No recorded historic built environments have been identified within a one-half mile radius of the project area.

6008 Friends Avenue, Whittier, California 90601-3724 email = jmckena@earthlink.net
(562) 696-3852 Office -- (562) 693-4059 FAX -- (562) 754-7712 Mobile

Copies of the historic map - Redondo (1896 and 1940) Venice (1934) - have been copied for review.

The California Point of Historical Interest (1992) of the Office of Historic Preservation, Department of Parks and Recreation, lists no properties within a one-half mile radius of the project area.

The California Historical Landmarks (1990) of the Office of Historic Preservation, Department of Parks and Recreation, lists no properties within a one-half mile radius of the project area.

The California Register of Historic Places lists no properties within a one-half mile radius of the project area.

The National Register of Historic Places lists no properties within a one-half mile radius of the project area.

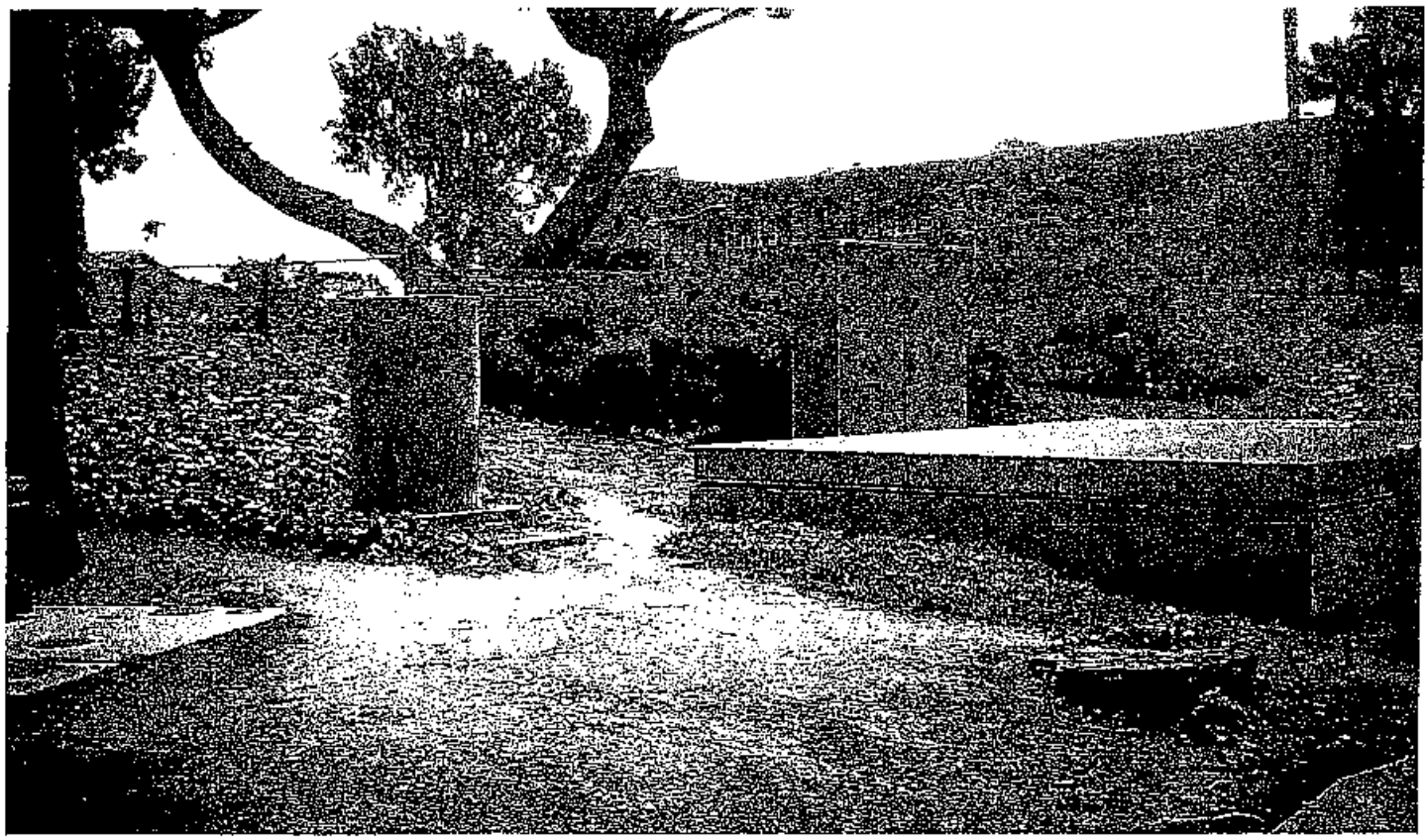
The California Historic Resources Inventory lists no properties that have been evaluated for historical significance within a one-half mile radius of the project area.

6008 Friends Avenue, Whittier, California 90601-3724 email = jmckenna@earthlink.net
(562) 696-3852 Office -- (562) 693-4059 PAX – (562) 754-7712 Mobile

APPENDIX C:

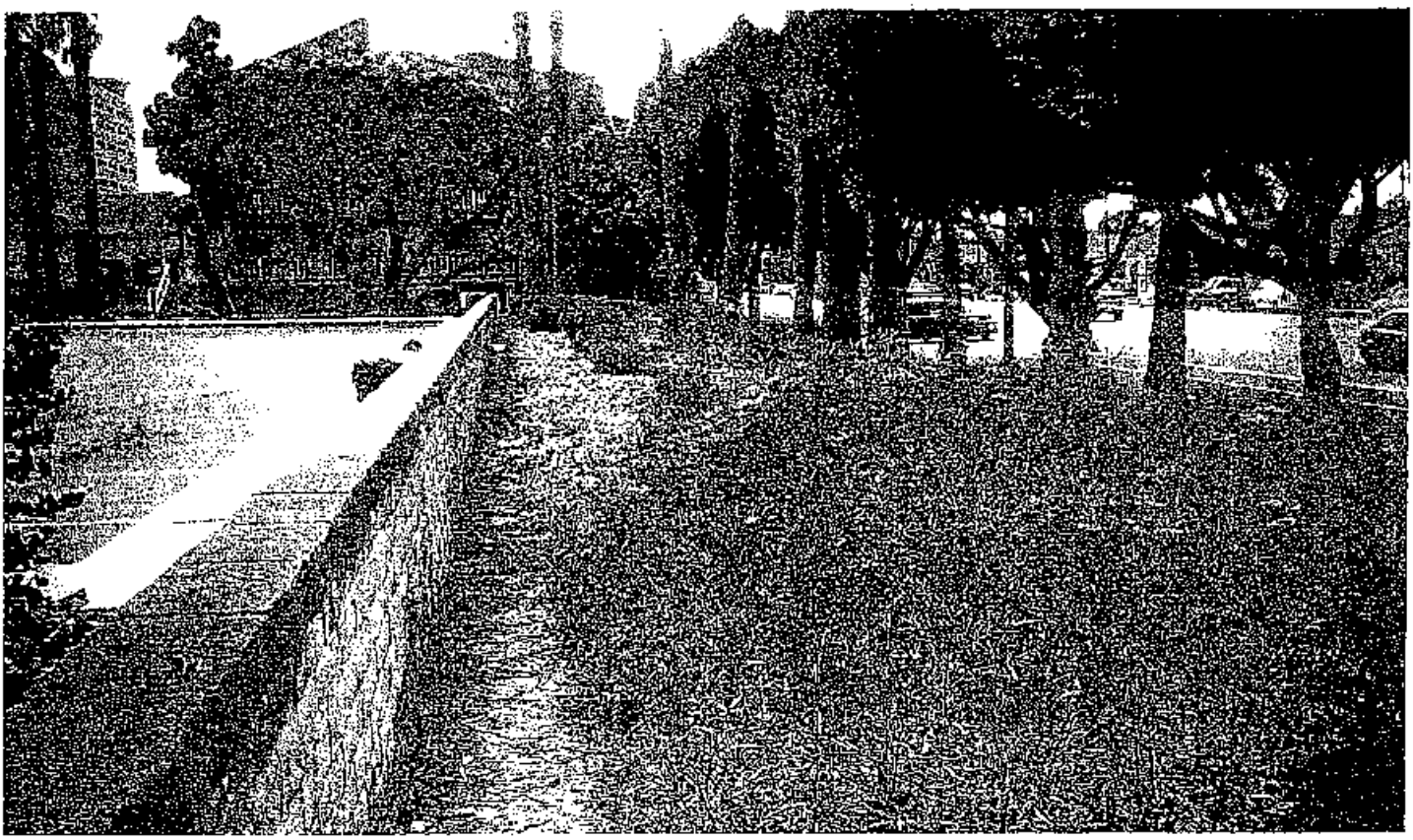
Photographic Record

View of Washington Boulevard, from Northeast Corner of Parcel OT (Southwest).

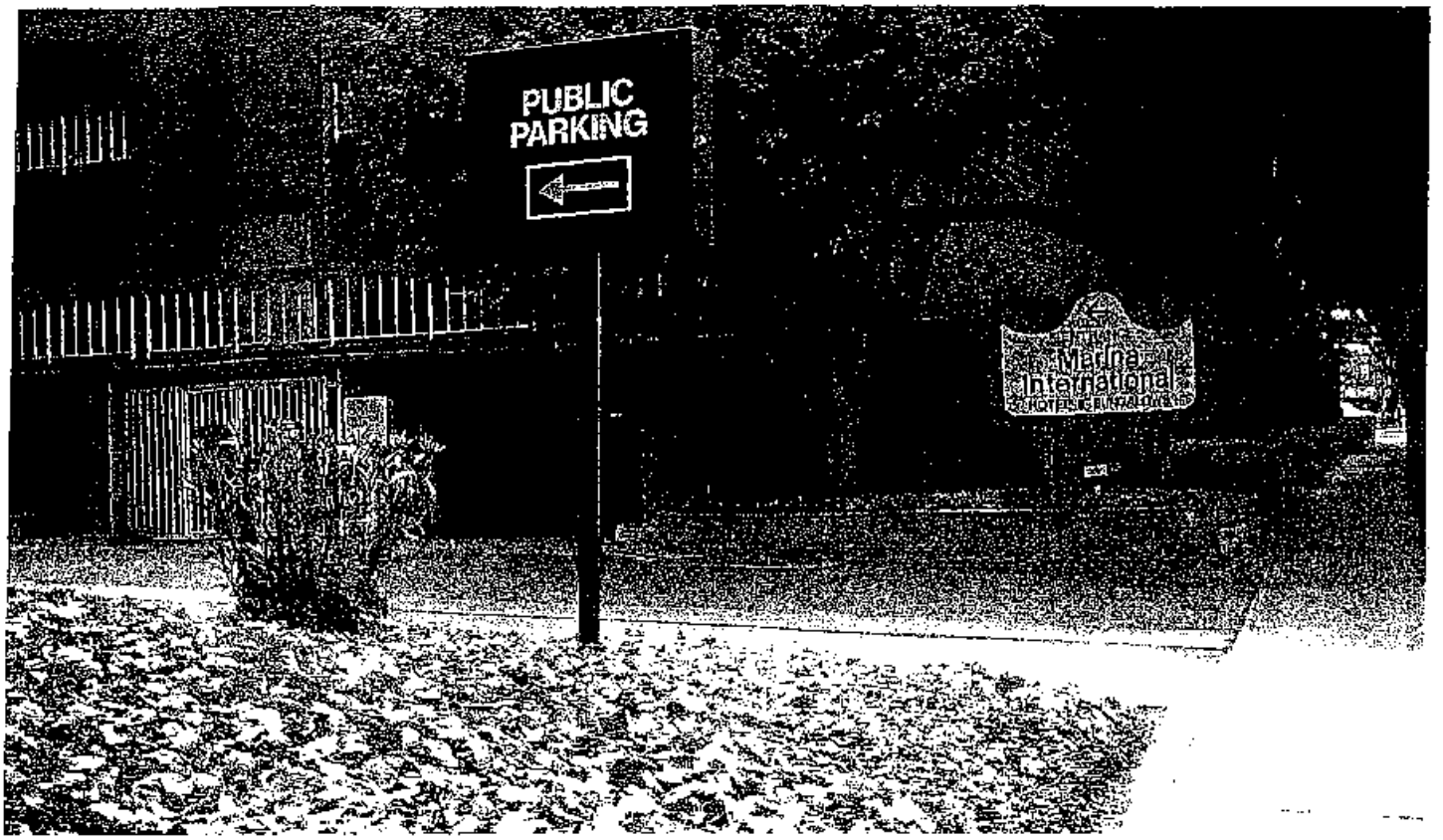


View from Northeast Corner of Parcel OT, with Utilities and Vegetation (South).

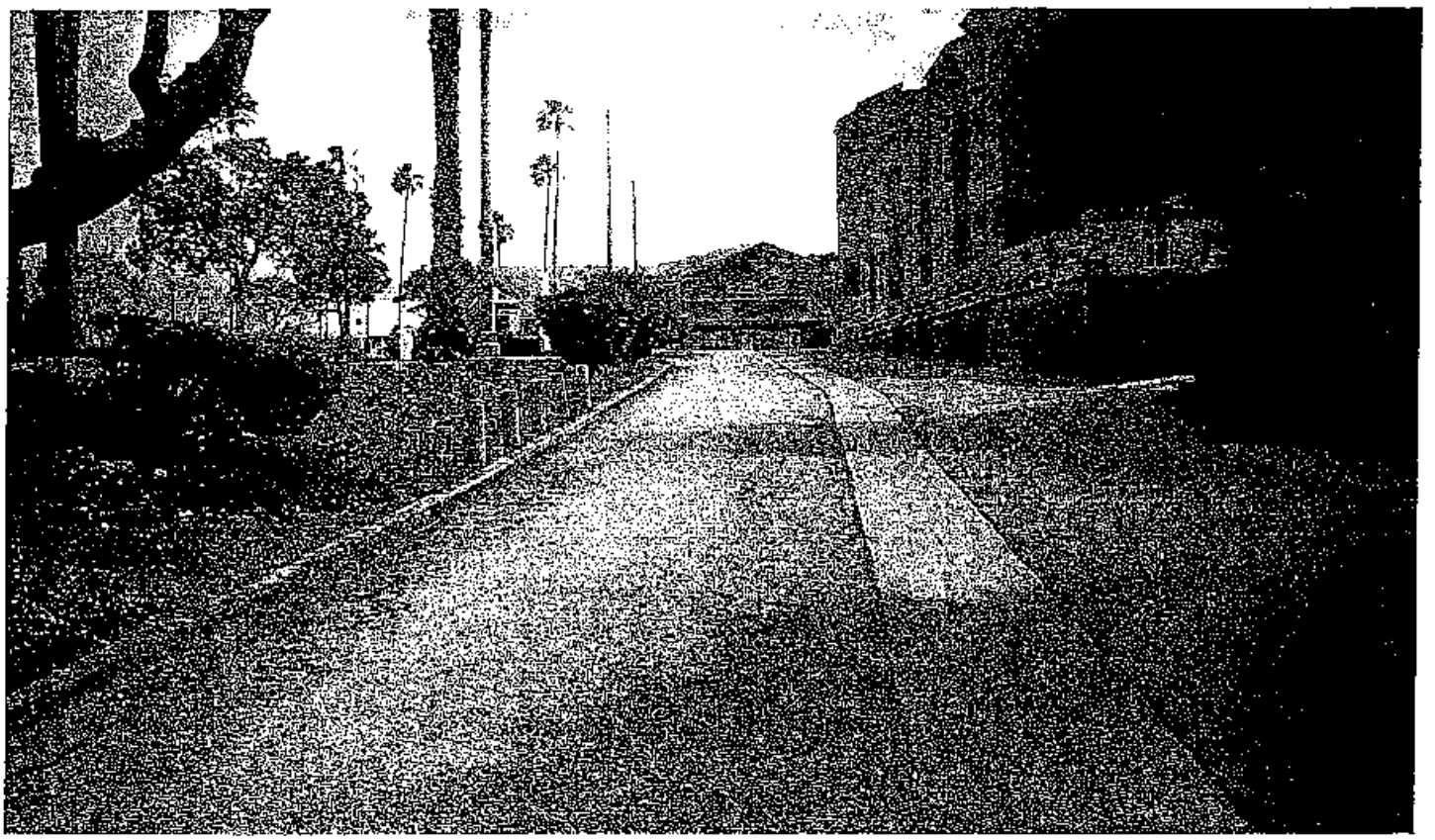
View from Northeast Corner of Parcel OT, showing Mature Tree, with Marina International Hotel in Background (South).



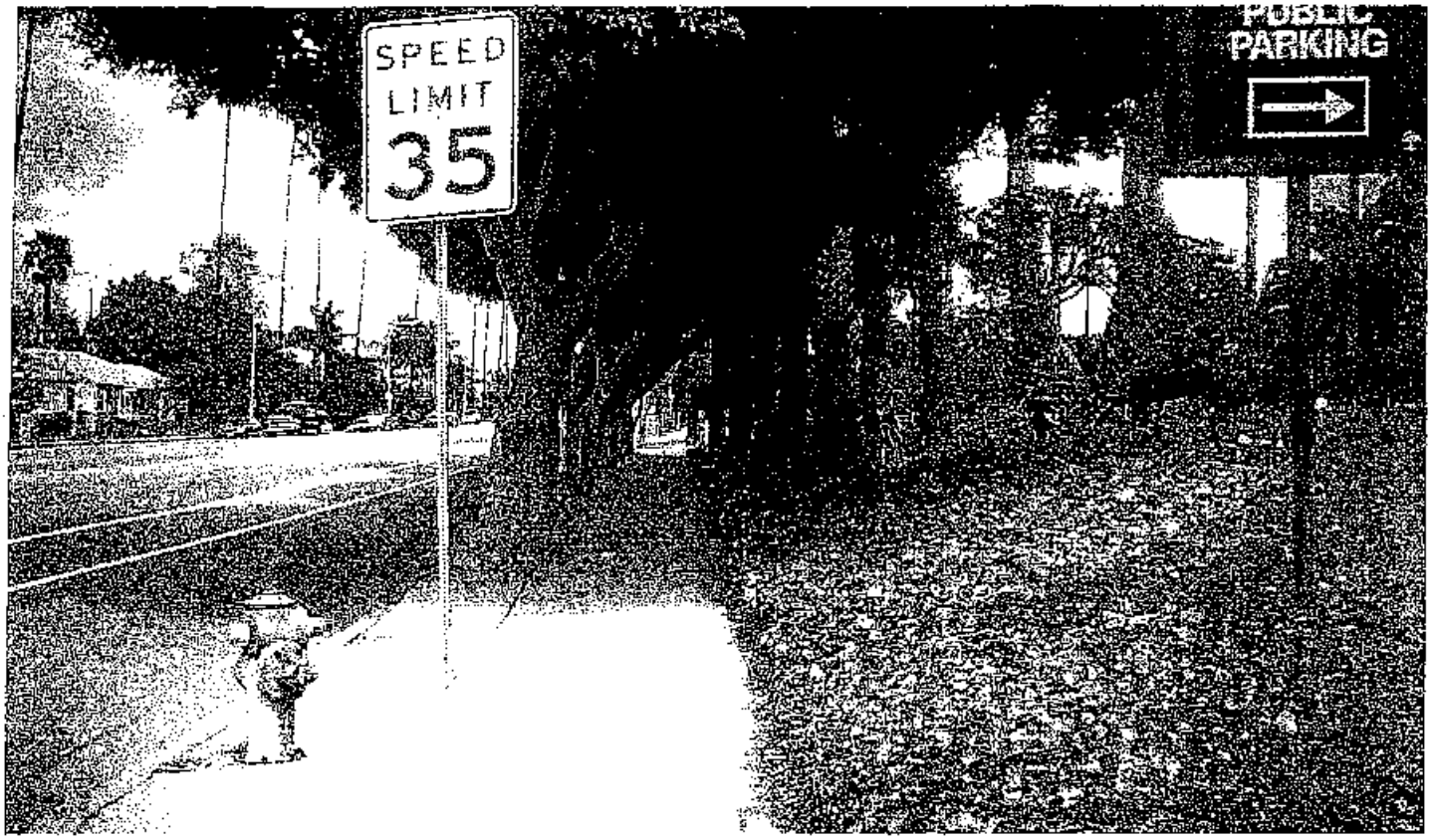
View from Northeast Corner of Parcel OT, with Low Wall and Vegetation (Southwest).



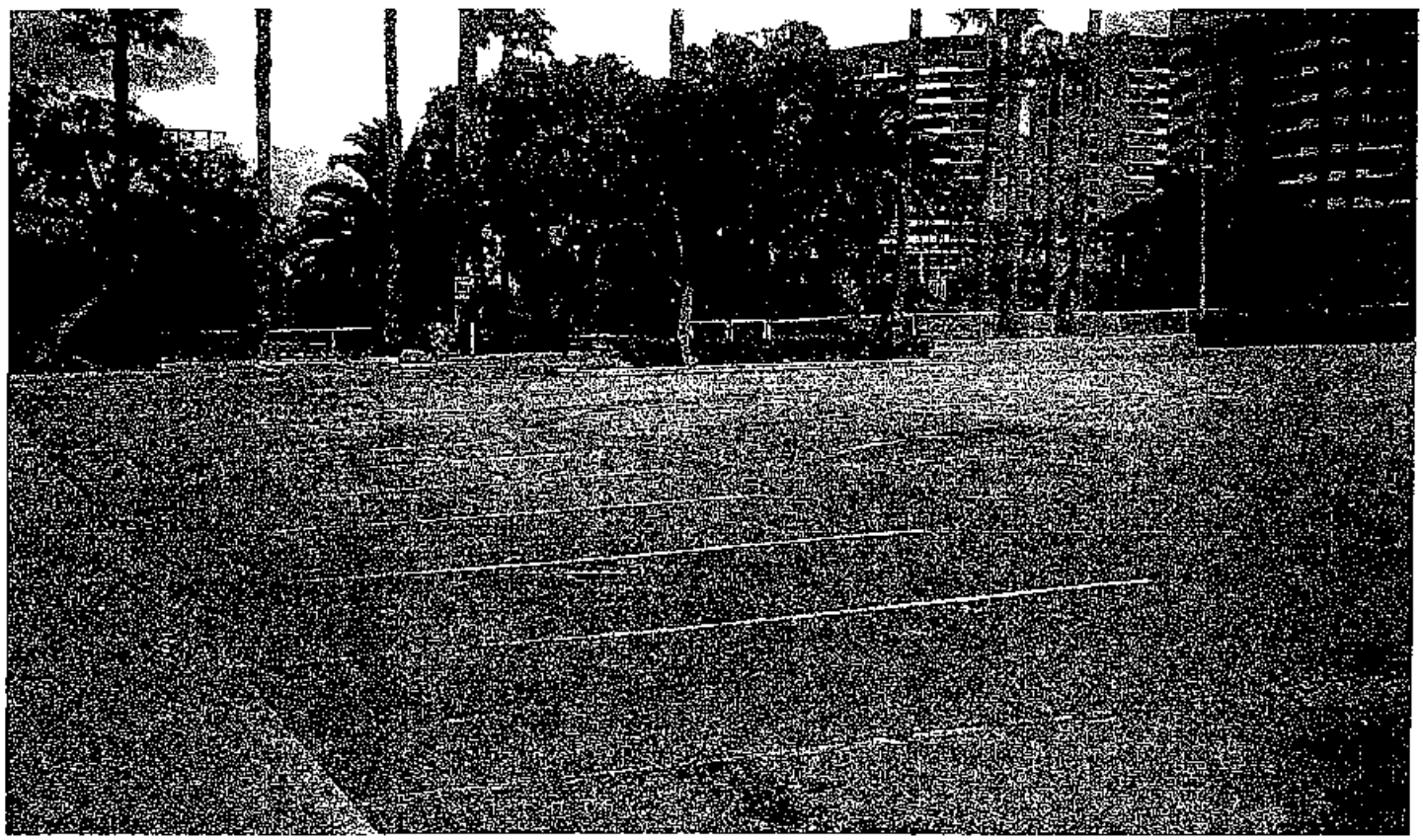
Entrance to Alleyway on West Side of Parcel OT, Adjacent to Marina International Hotel (Southwest).



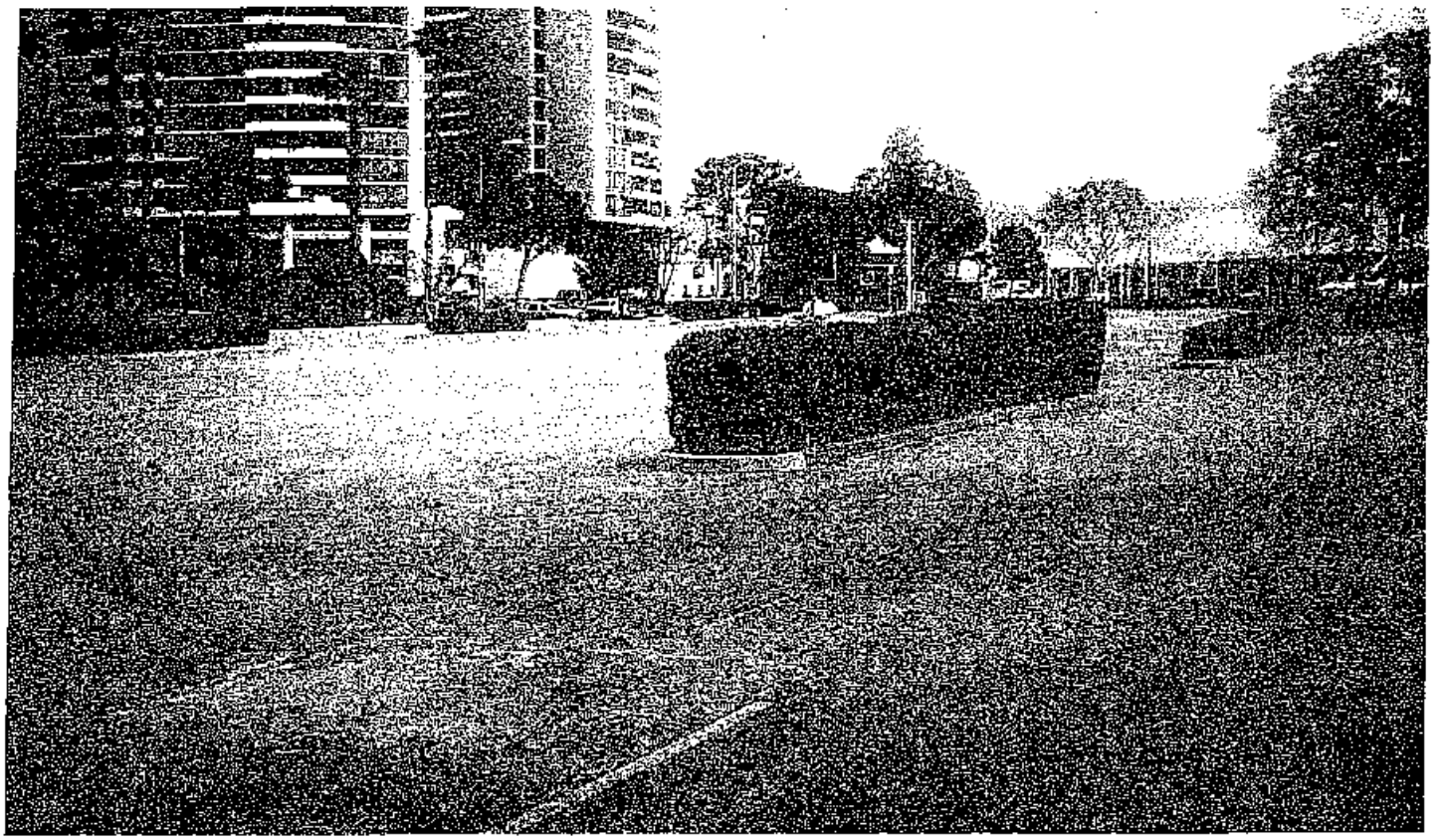
View of Alley Marking West Boundary of Parcel OT, from Washington Boulevard (Southeast).



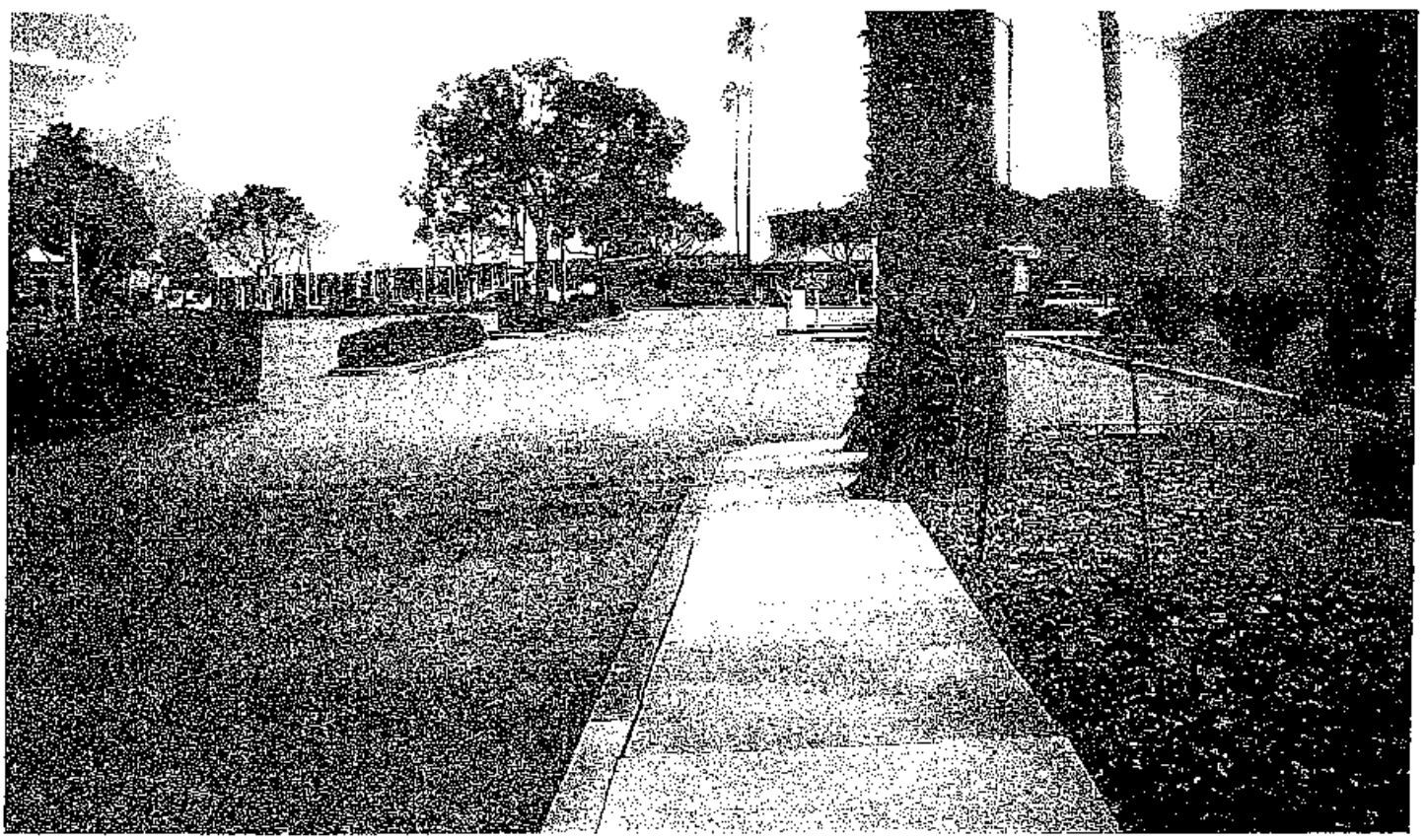
Looking Along Washington Boulevard, from Northwest Corner of Parcel OT (Northeast).



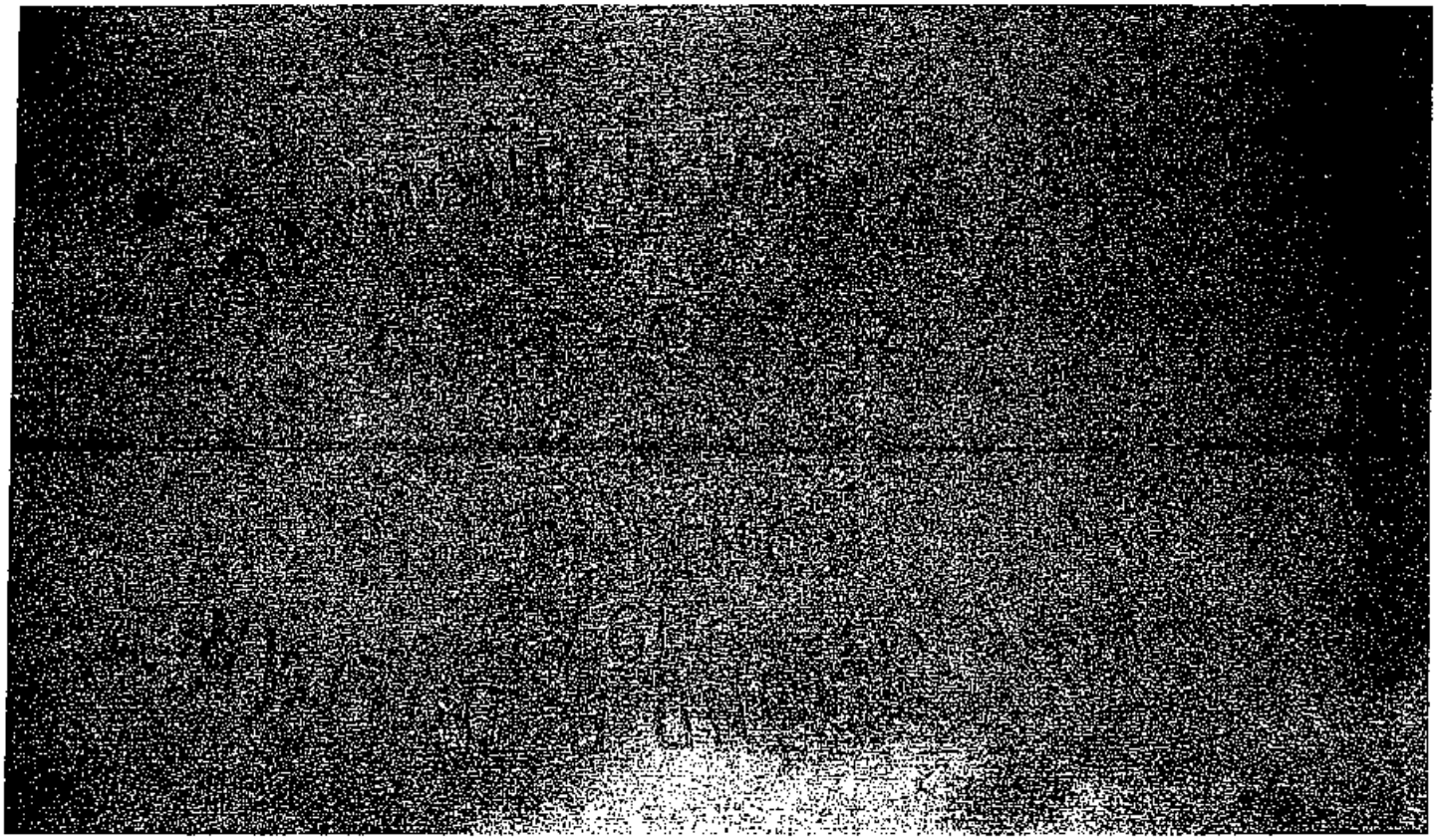
View of North End of Parking Lot, from Northwest Corner (Southeast).



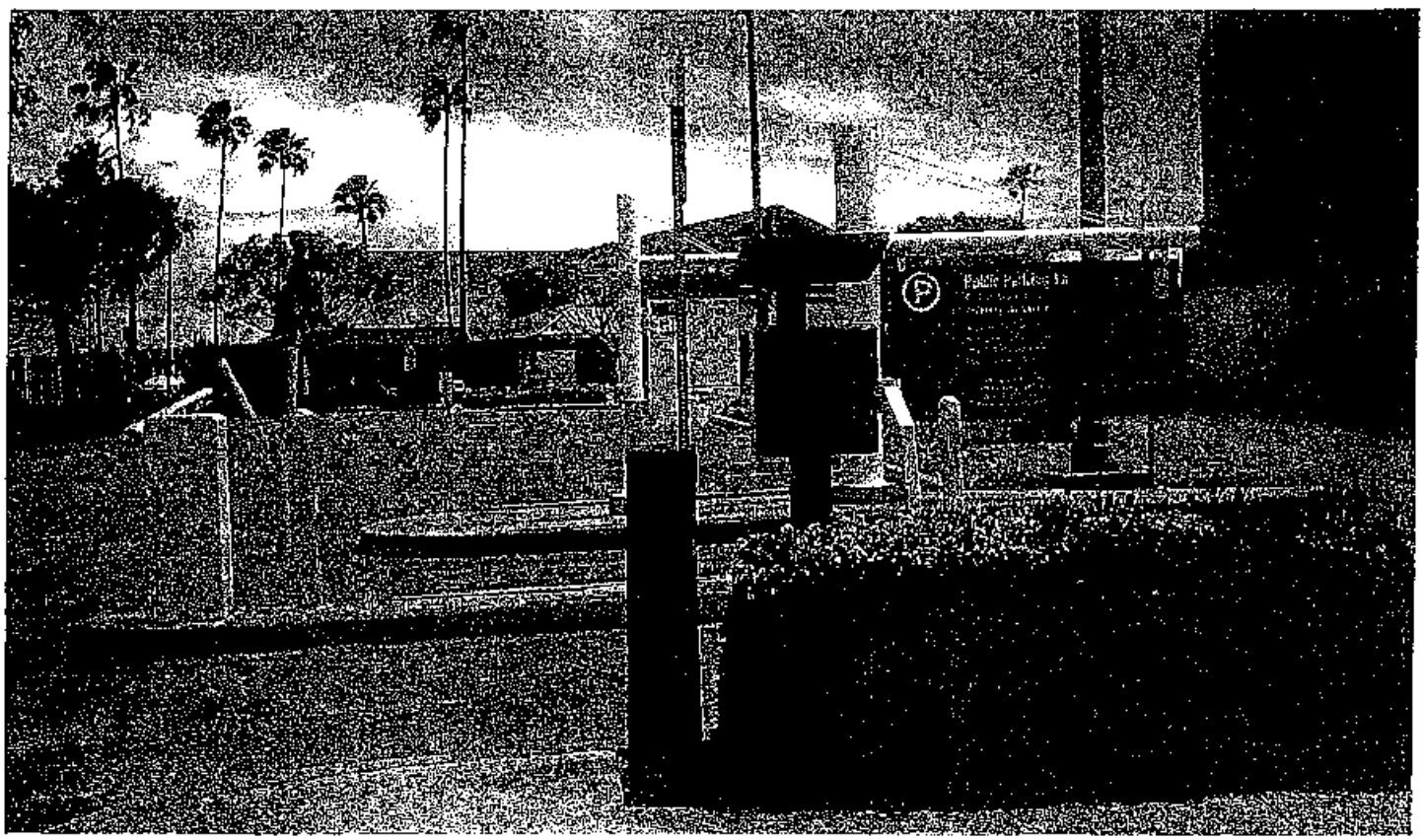
View of North End of Parking Lot, from Northwest Corner, Towards Admiralty Way (South/Southeast).



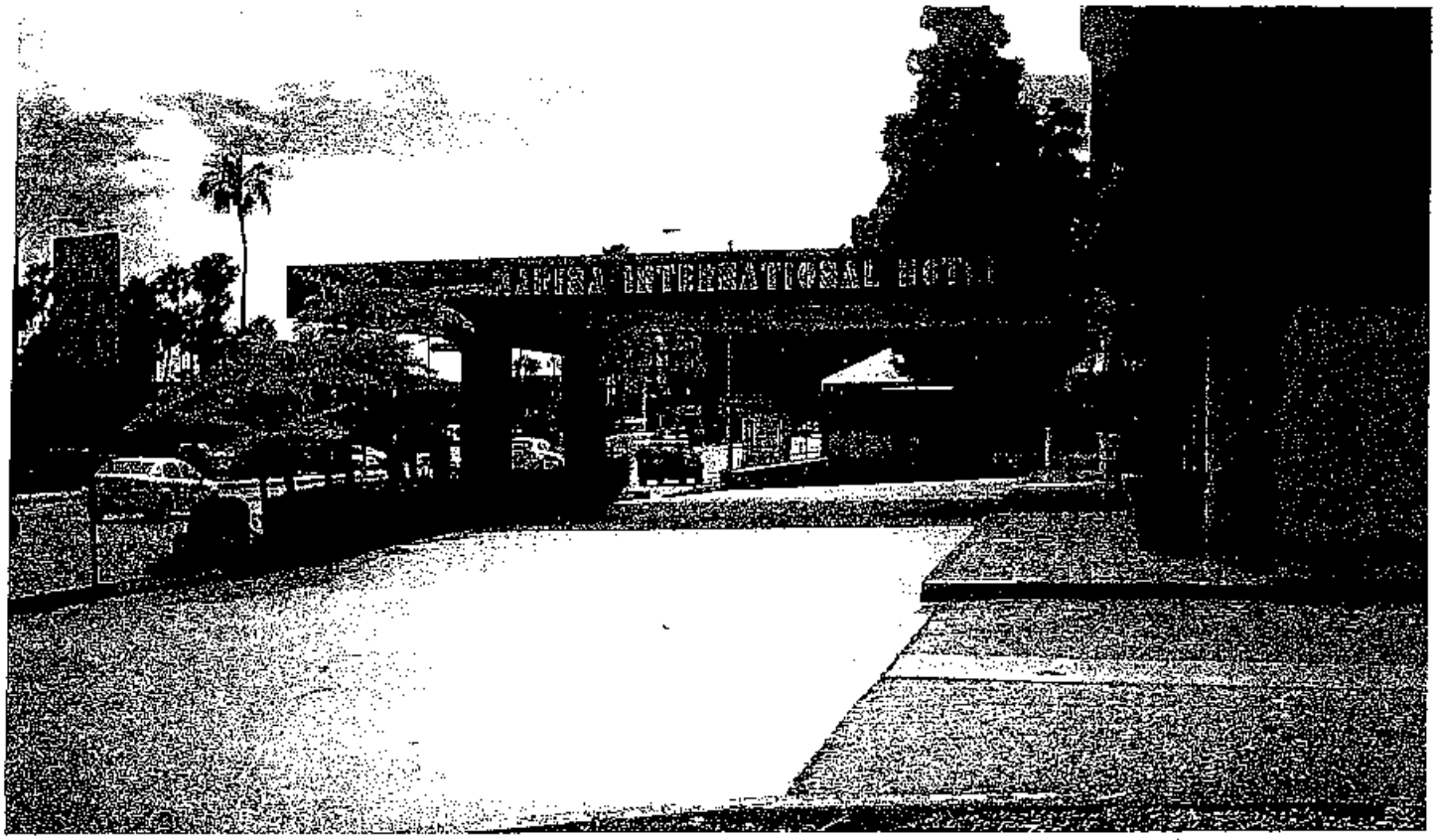
View of West End of Parking Lot, from Northwest Corner (Southeast).



View of Imprint in Sidewalk "Raymond R. Dollar 1973 Contractor" in West End of Parking Lot.

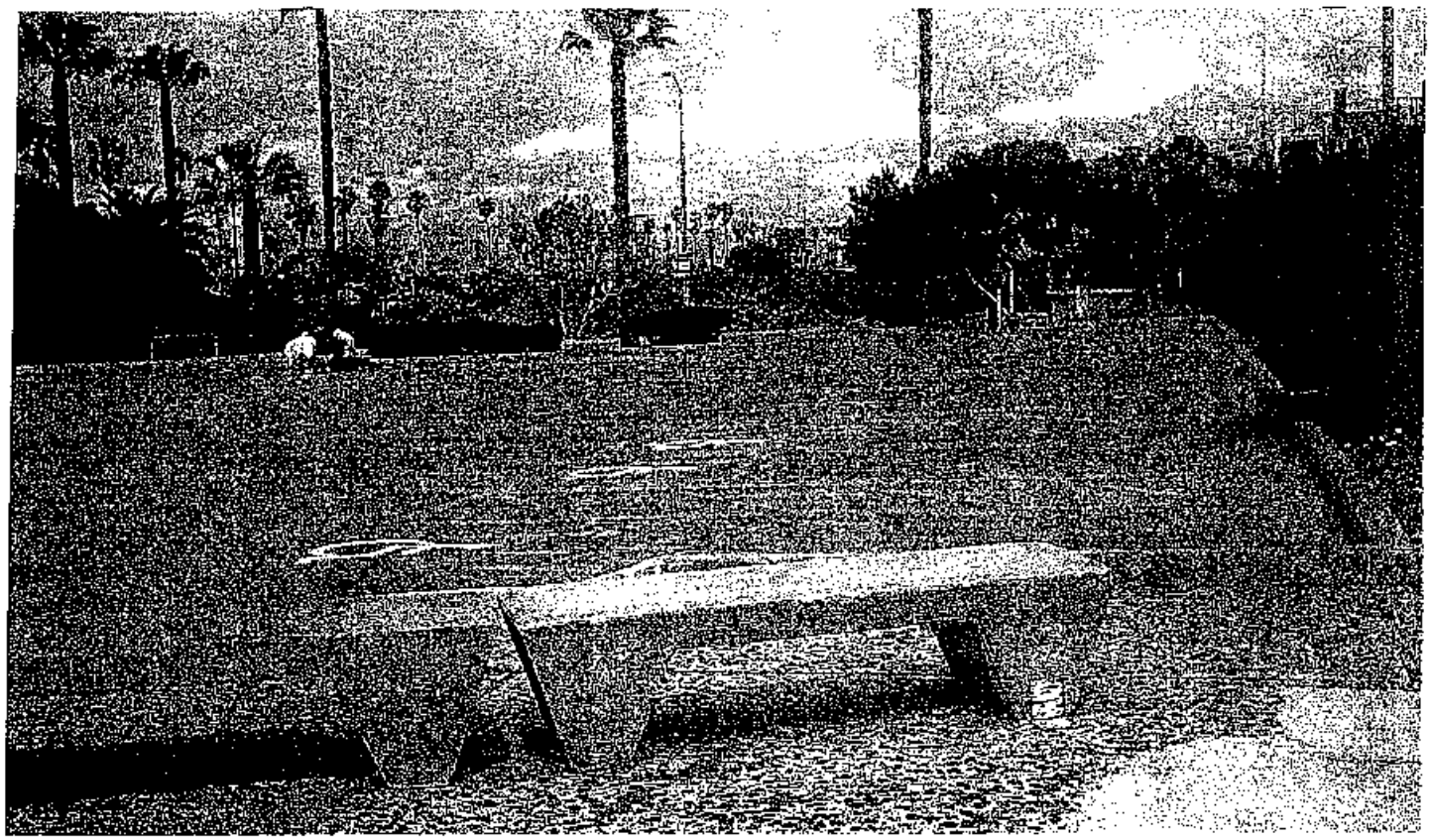


View of Entrance to Parking Lot on West End of Parcel OT (Southeast).

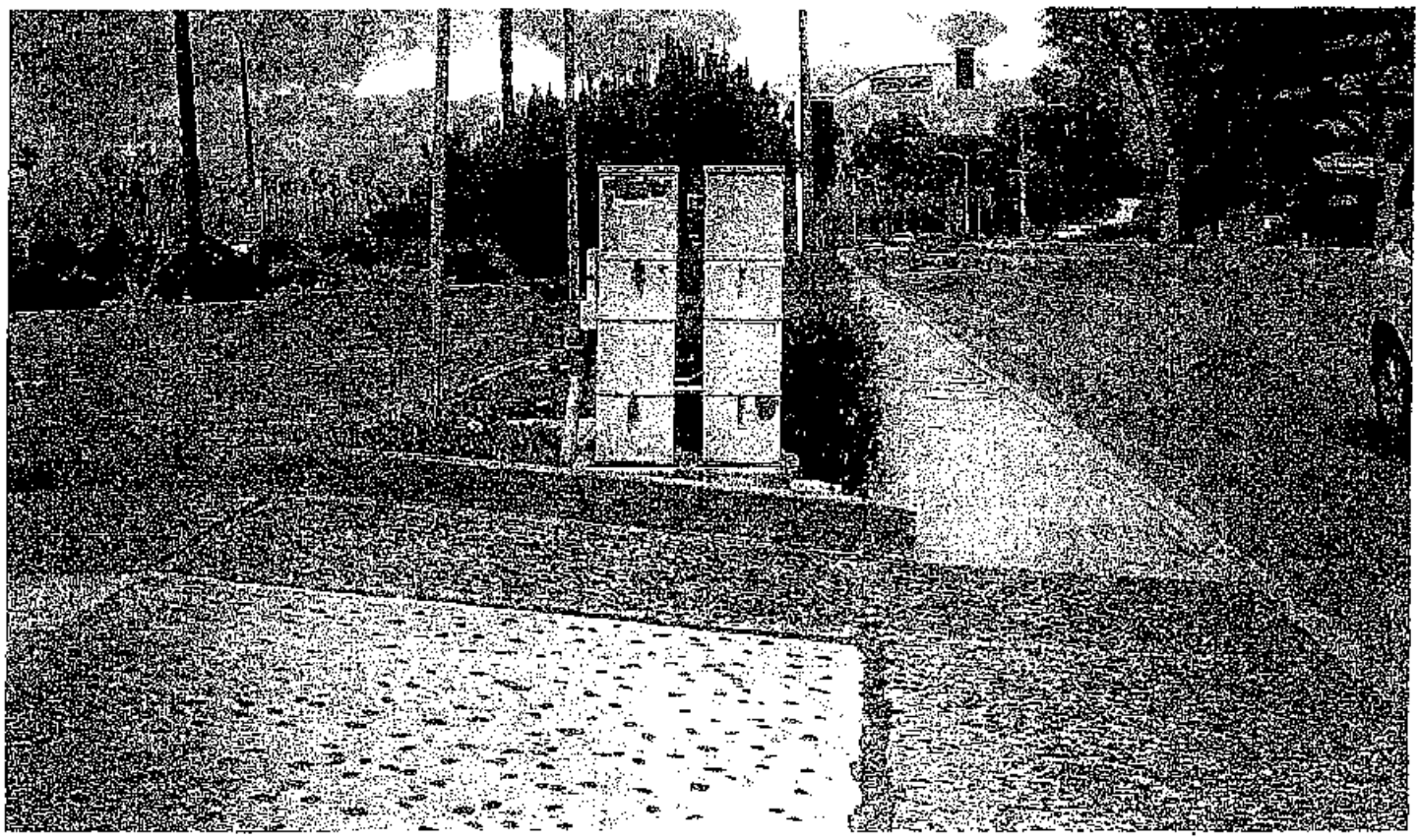


Entrance to Marina International Hotel on Admiralty Way, from Southwest Corner of Parcel OT (Southwest).

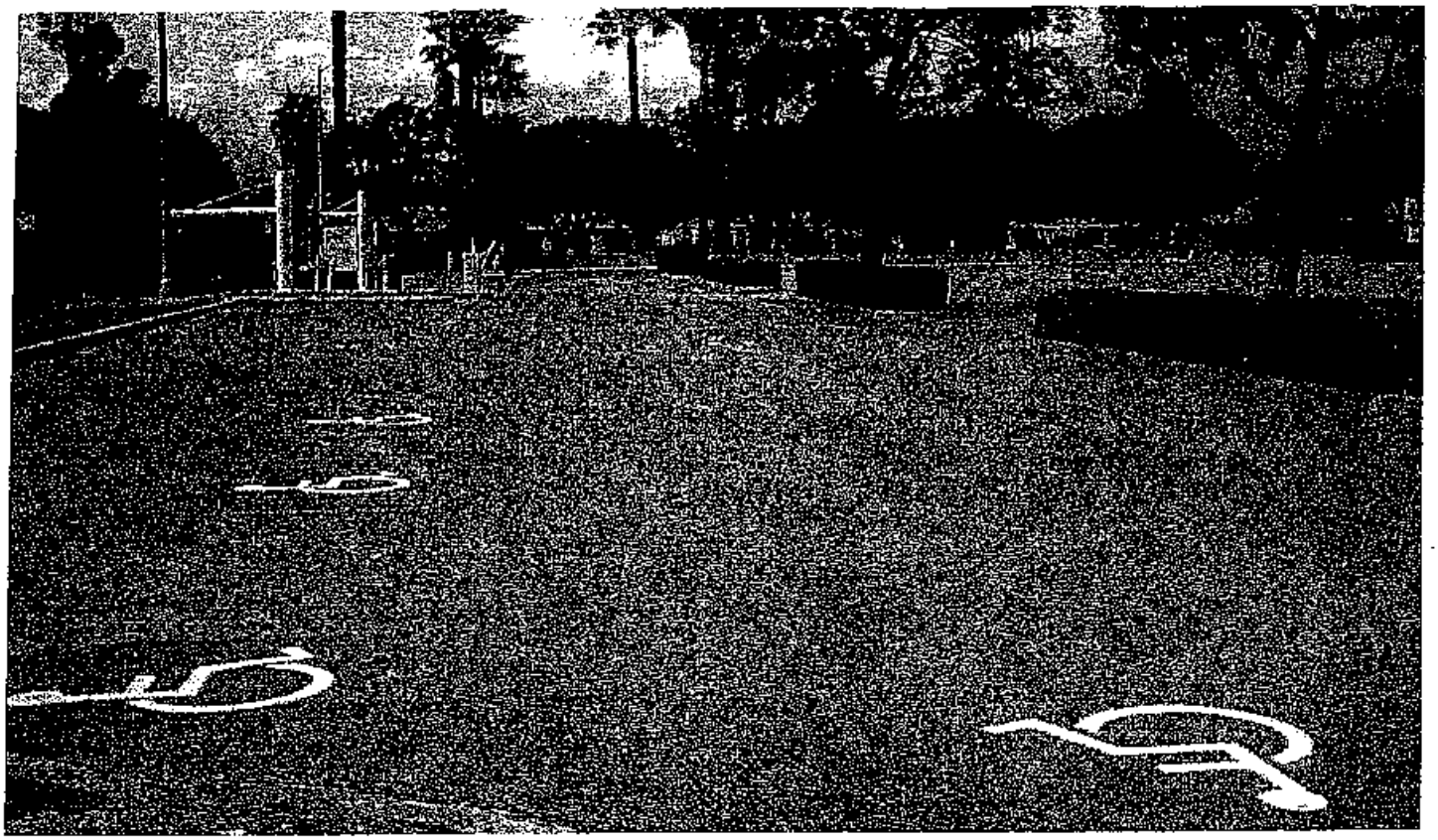
View from Southwest Corner of Parcel OT, Towards Washington Boulevard (North).



View from Southwest Corner of Parcel OT, Towards Marina Lagoon (Northeast).

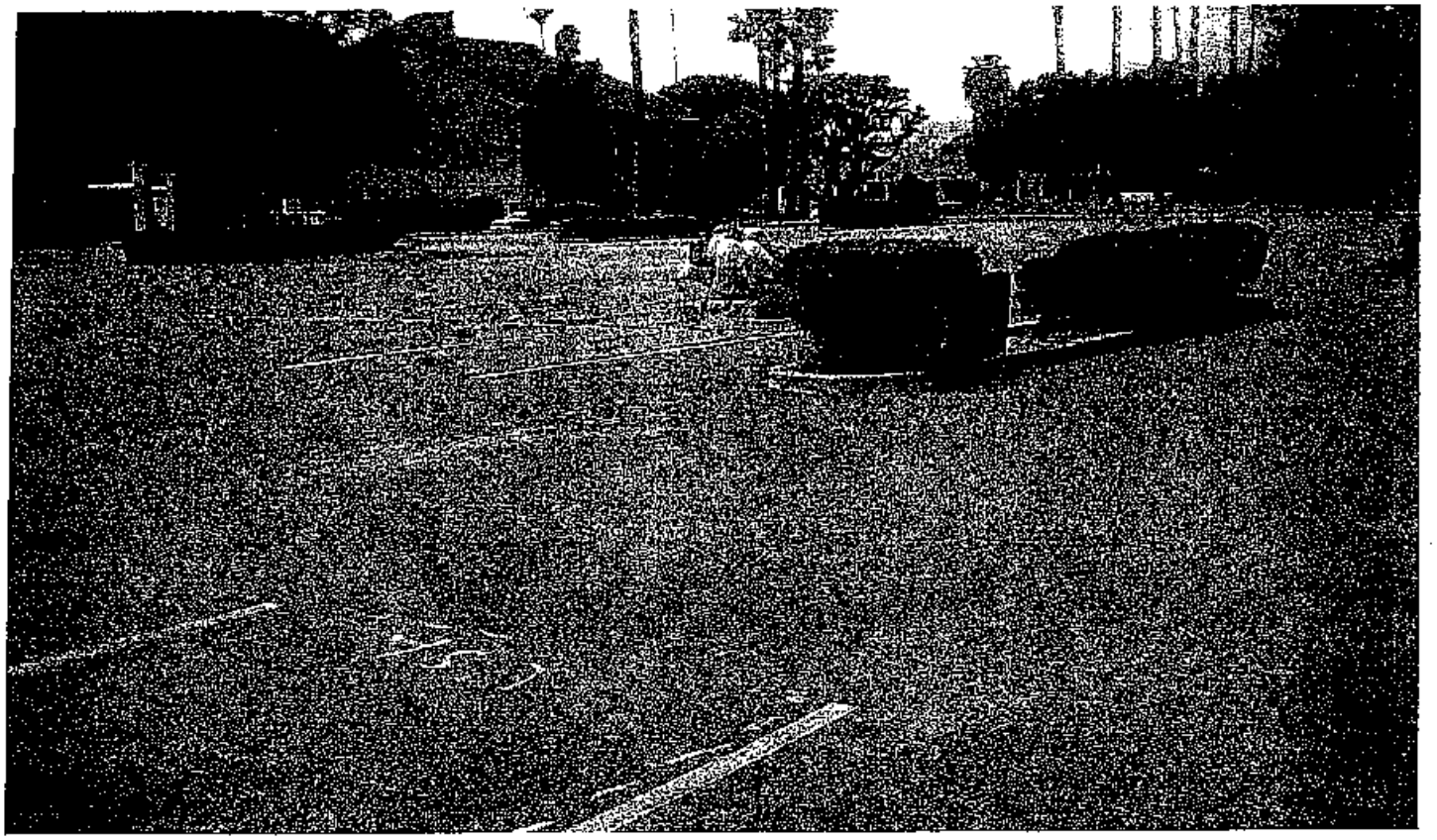


View from Southwest Corner of Parcel OT, Along Admiralty Way (Northeast).

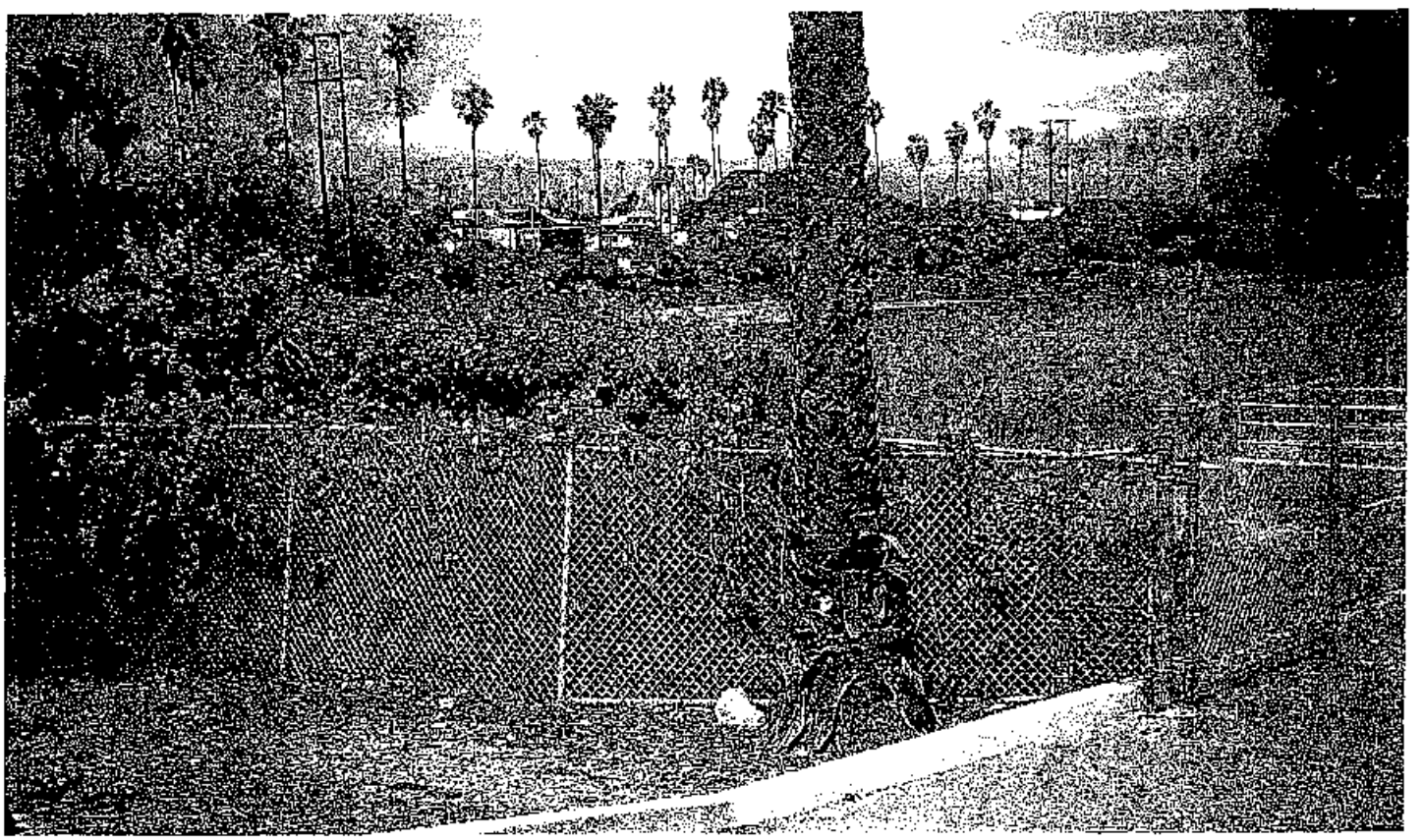


View of West End of Parking Lot, From Southwest Corner (Northwest).

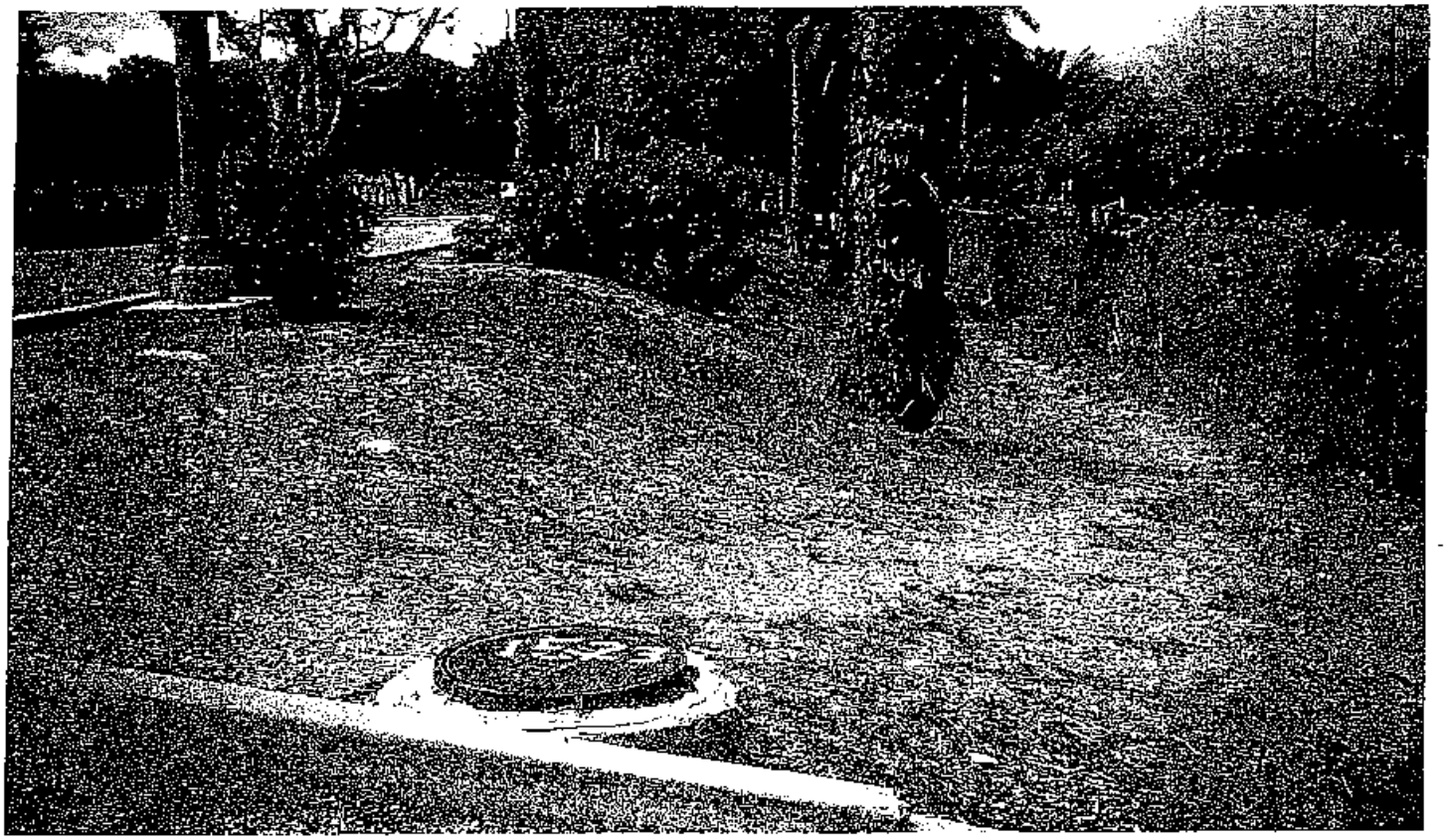
View of East End of Parking Lot, from Southeast Corner (Northwest).



From Southeast Corner of Parking Lot , Towards Marina International Hotel and Washington Boulevard (Northwest).

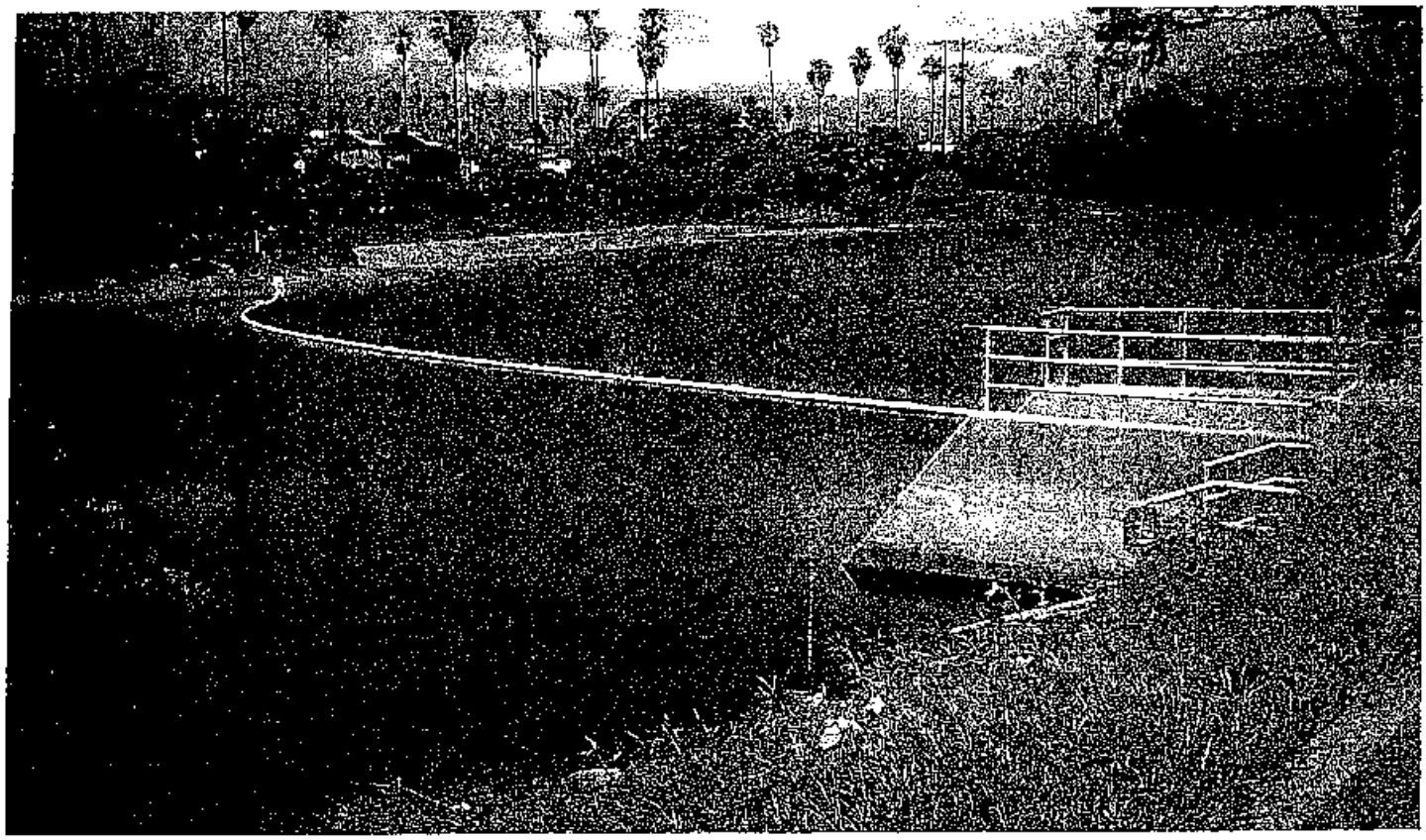


View of Marina Lagoon from Southeast Corner of Parking Lot (Northeast).

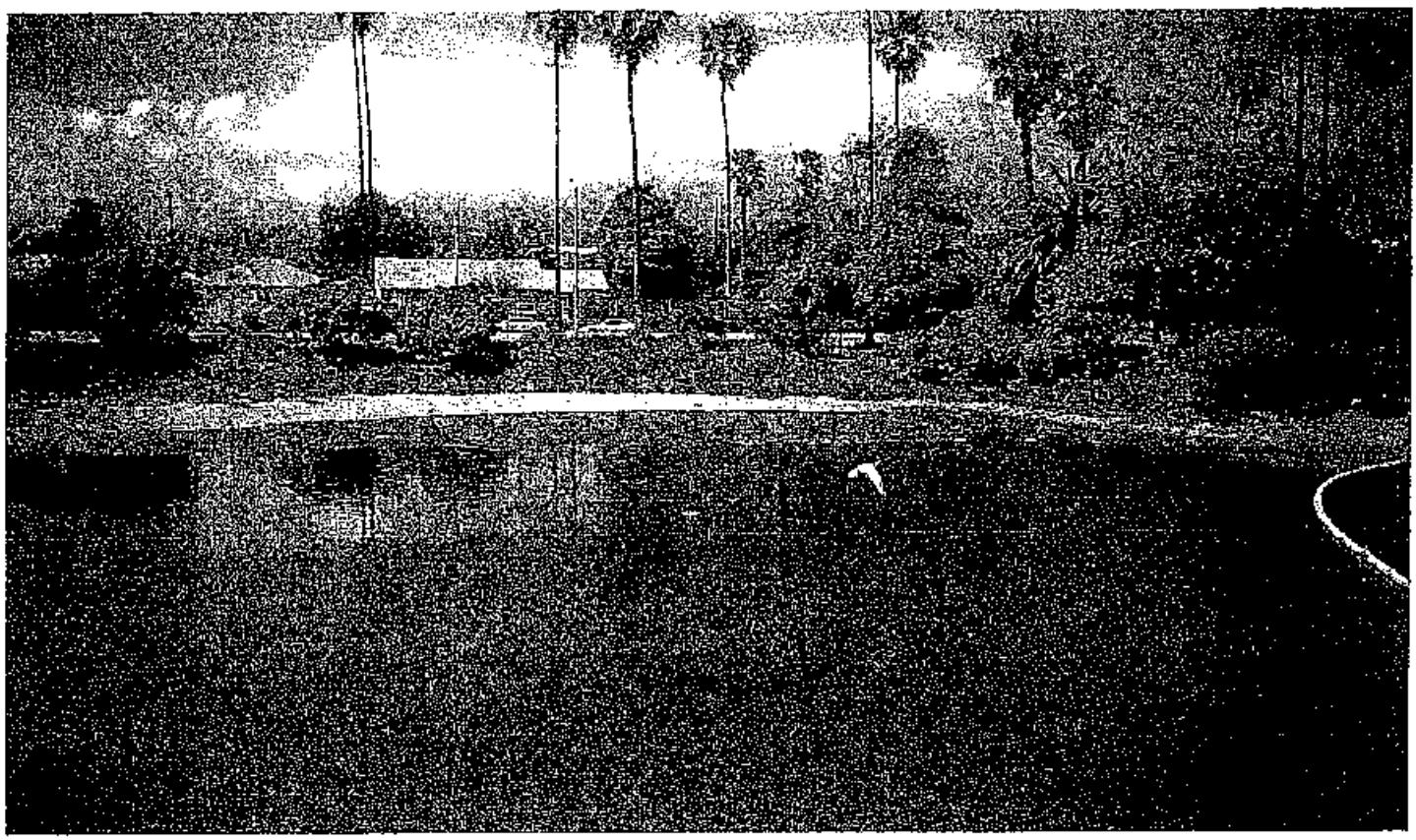


View of Dirt Path Marking East End of Parcel OT, from Southeast Corner of Parking Lot (Northwest).

View from Southeast Corner of Parking Lot, Towards Marina International Hotel (Northwest).



View of Marina Lagoon, from Southeast Corner of Parcel OT (Northeast).



View of Marina Lagoon, with White Crane in Flight, Towards Washington Boulevard (North).

View from Entrance to Marina Lagoon, Along Admiralty Way (Southwest).

View of Concrete Utilities at East End of Parcel OT (Northwest).

RESULTS OF A PHASE I CULTURAL RESOURCES INVESTIGATION OF THE MARINA PARCEL 21 PROJECT AREA, APPROXIMATELY 2.55 ACRES IN MARINA DEL REY, LOS ANGELES COUNTY, CALIFORNIA

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Job No. 03-06-05-1199
May 4, 2006

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RESULTS OF A PHASE I CULTURAL RESOURCES INVESTIGATION OF THE MARINA PARCEL 21 PROJECT AREA, APPROXIMATELY 2.55 ACRES IN MARINA DEL REY, LOS ANGELES COUNTY, CALIFORNIA

by,

Jeanette A. McKenna, Principal
McKenna et al., Whittier, CA.

INTRODUCTION

McKenna et al. (Appendix A) initiated this Phase I cultural resources investigation of the Marina Parcel 21 property (a part of 13967 Marquesas Way, but actually fronting 14025 Panay Way) in Marina Del Rey, Los Angeles County, at the request of Envicom Corporation, Agoura Hills, California. This property, a 2.55 acre property, is cross-referenced as Assessor Parcel No. 4224-003-900. This study has been prepared in compliance with the California Environmental Quality Act (CEQA), as amended.

PROJECT DESCRIPTION

The proposed project involves the development of the 2.55 acre property on Panay Way, Marina Del Rey, as a mixed-use property referred to as the Holiday Harbor Courts. The property is currently owned by Los Angeles County and leased to the developer as a parking area. The property is currently developed as a commercial property and associated parking. The proposed development will consists of two structures for a health club and retail/commercial use.

LOCATION AND SETTING

The project area is located at 14025 Panay Way. The specific property is cross-referenced as Parcels 20 and 21 in local Land Use Plan, Marina Del Rey, Los Angeles County, California. This property is within the developed Marina Del Rey basin (Basin 3) and relatively close to the Pacific Ocean frontage (Figures 1 and 2). The proposed project area is part of a larger parcel (APN 4224-003-900) and east of Ocean Avenue/Via Marina and equated with Township 2 South, Range 15 West, and the equivalent of Section 21(USGS Venice Quadrangle (rev. 1981; Figure 3).

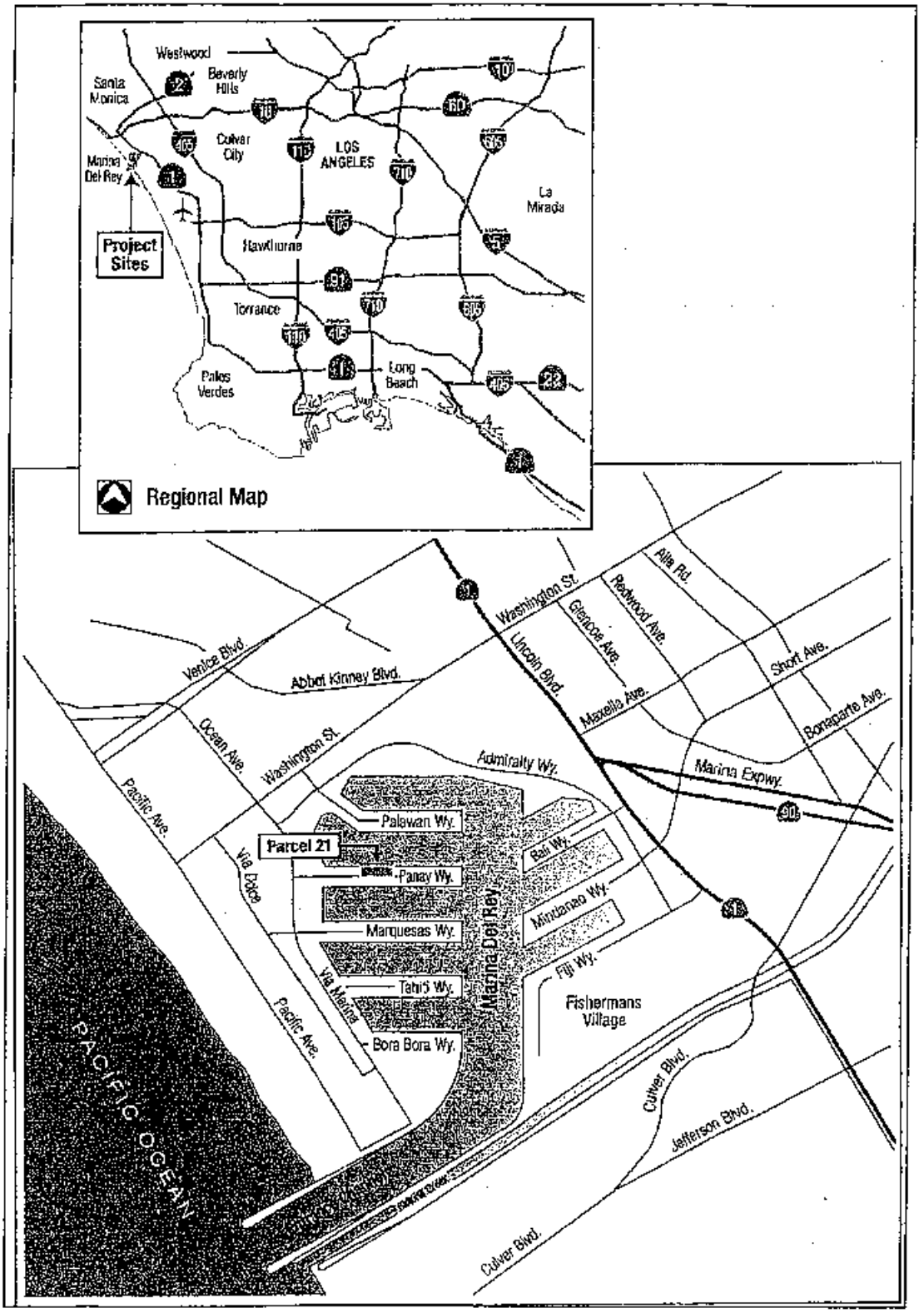

Figure 1. General Location of the Project Area.

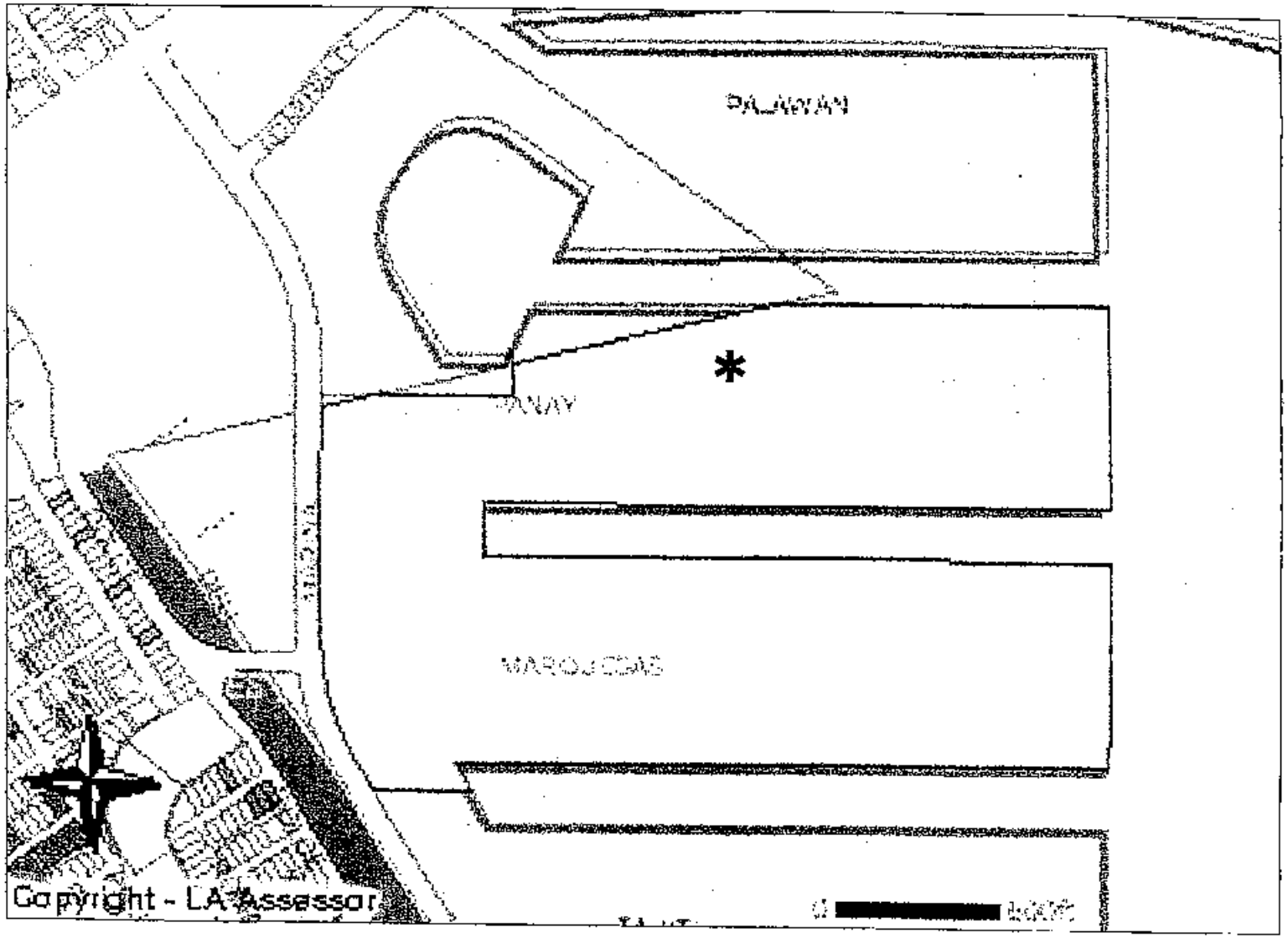

Figure 2. General Location of the Project Area (Co. Assessor Map).

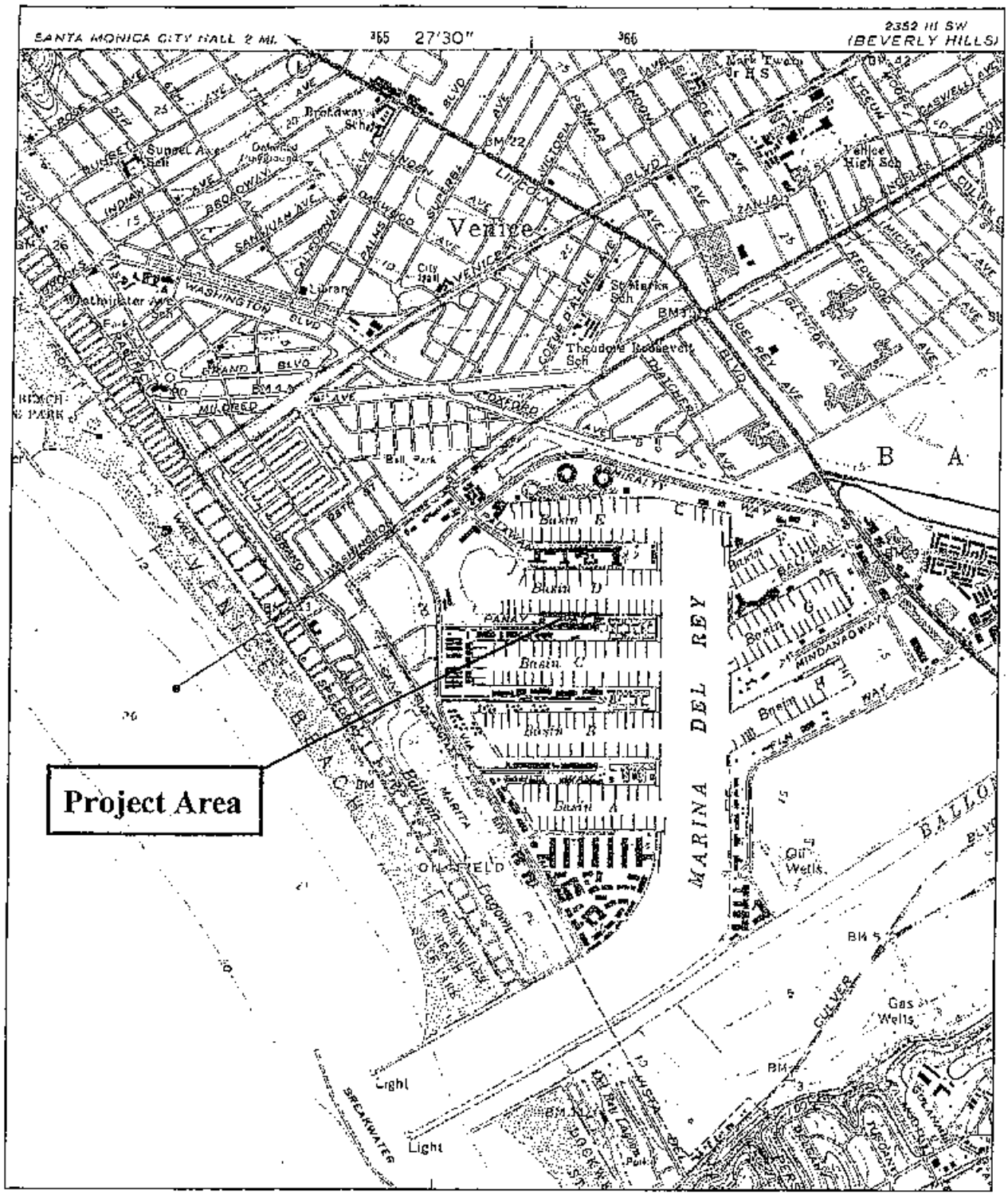

Figure 3. Specific Location of the Project Area (USGS Venice Quadrangle, rev. 1981).

The County Assessor also identifies this property as being illustrated on "... L.A. Co. Assessor Map No. 88 as Bk 1 Pg 53 ..." (Figures 4 and 5). The entire property is currently being used for commercial purposes with parking. Consisting of approximately 200,129 square feet, the property measures approximately 741 feet by150 feet. The property is relatively flat and includes some landscaping.

BRIEF CULTURE HISTORY BACKGROUND AND PROPERTY LAND USE

The project area is located within the Marina Del Rey area of unincorporated Los Angeles County, a geographical area ethnographically associated with the Gabrielino/Tongva of Southern California (McCawley 1996; Johnston 1962). Altschul, Homberg, and Ciolek-Torrello (1992) present a detailed discussion of the prehistory of this area of Southern California, suggesting the Chumash may have also occupied the area. Whether Gabrielino or Chumash, the prehistory of the area can be dated back 7500 years with a significant presence of prehistoric populations within coastal areas. Though technically within an urban setting, there is still a potential for the intact and/or undisturbed prehistoric resources within or near the project area. Resources, if identified, may be associated with either the Gabrielino/Tongva or Chumash, depending on the nature of the find.

This project area is located north/northwest of Ballona Creek and south of the City of Venice, within the historic Rancho Ballona (Paso de las Carretas Grant), a grant of 1839. Citing Gudde (1969:20):

> The name is derived from the Ballona or Paso de las Carretas grant, dated November 27, 1839. According to the tradition of the Talamantes family, co-grantees of the rancho, the place was named after the city of Bayona in northern Spain, the home of one o fhteir ancestors ...

With respect to the Rancho Ballona, Avina (1932:58) describes the rancho:

> One square league in Los Angeles county, November 1839 by Alvarado to Agustin Machado and probably to Ignacio Machado, Felipe and Tomas Talamantes. Approved May 1845 as Terreno en las cercanias de Los Angeles. The claimants stated that the grant was made to them after 18 or 19 years possession. Witnesses said they had three houses, land under cultivation and cattle and horses there in 1832. There was a grant of Rancho de los Quintos granted to Talamantes and Machado in 1819, later claimed by the pueblos.

The Thompson and West History of Los Angeles County, California (1880:135-137; reprinted) identifies the project area as being within the La Ballona Township within Los Angeles County and on the southern boundary of the community of Venice. Historically, the area now known as Venice

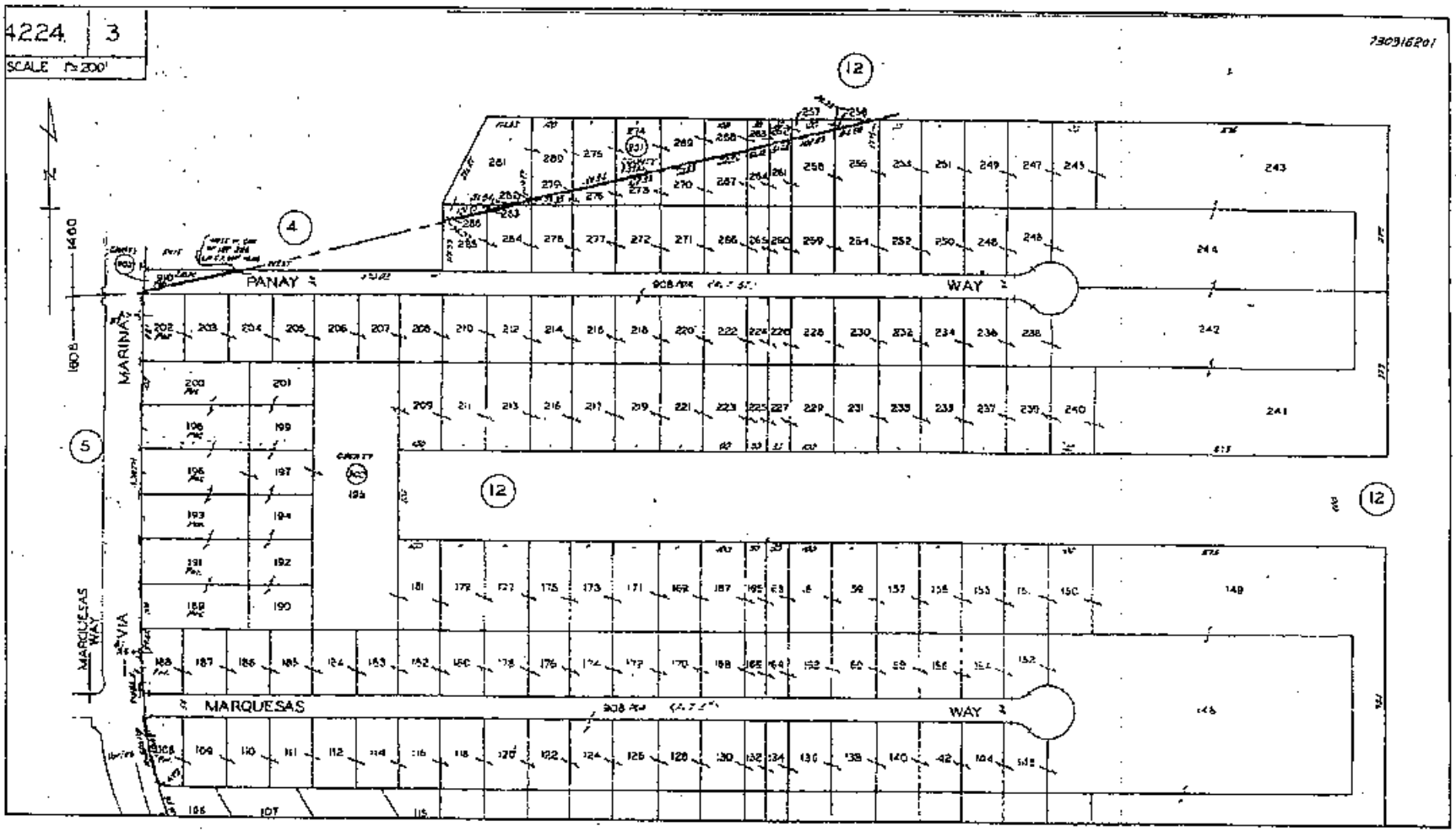

Figure 4. Assessor Parcel Map Identifying Project Area.

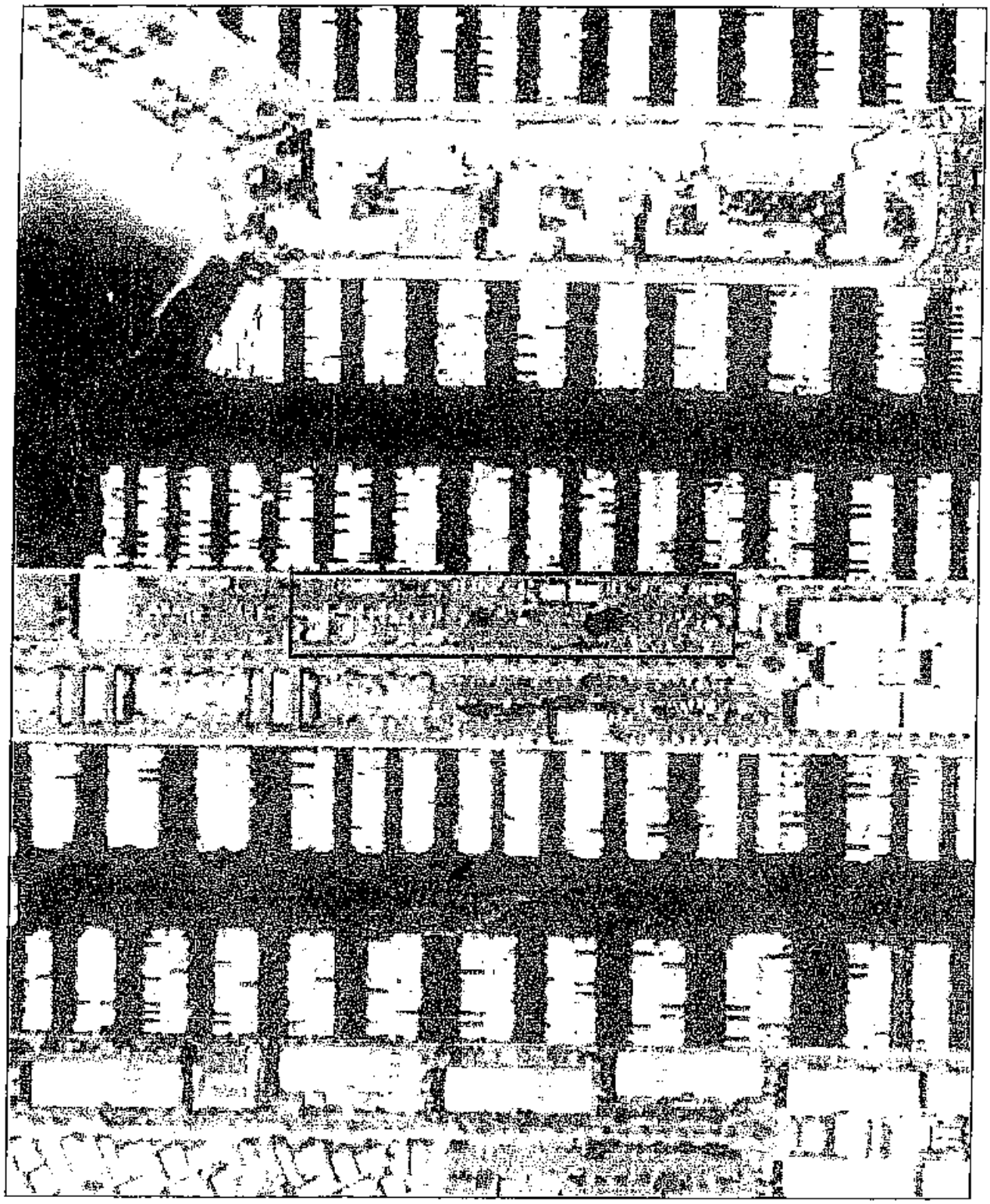

Figure 5. Aerial Photograph Illustrating Project Area.

was realized in ca. 1890 and a brief history of the community (http://www.westland.net/venice/history.htm) breaks the history of the area into three periods of significance: 1890 to 1906; 1907 to 1929; and 1930 to Present). This history reads:

Birth of "Venice of American" (1890-1906)

In the 1890's, one man's dream of a renaissance resort and amusement park transformed a deteriorating marshland west of Los Angeles, California, into the "Coney Island of the Pacific". Despite disbelief and opposition, the dreams of Abbot Kinney materialized in grand style. The vision of Abbott Kinney, a wealthy tobacco mogul, world traveler and co-owner of the Ocean Park Casino and Resort, was to turn the land south of Ocean Park through the Del Rey peninsula into a "Venice of American." He envisioned a resort town culturally reminiscent of Venice, Italy, complete with canals, gondolas, amusement piers, hotels, and Venetian-style structures. With the Casino thriving, Kinney and his partners purchased all the land south of Ocean Park. After the partnership was dissolved, the split was determined by a flip of a coin and Kinney won the toss. He chose the marshy southern half of the property. With his family by his side, Kinney set out to accomplish his goal.

In 1904, Kinney sent his building superintendent to the East Coast to visit various seaside resorts. Acquiring a landscape architect and town planner from Boston, Kinney and his staff drew up preliminary plans in June. Contracts were signed to dig up the half mile long, seventy foot wide Grand Canal and build the 900 foot long, 30 foot wide amusement pier at Windward Avenue. Construction began shortly thereafter. He then hired architects to design all the town buildings in "Venetian Renaissance" style.

In September, The Los Angeles Pacific Co. Enabled inland LA residents to visit Venice by completing the first electric trolley line. By the year's end, construction of the Ship Café and Auditorium, located on the Abbott Kinney Pier, the Venice Canals, and the St. Mark's Hotel on Windward were well underway.

All was running smoothly until two disastrous winter storms in February and March of 1905 demolished the newly built pier. As a result, the grand opening date was pushed back from May to July. Over 1000 workers worked around the clock to rebuild the pier, auditorium and Pavilion in time for the July 4th weekend rescheduled openings.

On June 30, ocean water, streaming in through two huge pipes, began flowing at a rate of 500 gallons a second thus filling the canal's central lagoon ...

Venice, The Coney Island of the Pacific (1907-1929)

As the town was taking shape, Kinney felt the need to consolidate power and gain control of many of the concessions. And as expected, lawsuits followed, but Kinney persevered and won the majority of the cases. In 1907, Kinney faced a new battle when the Trustees who owned the rival Ocean Park Pier refused to issue him a building permit for his proposed ocean front bathhouse and Plunge. An outraged Kinney took matters into his own hands and began pouring the concrete foundations. The Sheriff attempted to dynamite the concrete foundation, but succumbed to the pressures of the woman's Pick and Shovel Club when they picnicked on the site. The pool eventually opened in August and was free to the public ...

For the next few years construction of new attractions and theaters vitalized the area. A Scenic Railroad ride beside the Abbot Kinney Pier was built where the riders were surrounded by mountainous terrain and rode through a scenic tunnel. The Pier was widened and Kinney added a Dentzel carousel, a Japanese Tea House and an Ocean Inn Restaurant. Other new rides included a Ferris wheel and a Rapid's ride where a dozen people at a time made their way in a boat through a serpentine canal. The surrounding walls depicted scenes from an Irish castle, the Panama Canal and a view of the western frontier.

The Fraser's Million Dollar amusement pier also opened claiming to be the largest in the world at 1250 feet long and 300 feet wide. The pier housed a spacious dance hall, two carousels, the Crooked House fun house, the Grand Electric Railroad, the Starland Vaudeville Theater, Breaker's Restaurant and a Panama Canal model exhibit.

Business was booming until a fire ravaged the Fraser Pier and five square blocks of Ocean Park's business district. 700 fire fighters from 12 companies did all they could but were unable to contain the flames. The winds finally shifted and nearby Venice was spared. It was a 2.5 million dollar loss and a major setback for the area. Unfortunately, nearly all of the loss was uninsured.

During the teens, Venice obtained a professional baseball franchise, built a new Fraser Pier, hosted a Grand Prix automobile race, and formed an aerial police force. The first bathing beauty contest, sponsored by the Los Angeles Examiner took place in 1912. By 1920, Venice's population reached 10,385 residents. Despite Prohibition, Venice increased it's growth with new and improved attractions on both the Abbot Kinney Pier and the Ocean Park Pier. Speakeasies also emerged in basements of businesses along Windward Avenue. Liquor supplies were smuggled through tunnels leading from the beaches to hotel basements.

Sadly, on November 4, 1920, tobacco baron, Abbot Kinney died of lung cancer from years of heavy smoking, leaving his eldest son, Thornton, to take over the business.

One month later, his amusement pier burned to the ground. The only attractions spared by the fire were a new roller coaster and the bandstand tower. Six months later, the pier was rebuilt and operating. In 1924, the Ocean Park Pier experienced yet another devastating fire that destroyed the entire complex and the adjacent Licks Pier. Both piers reopened in 1926.

Annexation, Depression, Ruin and Rebirth (1930-Present)

Distraught by the inability of the City Council to adequately govern Venice, the residents held an election and the voters decided that Venice be officially annexed to the City of Los Angeles. It was like Los Angeles annexing Disneyland. The city, which never cared for Venice's honky tonk atmosphere, started to dismantle the amusement industry. It began with the removal of the miniature railroad and filled in the majority of the canals to accommodate increased automobile traffic. The canals South of Venice Boulevard remained intact and today they still mirror the scenic beauty of yesteryear. The city converted the bankrupt Sunset Pier into a municipal bathing pavilion.

In 1930, oil was discovered on the Venice Peninsula. Within a year, 148 oil wells were producing over 40,000 barrels of oil daily. Jobs were created, but environmental destruction was wide spread and polluting the surrounding residential area and beaches.

In 1932, the Depression hit hard. Various Venice banks went bankrupt and the Venice Pier went into receivership. However, when liquor consumption became legal again and bingo games were modified into a game of skill, the economy benefited [sic].

When World War II started, it affected Venice and it's seaside amusement centers. A blackout was instilled which allowed only daytime use of the piers and their attractions. National Guardsmen patrolled the beaches in search of enemy submarines and ships. During the daytime, Venice became a major draw for sailors and soldiers on weekend leave. Country Western and Swing music echoed from the dance halls and casino lounges. The evening curfew was eventually lifted in 1944 and life in Venice returned to normal.

When the Kinney Pier's lease expired in 1946, the Los Angeles Parks and Recreation Department declined to renew the lease, although the company had just recently refurbished the pier entrance and repaired the aging deck. Profitable or not, the city's plan was to widen the beaches they removing all piers. Attempts were made to extend the lease for another year, but the Parks department refused and the pier closed on midnight April 20, 1946 and the pier was ordered to be dismantled. The Ocean Park Pier, however, thrived in the late 50's after it was converted to a nautical theme park. It remained in existence until 1967 ...

> Venice was in a severe state of decay and in desperate need for redevelopment. In the early 1960's, the city instituted a policy of "Code Enforcement" where all buildings had to be upgraded to current building standards ...
>
> Venice experience[d] a rebirth in the 70's but not as a major tourist destination. The focal point was not maintaining the character of Venice so as not to chase out the low income population. In 1972, the city constructed an 18 mile bicycle path adjacent to Ocean Front Walk which extends from Torrence to Santa Monica ...

The area now referenced as Marina Del Rey was summarized by the Marina del Rey Convention & Visitors Bureau and "The History of Marina del Rey," and provided by Chesler (2006):

> Marina Del Rey has been a long time in the making. Construction of the jetties for the present entrance channel began in December 1957, but efforts towards a harbor at this location actually began some seventy years earlier, sponsored, ironically, by a railroad.
>
> In 1887, a far-sighted man, named M.C. Wicks, organized the Port Ballona Development Company under the auspices of the Santa Fe Railroad. Wicks dreamed of developing the Playa del Rey estuary and inlet into a major commercial harbor to serve the Los Angeles area. He managed to raise $300,000, all of which went for construction work over a three-year period. However, Wicks went bankrupt and the area was eventually taken over by duck hunters.
>
> Another quarter of a century passed without action, but the dream kept recurring. In 1916, the U.S. Army Corps of Engineers reports to Congress that a new proposal to develop the Playa del Rey Inlet and basin as a major harbor was impractical ...
>
> Twenty year later, in 1936, Congress authorized reconsideration of the negative 1916 report and the Country Board of Supervisors ordered another study in 1937. This time there was competition, and the decision went to San pedro, where major expansion had been approved to form the present Los Angeles Harbor.
>
> From this point on, the dream focused with increasing clarity on a harbor for small craft. World War II caused a temporary halt to planning, but on September 7, 1949, the U.S. Army Corps of Engineers submitted a report indicating the feasibility of construction of a pleasure craft harbor for 8,000 boats at a total estimated cost of $23,603,000 ...
>
> In 1953, the County Board of Supervisors sponsored State legislation which eventually granted the County a $2 million loan frm State tidelands oil revenues to assist in purchase of the new harbor site. In 1954, President Eisenhower signed Public Law

780, making the Martina del Rey harbor an authorized federal project and planning moved into high gear. The federal commitment, however, was limited to the "main navigational features" and involved a 50-50 sharing of these costs by the local sponsor; in this case, the County of Los Angeles.

On November 6, 1956, a general election resulted in County voter approving the revenue bond method of financing the remainder of the project, and in December 1959, a $13 million revenue bond issue was sold to provide funds for much of the actual construction. Meanwhile, in December 1957, construction of the "main Navigational features: began as a joint Federal-County project; by November 1958, the entrance channel jetties were completed and the first tangible facilities had emerged from the long-standing dream.

Big projects have big problems, and Marina del Rey had its share; construction delays plagued the early development. Shortly after the harbor finally opened for operation, it suffered storm damage so severe in the winter of 1962-63 that an emergency program was initiated to provide protection from wave action. Fortunately, based on early indications of excessive vulnerability of the harbor to wave action, a model study was already well under way at the U.S. Army Corps of Engineers Waterways Experiment Station at Vicksburg, MS.

With the cooperation of the Federal Government, this study program was expedited on the "crash" basis; the model was used to arrive at a feasible interim solution, and the County proceeded to immediately construct temporary protective sheet-pile baffles in the entrance to the channel to give vital protection pending the completion of permanent protective works by the U.S. Corps of Engineers ...

Meanwhile, the results of the model study indicated a requirement for a permanent off-shore breakwater. The County Board of Supervisors promptly appropriated $2.1 million of the estimated cost of $4.2 million for this project as the sponsoring agency's share, and a concerted effort by the County's legislators in Congress was successful in securing the matching Federal appropriation in the 1963-64 budget.

Construction of the breakwater began on October 15, 1963, and was completed in January 1965. The dispatch with which this major point project was planned, funded and constructed reflected a healthy working relationship between County and Federal governments and particularly indicated the effective representation enjoyed by the County in Congress ...

Marina del Rey successfully surmounted its major development problems and was progressing steadily toward complete fulfillment of its destiny. Formal dedication of the Marina de Rey Harbor was held on April 10, 1965 ...

> Today, Marina del Rey is an indispensable social, environmental and economic success, and has become a role model for other urban marinas throughout the world. As the Marina heads into the next century, considerations for future planning and design are underway. Marina del Rey will never be thought of as a finished product, but instead as a constantly evolving Marina "new town" with an inherent capacity to accept change. Currently, the County continues to strive for an optimum balance between public and private interests, as economic and recreational needs reinforce the Marina's role as a multifunctional activity center for the Los Angeles metropolitan area.

Illustrated in 1887 (Figure 6), the Ballona Lagoon is still in it's natural state, but the "New Piers" are present. Between 1887 and 1964, improvements were limited to the ocean frontage and not within the lagoon, itself. In 1964 (Figure 7), the Lagoon is still intact and accessed from the strand between the developed coastline and the interior region.

As illustrated in Figures 1 through 3, the marina is developed with the various slips and basins. All improvements are denoted as post-1964 improvements, rendering them less than 40 years of age. The current configuration is illustrated in the Department of Conservation map of 2001 (Figure 8) and identifies the ocean frontage as part of Venice which the interior is identified as Marina Del Rey. In more detail, Figure 9 illustrates the area's oil wells, oil fields, and landfill sites.

Specifically, the Marina Del Rey area is identified as Playa Del Rey and the historic Venice Landfill is identified as being located near Washington Street and outside the boundaries of the current project area. However, since areal extent of the landfill is not known and, given the entire area is built on fill over the lagoon, there is a potential for the Venice landfill to extend into the current project area. The project area should be considered sensitive for historic archaeological resources.

The current improvements to the property are post-1964 and, based on Assessor data, likely post-1974. The existing structure is a two story office building with wood shingle siding and exterior balconies for access. There is a suggestion of New England architecture, but the structure is more eclectic and exhibits a mixture of styles, including some Oriental influences. In either case, the existing structure is not historic and of no architectural significance.

METHODOLOGY

To complete this evaluation study, McKenna et al. completed the necessary research and review of documentation to address the requirements of CEQA and local agencies. McKenna et al. conducted the following tasks:

1. **Archaeological Records Check**: Completed through the California State University, Fullerton, South Central Coastal Information Center, Fullerton, California (Appendix B). This repository houses documentation on previous studies, lists of important or significant

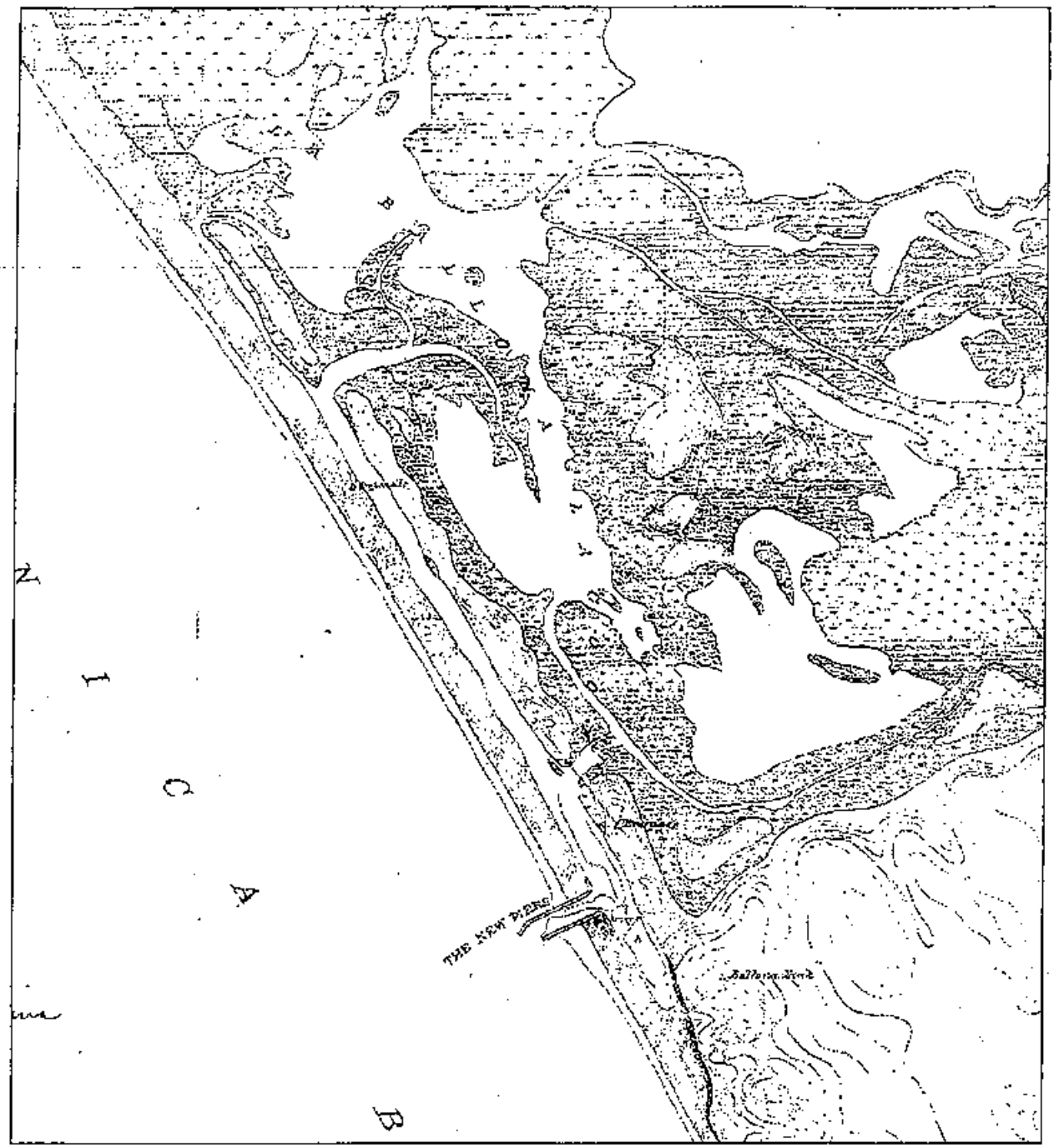

Figure 6. Map of 1887 Illustrating the Ballona Lagoon and Associated Amenities.

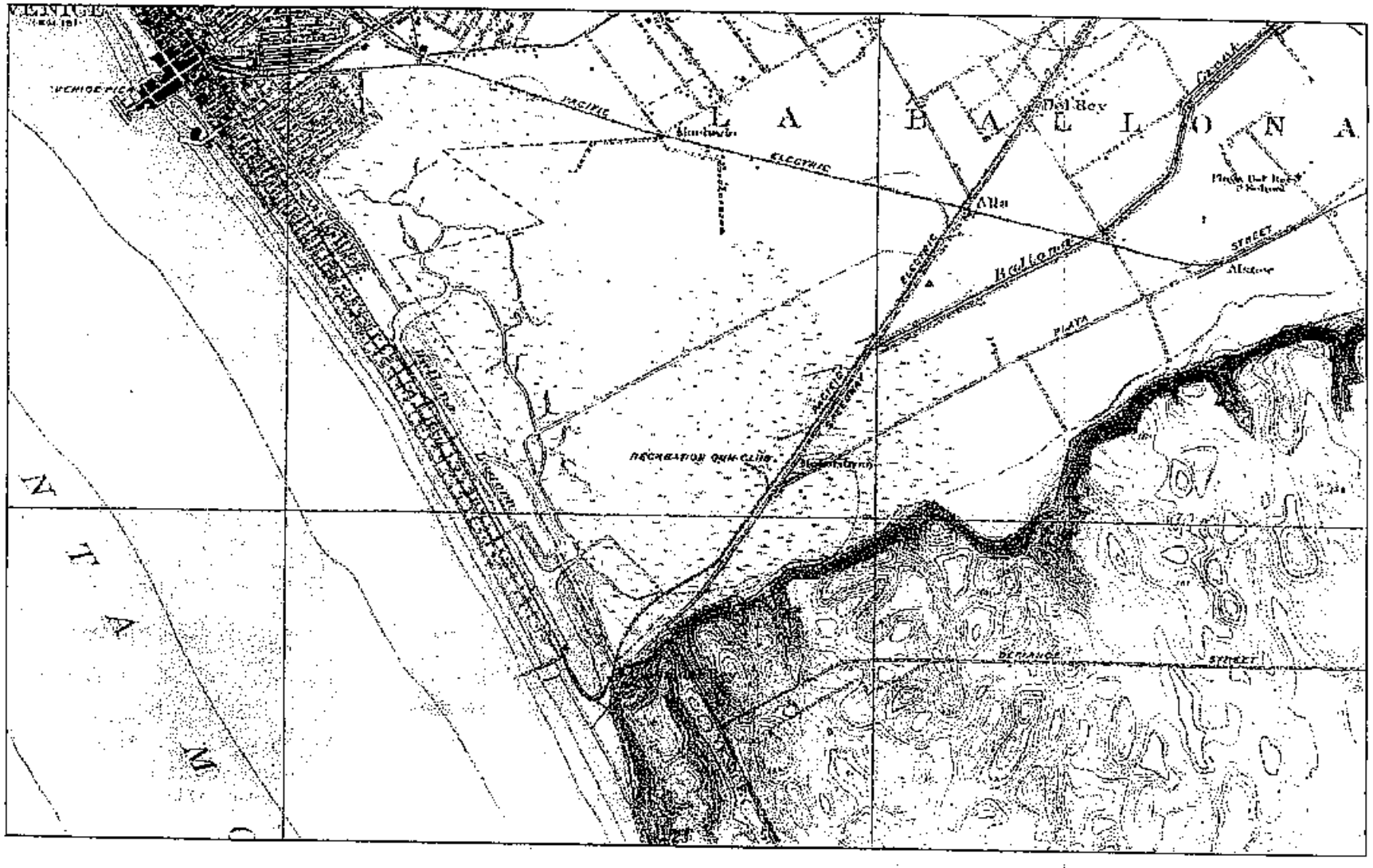

Figure 7. USGS Map of 1964 Illustrating the Pre-Developed Ballona Lagoon/Marina Del Rey Area.

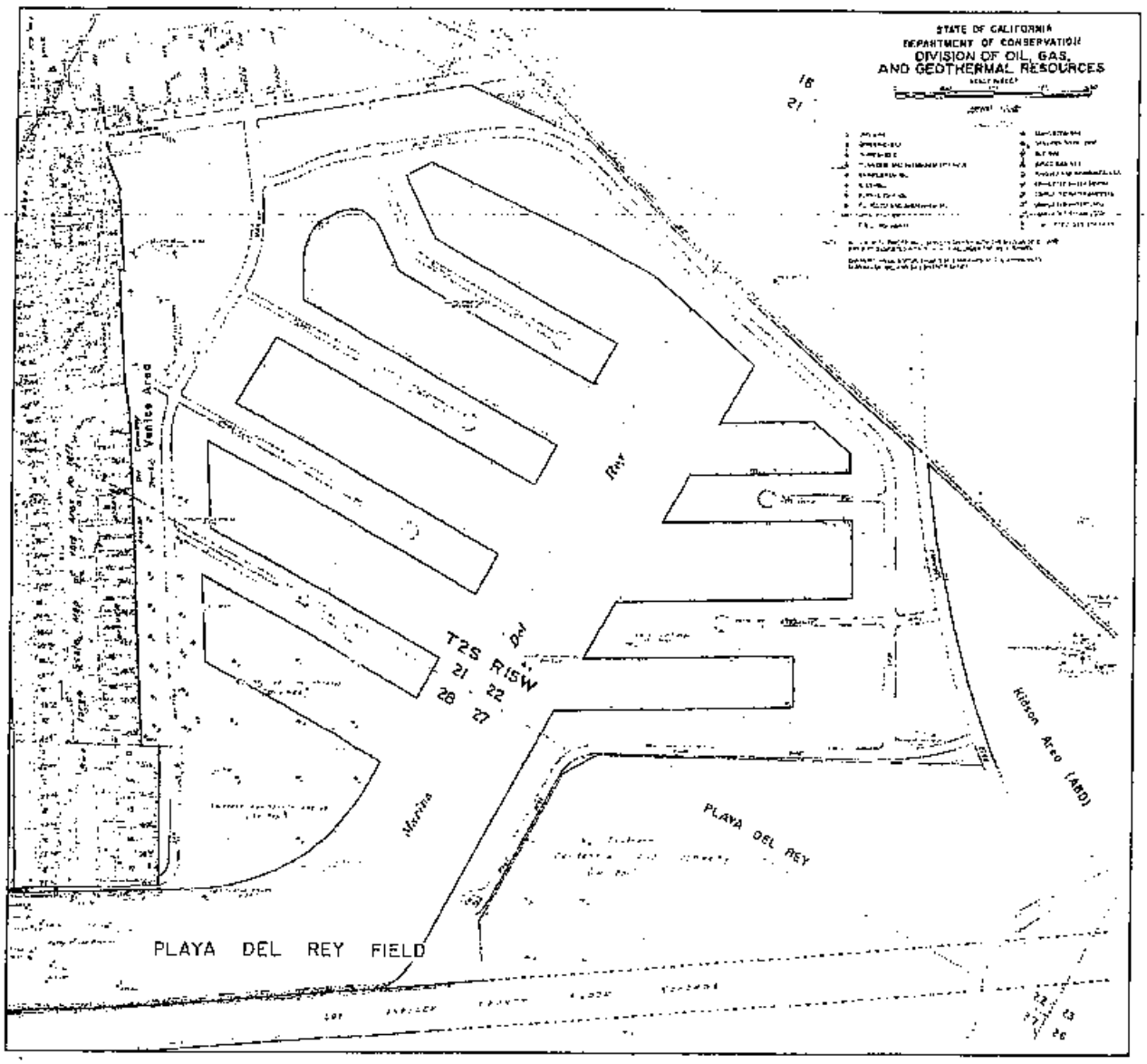

Figure 8. Division of Oil, Gas, and Geothermal Resources (2001).

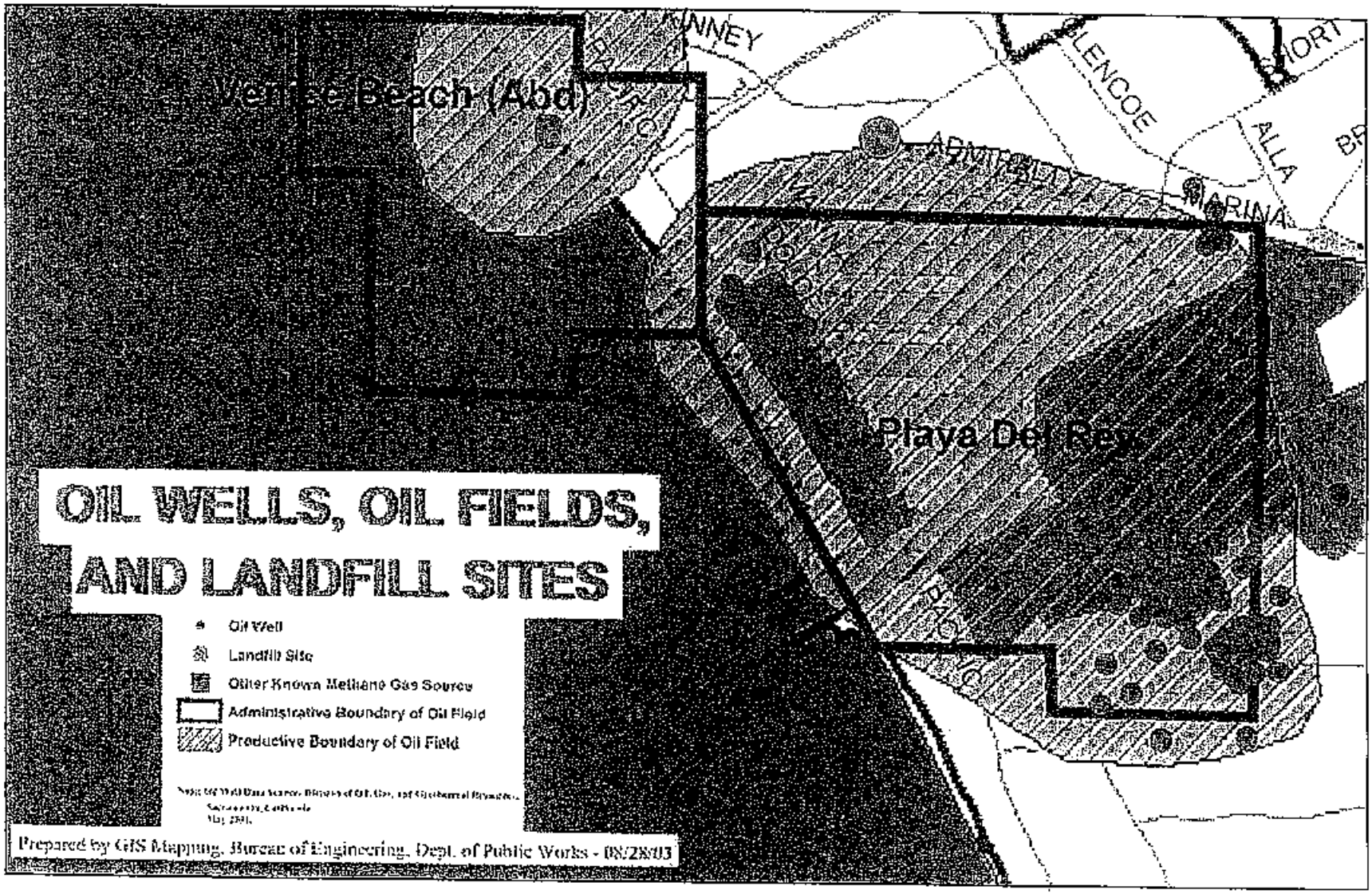

Figure 9. Bureau of Engineering Map of Oil Wells, Oil Fields, and Landfill Sites (2003).

resources, and historic maps for reference. Data obtained from this repository is used to place the project area in a context for preliminary evaluation.

2. **Historic Research**: Historic research was completed by reviewing files at the County Assessor's Office (Los Angeles County), the City of Los Angeles Public Library (downtown Los Angeles) and Archives (Norwalk), local libraries (Venice and Santa Monica) for address-specific data, historic directories and biographical information, and a search of internet data pertaining to the occupants of the residence. In addition, McKenna et al. researched historic maps and general histories for Venice/Marina Del Rey development history and obtained additional data from the L.A. Co. Department of Beaches & Harbors (Chesler 2006, personal communication). This information was compiled, ordered, and used in the interpretation and evaluation of the property.

3. **Native American Consultation**: McKenna et al. contacted Anthony Morales, Chair of the Gabrielino-Tonga of Los Angeles County, and inquired into the sensitivity for Native American resources in this area. Mr. Morales emphasized the relative sensitivity based on ethnographic data and recently compiled data in Playa Vista, where hundreds of Native American burials have been identified along Ballona Creek. He asked to be kept informed of any findings and, if resources are identified, involve Native Americans in the recovery process.

4. **Field Survey**: The field survey was completed on April 10, 2006, by Kristina Lindgren of the McKenna et al. staff. The field survey confirmed that the project area is currently developed with no evidence of the natural setting. Research on the property included a survey of the periphery of the property, compilation of a photographic record (Appendix C), and documentation of the surrounding areas. Field notes and the photographic record are on file at McKenna et al., Whittier, California.

5. **Analysis and Recordation**: McKenna et al. completed the required analysis of the property at a level conducive to compliance with the California Environmental Quality Act, as amended.

6. **Report Preparation**: This technical report has been prepared in a manner requested by the Office of Historic Preservation, Sacramento, and the South Central Coastal Information Center for properties located within Los Angeles County. It also conforms to the standard data requests of the City of Los Angeles Cultural Heritage Commission.

PREVIOUS RESEARCH

A standard archaeological records check was completed by McKenna et al. on April 17, 2006. This research resulted in the identification of fourteen cultural resources studies within a one-half mile radius of the current project area, including those of Adams (1974; LA-27, includes a letter report from Rozaire); UCLA (1979; LA-624); Singer (1979;LA-630); Greenwood and Foster (1980;LA-

682); Singer (1980;LA-846); Dillon (1982;LA-1157); Tartaglia (1979;LA-2669); Buckman (1974; LA-3583)King (1998;; LA-4052); Duke (1999;LA-4564); [Not in Files (LA-4865)]; National Park Service (1985;LA-5563); Duke (2001;LA-5761); and Foster (2004; LA-7185). Despite the extent of this coverage, none of the project specifically addressed the current project area.

The nearest project was completed to the southwest of the project area - within the City of Venice and just southwest of the Los Angeles Corporate Boundary (Adams 1974). Rozaire (1974), in summarizing his survey of this property, concluded that disturbances have destroyed the natural setting of the "Silver Strand and Del Rey Beach Tracts" and, therefore, no archaeological resources were identified. Likewise, despite this coverage, no prehistoric or historic archaeological resources have been recorded within one-half mile of the project area. Likewise, no historic resources (structures) have been recorded within one-half mile of the property. Based on these results, it would suggest that the current project area is not sensitive for cultural resources.

Contrary to the findings presented above, recent investigations along Ballona Creek (Statistical Research, Inc., in preparation) have resulted in the identification and removal of hundreds of Native American burials and numerous prehistoric features representing a significant occupation of the area by prehistoric populations. Therefore, there is still a relative level of sensitivity for prehistoric resources within the Ballona Lagoon. Similarly, research resulted in the identification of the project area as part of the landfill area for the City of Venice and the development of the Marina Del Rey facilities. As such, there is a strong potential for buried historic archaeological resources. McKenna et al. recommends that the area be considered sensitive for both prehistoric and historic archaeological resources.

EVALUATION CRITERIA

The previous development of the project area (as a parking lot between other modern developments) dates to the post-1964 era. The modern development is reported to have included areas impacted by the presence of the Venice Landfill and areas of potential prehistoric use. The State's criteria for rendering significance and eligibility for the California Register are detailed in the California Code of Regulations (CCR) Title 14, if:

1. Is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States;

2. Is associated with the lives of persons important to local, California or national history;

3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or

4. It has yielded, or has the potential to yield, information important to the prehistory of the local area, California, or the nation.

Further, the resource must maintain integrity as defined by the seven "qualities of integrity" listed as follows:

1. Location: The place the historic property was constructed or the historic event occurred;

2. Design: The combination of elements creating the property's form, plan, space, structure, and style;

3. Setting: The physical environment of the historic property;

4. Materials: The physical elements combined at a particular period of time and in a particular pattern or configuration to form a historic property;

5. Workmanship: The physical evidence of the craft of a particular culture or people during any given period;

6. Feeling: The property's expression of the aesthetic or historic sense of a particular period of time; and/or

7. Association: The direct link between an important historic event or person and the property.

If resources are present within the project area, evaluation of the find(s) would be completed through analysis and application of the criteria presented above. This level of analysis is generally referred to as a Phase II investigation.

RESULTS OF THE INVESTIGATIONS

As a result of the current investigation, McKenna et al. found no surficial evidence of prehistoric resources within the project area. Despite these negative findings, the proponent should be aware that significant prehistoric resources have been identified in the vicinity of the Ballona Lagoon and there is a potential for buried prehistoric archaeological resources in this particular area.

No historic archaeological resources were identified within the project area. However, the area is peripheral to the reported location of the historic Venice Landfill and there is a possibility that the landfill will extend into the project area. Therefore, the proponent should be aware of this potential and be prepared to deal with historic archaeological issues, should they arise.

The existing structure within the project area is modern and of no historical significance. The demolition of this structure will not result in an adverse environmental impact and, therefore, no mitigation measures are needed with respect to this structure. The project area and the nearby lagoon are not conducive to paleontological resources. Therefore, neither of these issues (paleontology or standing structures) need further attention. At this time, no significant resources have been identified within the project area and, therefore, there has been no evaluation of any resources. Nonetheless, the project area has a relative sensitivity for both prehistoric and historic archaeological resources.

CONCLUSIONS AND RECOMMENDATIONS

No cultural resources were identified within the current project area. The area is, however, considered sensitive for both prehistoric and historic archaeological resources. Therefore, McKenna et al. is recommending that the removal of the asphalt paving and existing structure be monitored during removal. The subsequent grading of this property should also be monitored by a qualified archaeological monitor to insure protection of any prehistoric or historic resources that may be uncovered. Should evidence of any prehistoric or historic resources be uncovered, A Phase II evaluation must be conducted in accordance with CEQA requirements.

If, at any time, evidence of human remains are uncovered, the County Coroner must be contacted and permitted access to the site for preliminary identification of the remains. If the remains are found to be of Native American origin, the Native American Heritage Commission must be notified and permitted to identify the Most Likely Descendant (MLD) and, in consultation with the proponent and archaeological monitor, determine the appropriate disposition of the remains.

The extent and duration of the archaeological monitoring program can be determined once the project is approved and the grading plan is defined.

****

CERTIFICATION

CERTIFICATION. I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this archaeological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

5-4-06
Date

Jeanette A. McKenna, Principal Investigator, McKenna et al.

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APPENDIX A:

Professional Qualifications

JEANETTE A. McKENNA

Owner and Principal Investigator
McKenna et al., Whittier CA

Ms. McKenna specializes in the field of Cultural Resource Management: prehistoric archaeology, historic archaeology, and history. She is a past member of the Board of Directors for the Society of Professional Archaeologists (SOPA 1993-97) and is certified by the Society to conduct both prehistoric and historic archaeological studies. With its inception, Ms. McKenna was registered with the Registry of Professional Archaeologists (RPA; 1998- Present). Ms. McKenna has 30 years of professional experience as an archaeologist and has participated on over 1200 projects. The majority of her work has been conducted as a Field Director, Project Manager, and/or Principal Investigator in California and the Greater Southwest.

TECHNICAL CAPABILITIES

- Vast experience in the greater Southwest, Great Basin, and Southern California regions. Familiar with the full range of cultural resource investigations and has completed projects within the public and private sectors, including environmental management firms, planning and engineering firms, and State and federal agencies.
- Active in the discipline of Cultural Resource Management since 1976; over 29 years of experience in Southern California, Arizona, and Nevada.
- Particular interest in the desert regions of California and Arizona, with specializations in the Proto-historic and Historic Contact Periods.
- Considerable experience in dealing with prehistoric cultural remains and working directly with Native American groups in archaeological training programs (through Arizona State University and the Southern California Indian Center, Garden Grove).

EDUCATION AND AFFILIATIONS

B.A., Anthropology, 1977, CSU Fullerton
M.A., Anthropology, 1982, CSU Fullerton
Lambda Alpha Lambda Honors Society
Post Graduate Studies, Arizona State University, 1982-85
Post Graduate Studies, History Department
University of California, Riverside, 1991-92

Certification Program: CEQA, Land Use and Environmental Planning, University of California, Riverside, 1997-98

Society of Professional Archaeologists (SOPA)/Registry of Professional Archaeologists (RPA) Certification: Field/ Prehistoric Archaeology and Historical Archaeology (1984 to Present)

Board of Directors, Society of Professional Archaeologists 1993-1997 (American Society of Conservation Archaeologists Representative)
BLM California Permit No. CA-02-30 (exp. 2005)
BLM Arizona State Permit No. AZ-000107 (renewable)
Arizona State Museum Antiquities Permit (renewal)
Curation Agreement, San Bernardino County Museum

SELECTED PROJECT EXPERIENCE

- Historic Architectural Studies for Renovation and Restoration of the Greek Theatre, Los Angeles CA
- Evaluation of Cultural Resources within the Burbank and West Hollywood Redevelopment Project Areas, Los Angeles County, CA
- Historic Property Survey for the City of Whittier, Los Angeles County, CA.
- Archaeological Investigations and Resource Evaluations for the Proposed Cajon Pipeline, San Bernardino and Los Angeles Counties, CA
- Archaeological Class I Investigations for the Proposed Mojave Pipeline, San Bernardino County, CA
- Cultural Resources Investigations (Phases I, II, III, and Mitigation Monitoring) for the RIX/SARI Projects, Santa Ana Watershed Project Authority (SAWPA), San Bernardino and Riverside Counties, CA
- Phase I, II, and III Archaeological Investigations for the County Sanitation Districts of Los Angeles County, Puente Hills Landfill Solid Waste Management Facility Expansion Project, Whittier, CA
- Archaeological Mitigation Program, The Phoenix Indian School Track Site Project. Arizona State University Office of Cultural Resource Management and the Bureau of Indian Affairs, Phoenix, AZ
- Archaeological and Testing Program for the Hidden Valley Golf Course and Van Buren Golf Course Properties, Riverside County, CA
- Cultural Resources Overview Studies for the Annexation of Unincorporated County Lands to the City of Ontario, CA
- Historic Property Survey Reports: Warner Bros. Main Lot Ranch Lot Properties, Burbank, CA
- Historic Archaeological Investigations for L.A. County Sheriff's Facility, Lancaster, CA.

APPENDIX B:

Archaeological Records Check

McKenna et al.

History/Archaeology/Architecture/Paleontology

Jeanette A. McKenna, M.A.
Owner and Principal Investigator
Reg. Professional Archaeologist

April 17, 2006

RE: Record Search for the Archaeological Survey of Parcel 21 on Panay Way, Marina del Rey, Los Angeles County, CA. on the Venice 7.5' USGS Quadrangle (McKenna et al. Job 06.1199)

A record search was conducted on April 12, 2006, at the South Central Coastal Information Center, for the above referenced project. This search includes a review of all recorded historic and prehistoric archaeological sites within a one-half mile radius of the project area as well as a review of all known cultural resource reports. In addition, the file of historic maps, the California Points of Historical Interest (PHI), the listing of California Historical Landmarks (CHL), the California Register of Historic Resources Inventory (HRI) have been checked for the referenced project. The following is a discussion of the findings for the project area.

Previous Cultural Resources Investigations:

Fourteen studies (LA27, LA624, LA630, LA682, LA846, LA1157, LA2669, LA3583, LA4052, LA4564, LA4865, LA5563, LA5761, and LA7185) have been conducted within a one-half mile radius of the project area. None are located within the project area.

Archaeological Resources:

No recorded prehistoric archaeological sites have been identified within a one-half mile radius of the project area. No prehistoric isolates have been identified within a one-half mile radius of the project area.

No historic archaeological sites have been identified within a one-half mile radius of the project area. No historic isolates have been identified within a one-half mile radius of the project area.

Historic Resources:

No recorded historic built environments have been identified within a one-half mile radius of the project area.

6008 Friends Avenue, Whittier, California 90601-3724 email = jmckena@earthlink.net
(562) 696-3852 Office – (562) 693-4059 FAX – (562) 754-7712 Mobile

Copies of the historic map - Redondo (1896 and 1940) Venice (1934) - have been copied for review.

The California Point of Historical Interest (1992) of the Office of Historic Preservation, Department of Parks and Recreation, lists no properties within a one-half mile radius of the project area.

The California Historical Landmarks (1990) of the Office of Historic Preservation, Department of Parks and Recreation, lists no properties within a one-half mile radius of the project area.

The California Register of Historic Places lists no properties within a one-half mile radius of the project area.

The National Register of Historic Places lists no properties within a one-half mile radius of the project area.

The California Historic Resources Inventory lists no properties that have been evaluated for historical significance within a one-half mile radius of the project area.

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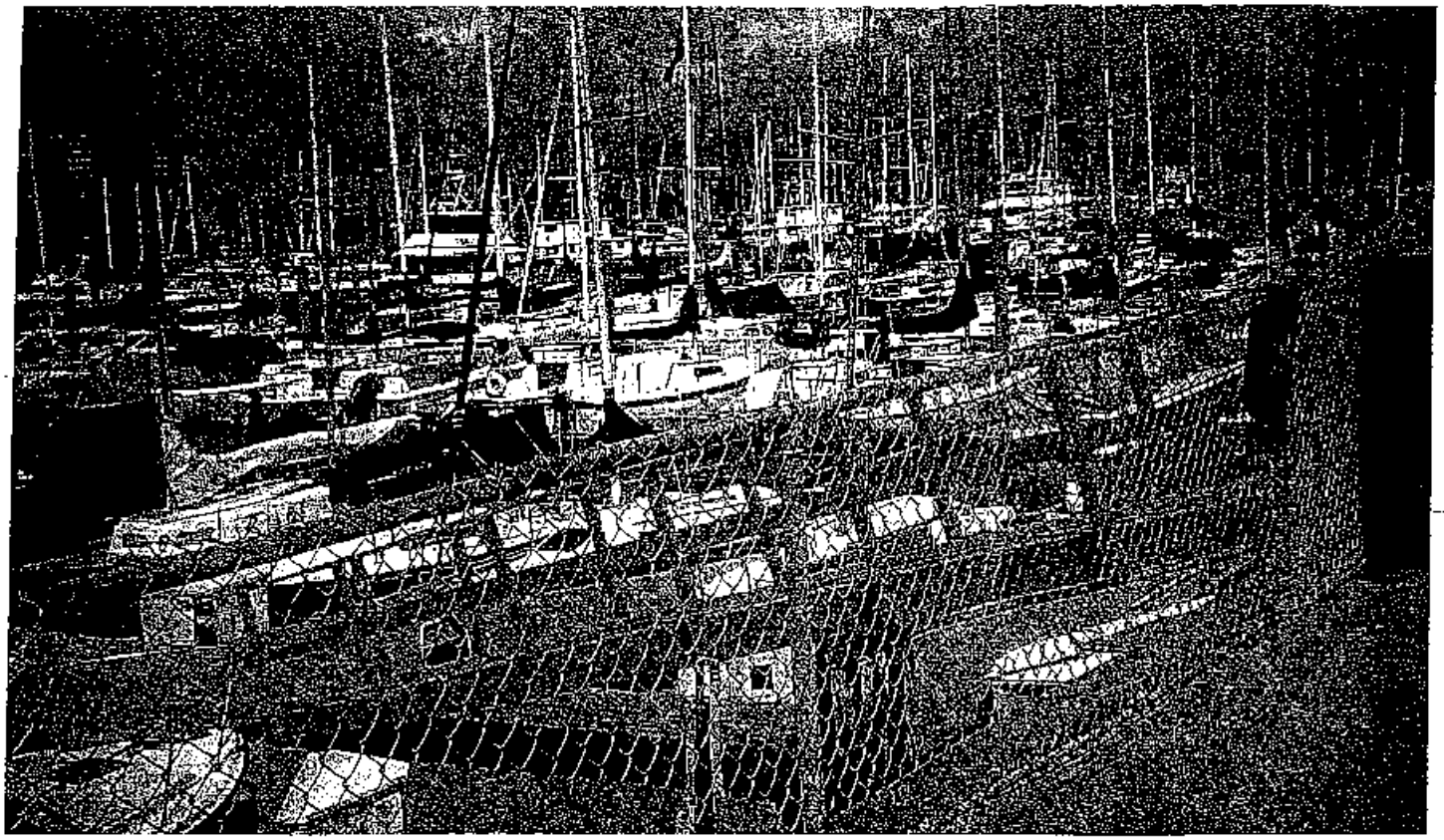
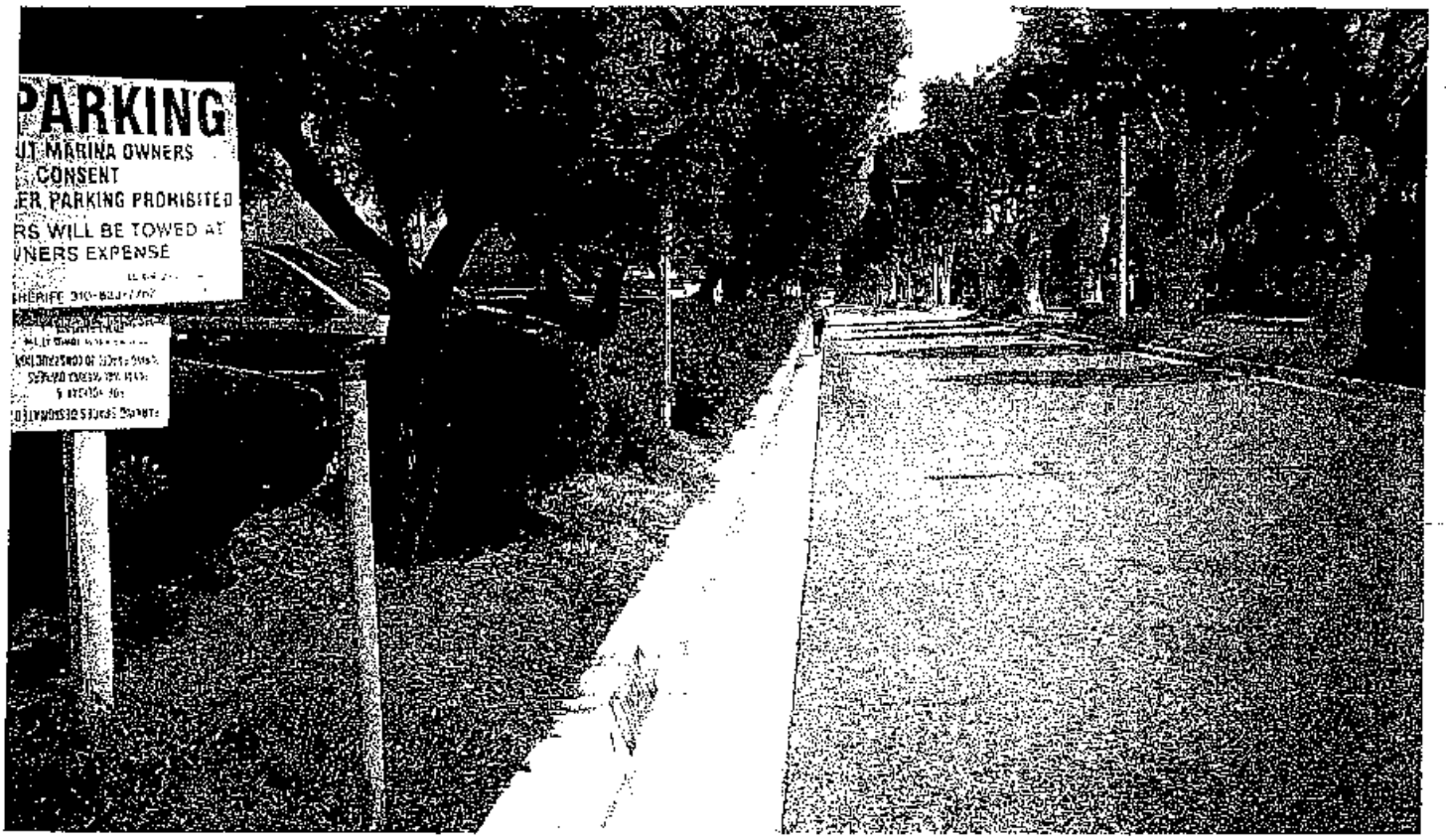
APPENDIX C:

Photographic Record



View of Marina at North End of Parcel 21 (Northeast).

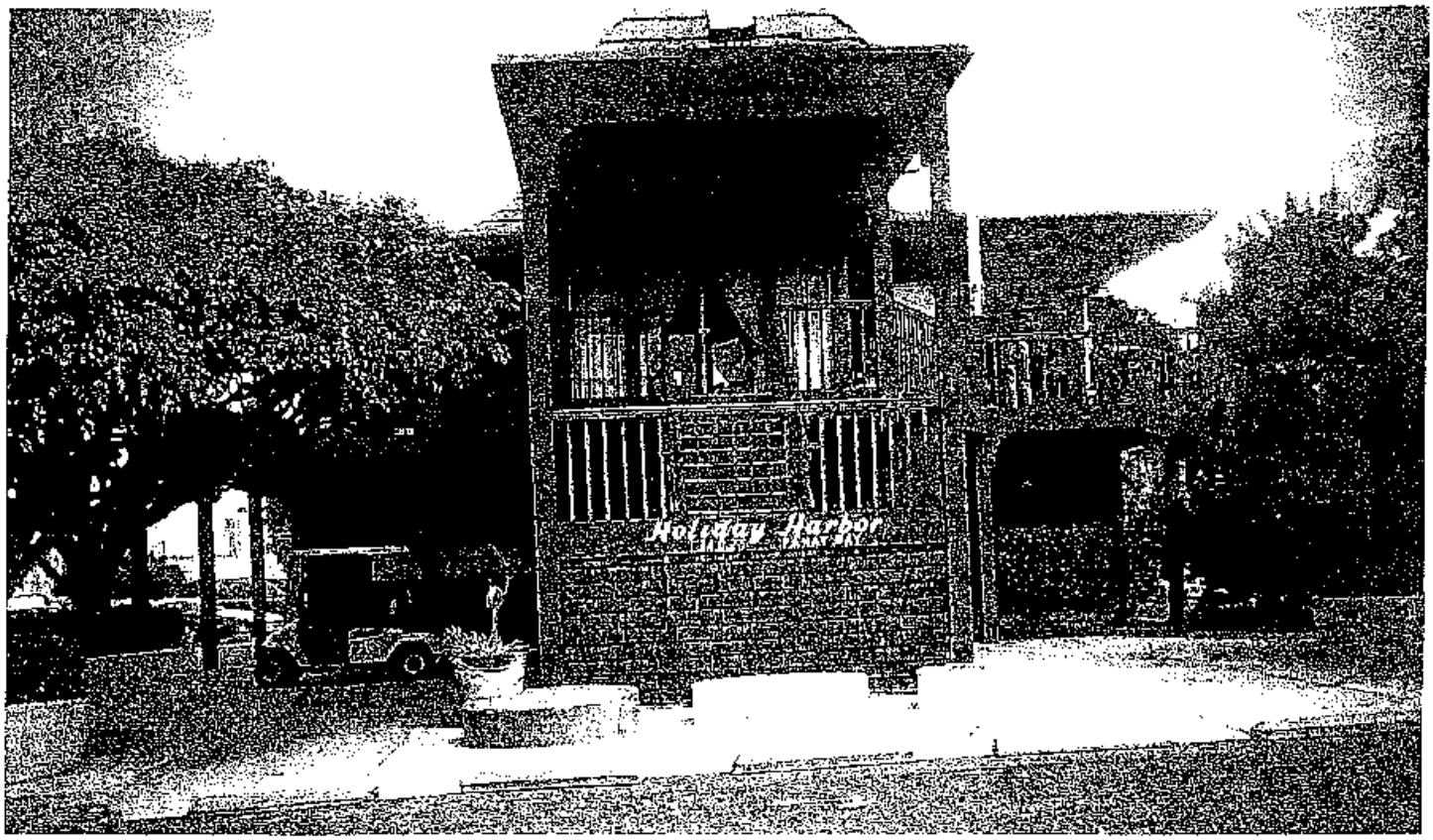
View of West End of Parcel 21, Towards Holiday Harbor Commercial Building (East).



View of Panay Way from Parking Lot for Holiday Harbor Commercial Site (East).

View of Panay Way Towards Via Marina, with Marina Fitness (West).

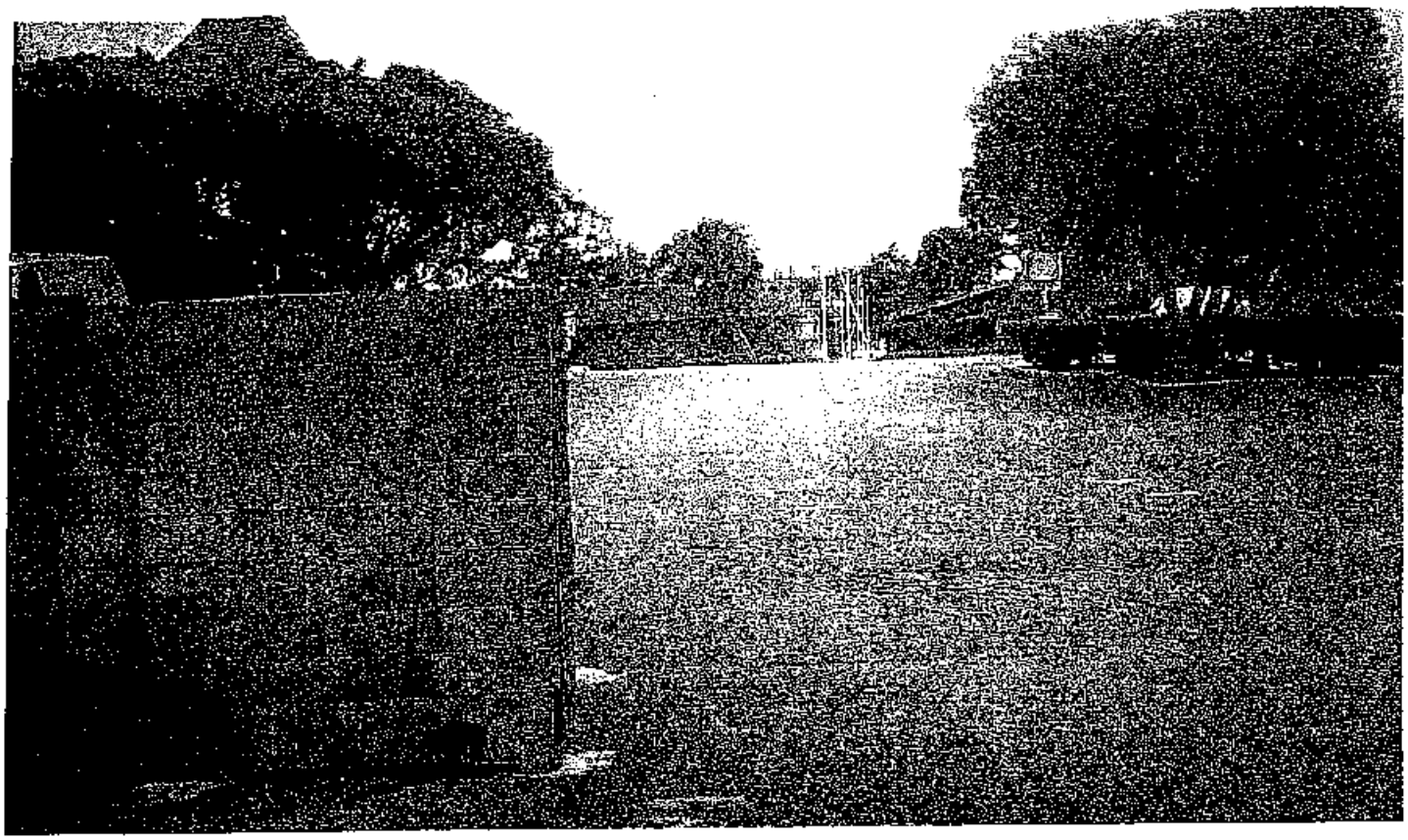
View from Southwest Corner of Parcel 21, from Panay Way (Northeast).



View of West End of Holiday Harbor Commercial Building, at 14025 Panay Way (East).

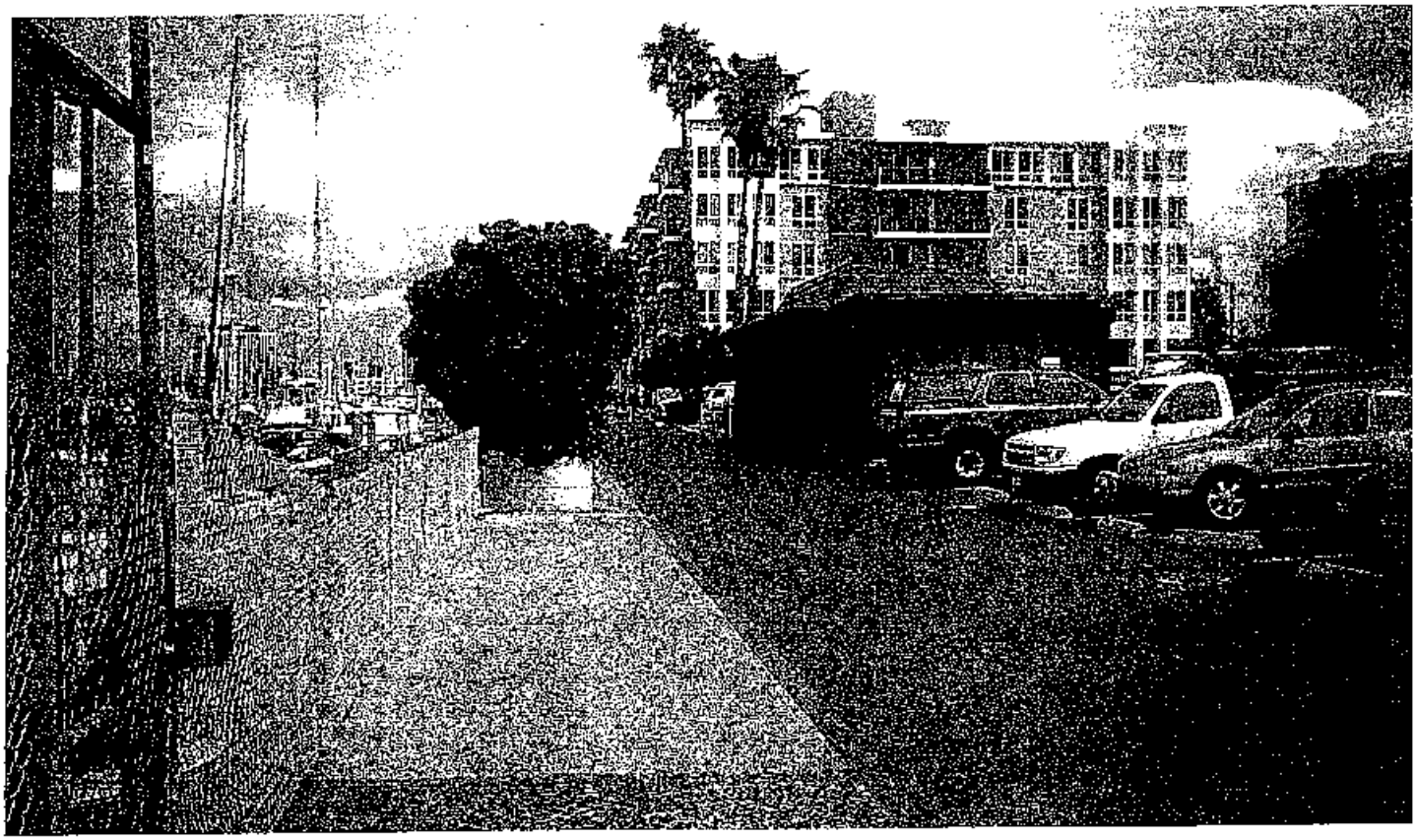
View from East End of Parking Lot in Parcel 21, Towards Marina Fitness (West).

View from East End of Parking Lot in Parcel 21, Towards Marina Fitness (West).



View of Entrance to Parking Lot from Panay Way, from North End of Parcel 21 (South).

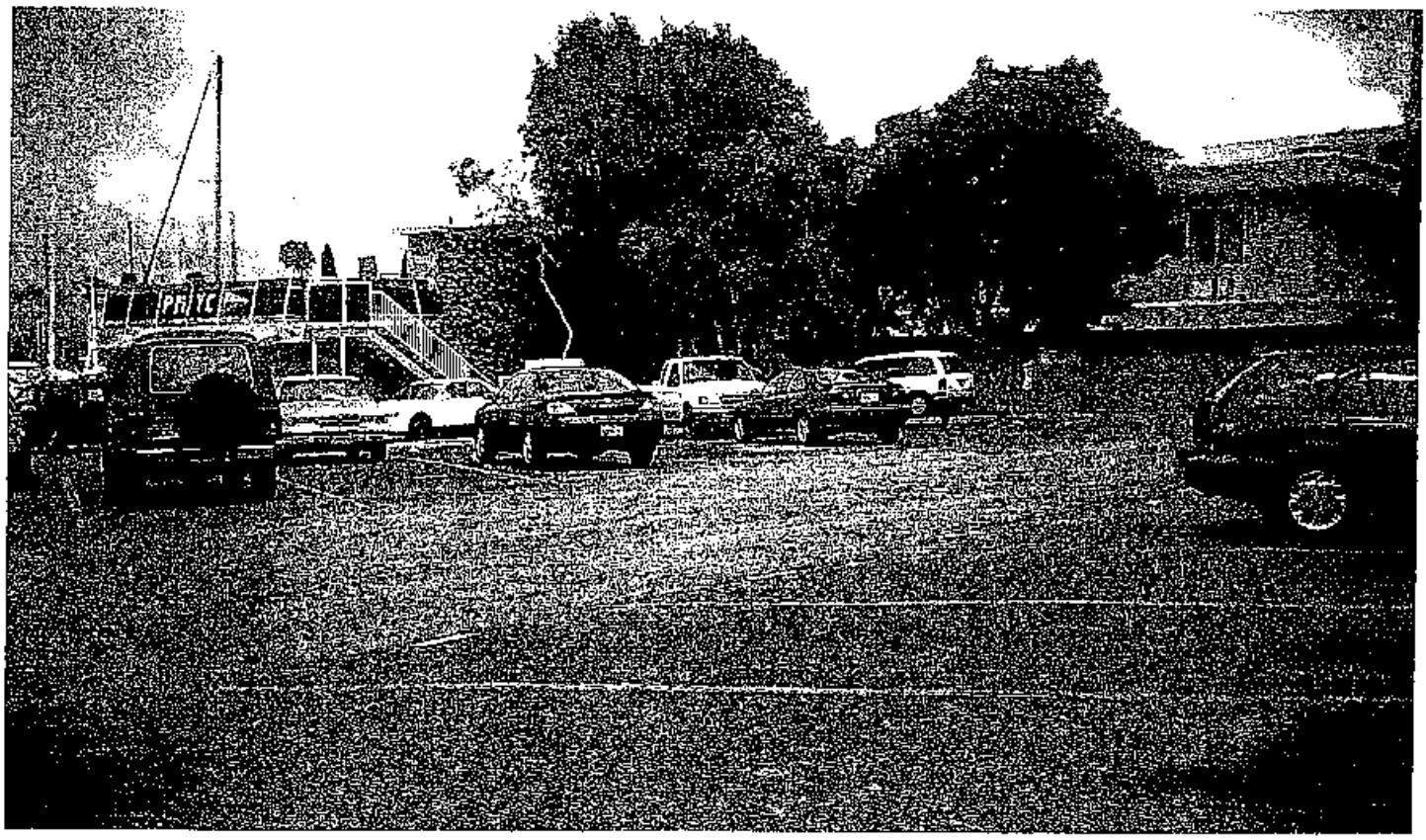
View of North End of Commercial Building at 14025 Panay Way (Southeast).



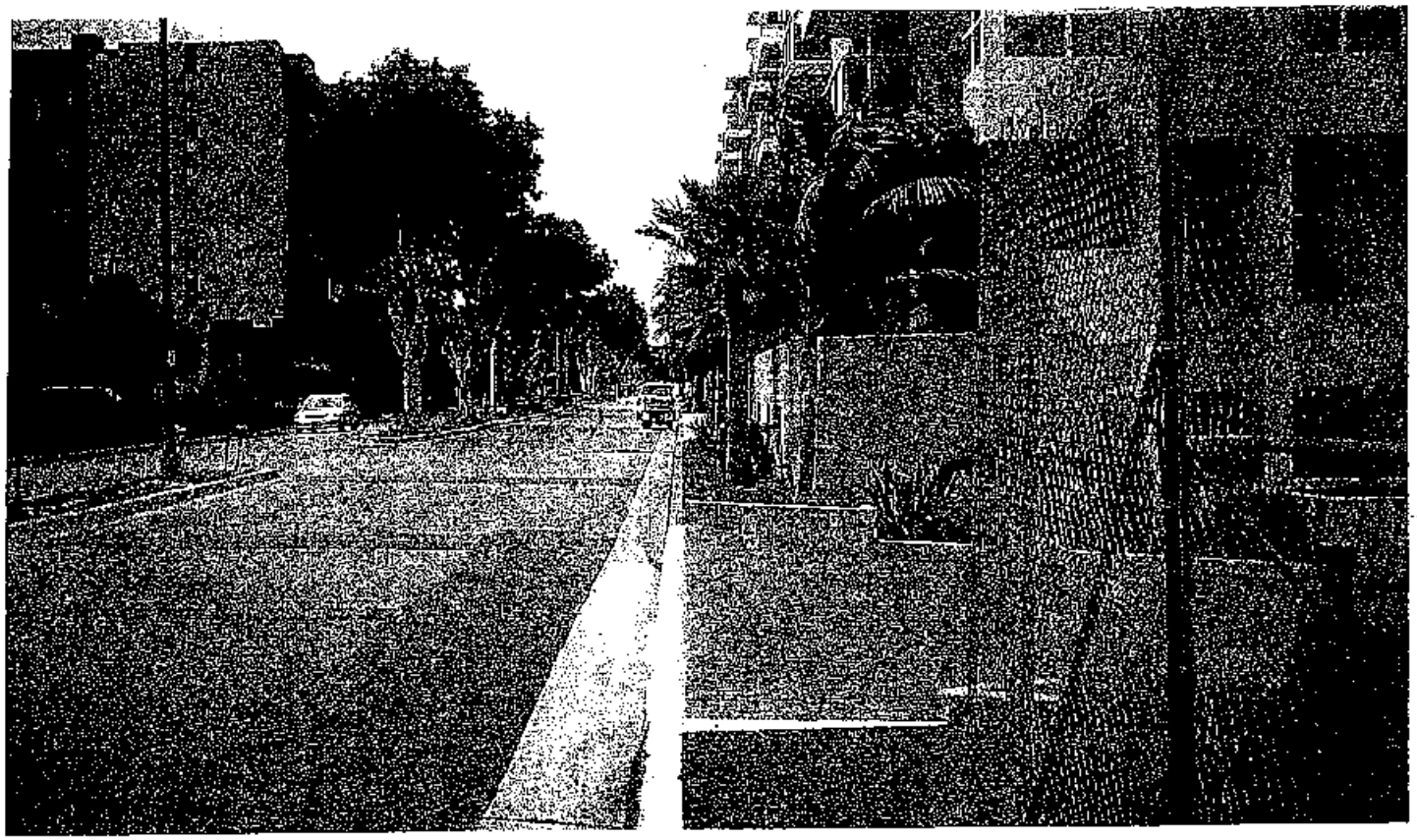
View of North End of Parcel 21, Adjacent to Marina (East).

View of Entrance to Recently Built Apartments at 13953 Panay Way (South).

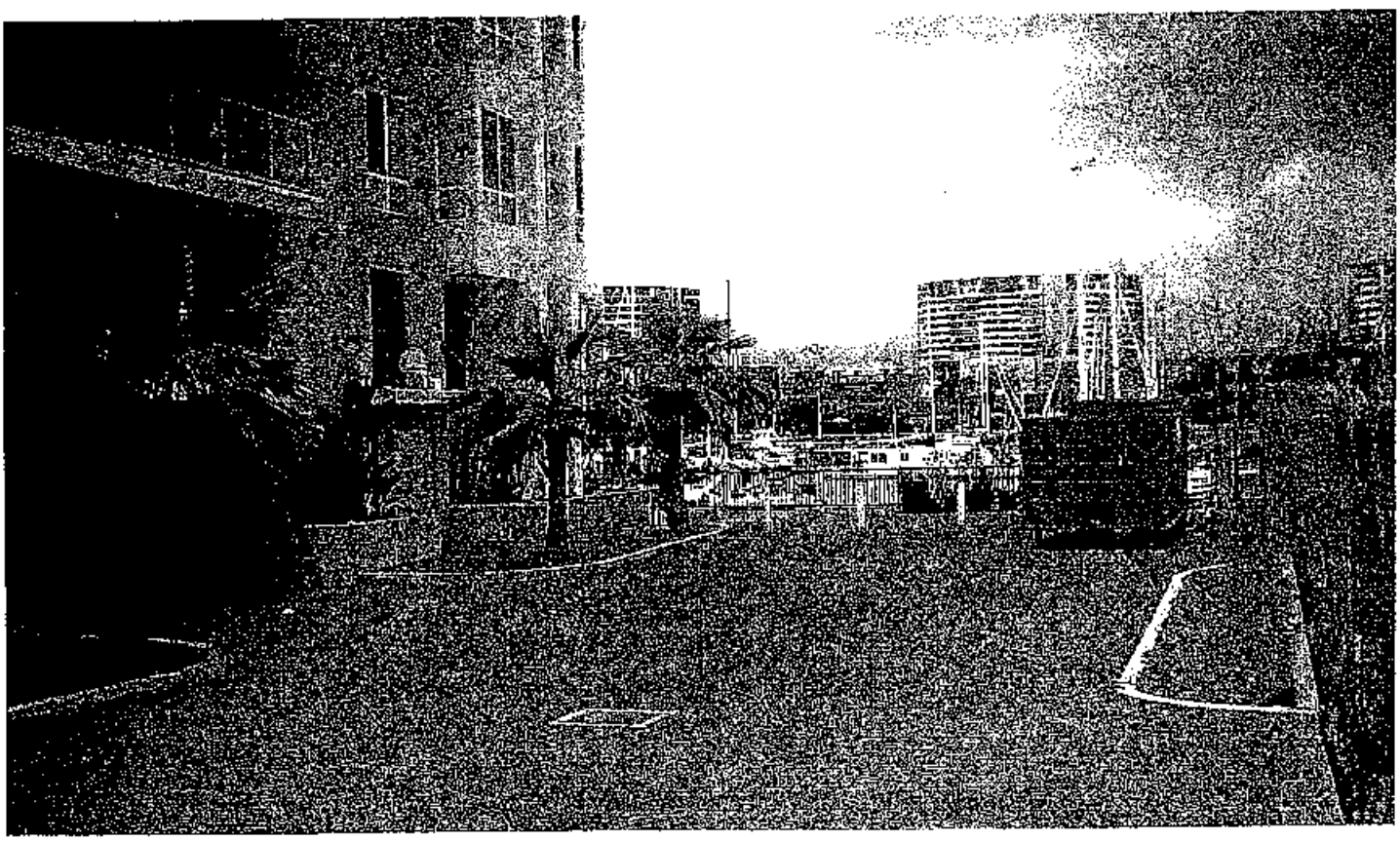
View of East End of Apartments at 13953 Panay Way, from Parcel 20 (West).



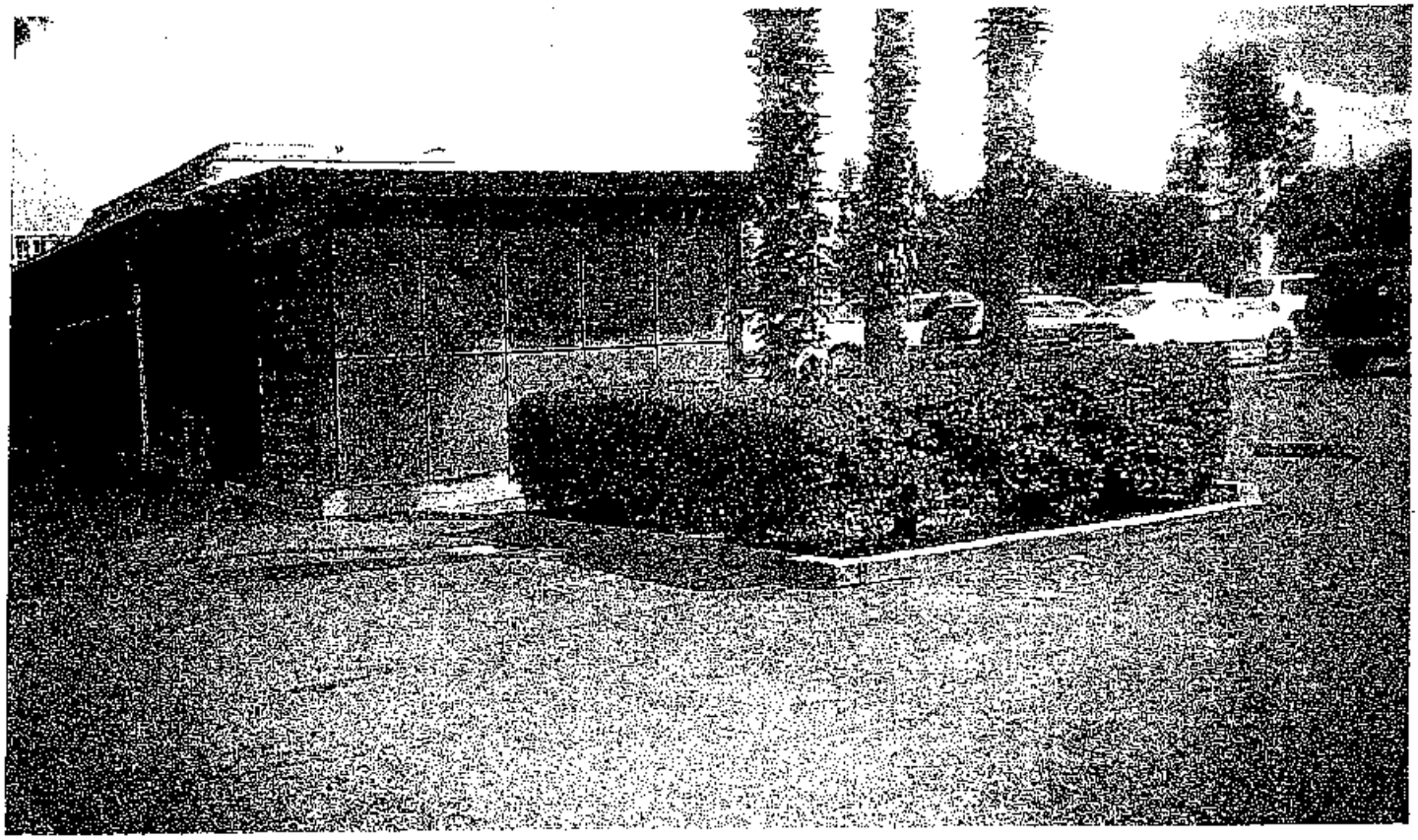
View of Parking Lot and Marina Yacht Club on Parcel 20 (Northeast).



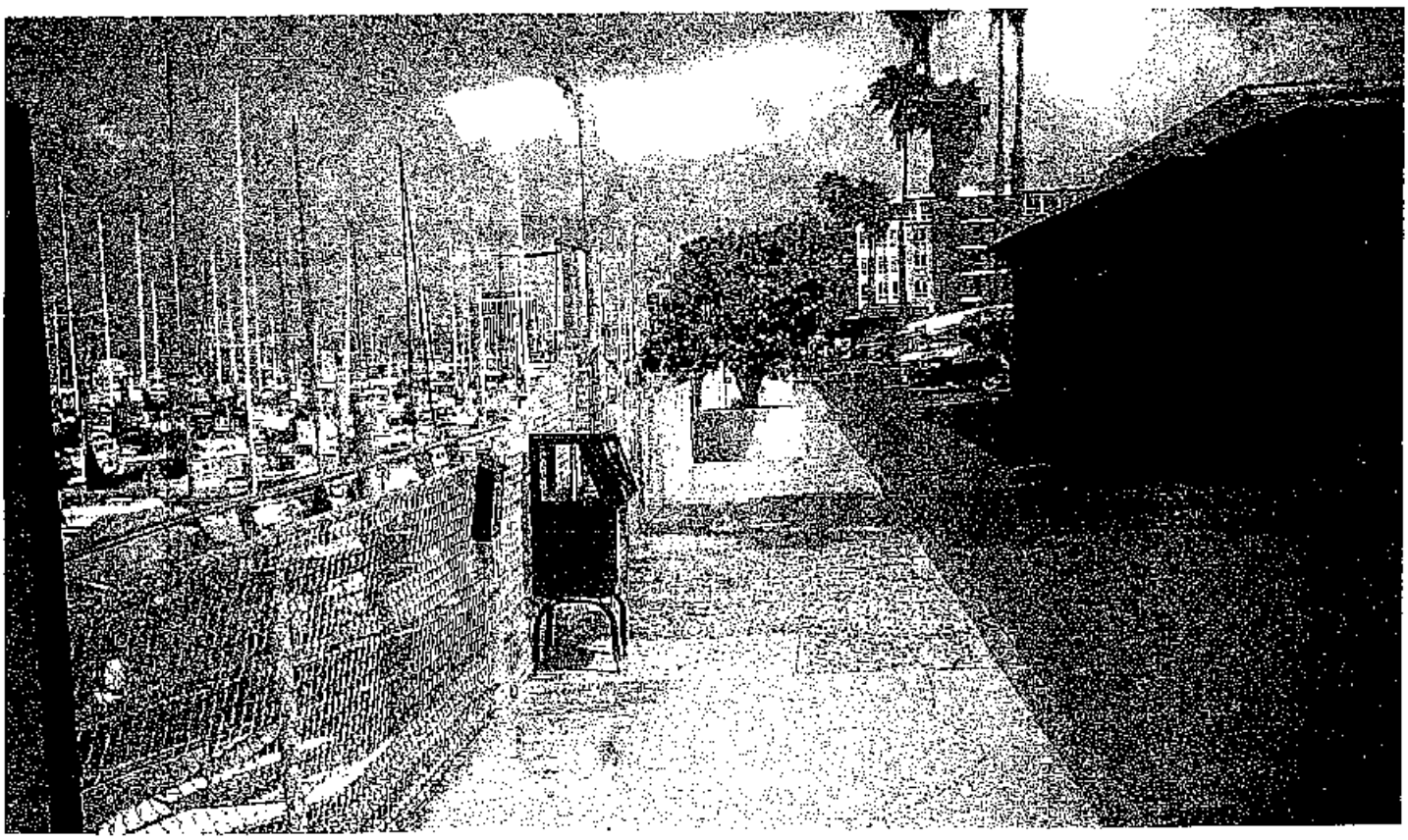
View of Panay Way from Parcel 20 (West).



View Towards Marina from East End of Apartments (South).



View from Northwest Corner of Parking Lot in Parcel 21 (Southeast).



Looking Along Northern Boundary of Parcel 21, Adjacent to Marina (East).

STATE OF CALIFORNIA — Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
916 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
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Web Site www.nahc.ca.gov
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March 30, 2007

Ms. Jeanette A. McKenna
McKenna et al.
6008 Friends Avenue
Whittier, CA 90601-3724

Sent by FAX to: 562-693-4059
Number of pages: 2

Re: Tribal Consultation Per SB 18/Sacred Lands File Search for Project- Pre-planning Outreach Activity; Marina Del Rey (Two Parcels); Los Angeles County, California

Dear Ms. McKenna:

Government Code §65352.3 requires local governments to consult with California Native American tribes identified by the Native American Heritage Commission (NAHC) for the purpose of protecting, and/or mitigating impacts to cultural places. Attached is a Native American Tribal Consultation list of tribes with traditional lands or cultural places located within the requested plans boundaries. Note the attached form for combining the Sacred Lands file search with SB 18 Tribal Consultation Lists.

As a part of consultation, the NAHC recommends that local governments conduct record searches through the NAHC and California Historic Resources Information System (CHRIS) to determine if any cultural places are located within the area(s) affected by the proposed action. You should know that the general sub-region that includes Marina Del Rey is culturally sensitive; you are probably aware of the large excavation of Native American human remains and artifacts at the nearby site of the Playa Vista development.

A NAHC Sacred Lands File search was conducted based on the township, range, and section information included in your request and no sites were found within the areas of potential effect you identified. However, local governments should be aware that records maintained by the NAHC and CHRIS are not exhaustive, and a negative response to these searches does not preclude the existence of a cultural place. A tribe may be the only source of information regarding the existence of a cultural place. I suggest you consult with all of those on the accompanying Native American Contacts list, which has been included seperately. If they cannot supply information, they might recommend others with specific knowledge about cultural resources in your plan area. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from Tribes, please notify me. With your assistance we are able to assure that our consultation list contains current information.

If you have any questions please contact me at (916) 653-6251.

Sincerely,

David Singleton, Program Analyst
Attachment: Native American Contacts

Los Angeles County
March 30, 2007

Gabrieleno/Tongva Tribal Council
Anthonty Morales, Chairperson
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Gabrielino Tongva

Gabrielino/Tongva Council / Gabrielino Tongva Nation
Sam Dunlap, Tribal Secretary
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Los Angeles, CA 90021
office @tongvatribe.net
(213) 489-5001 - Officer
(909) 262-9351 - cell
Gabrielino Tongva

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable only for consultation with Native American tribes under Government Code Section 65352.3.

APPENDIX G

Traffic Analysis

DRAFT

TRAFFIC ANALYSIS FOR THE PROPOSED 114-UNIT CONGREGATE-CARE RETIREMENT FACILITY AND 5,000 SQUARE FEET RETAIL ON PARCEL OT AND THE HOLIDAY HARBOR COURTS PROJECT ON PARCEL 21 IN MARINA DEL REY

Prepared for:

MDR OCEANA L.P. AND
HOLIDAY-PANAY WAY MARINA, L.P.

Prepared by:

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Revised June 2008

EXECUTIVE SUMMARY

The project under consideration is the development of Parcels OT and 21, located in the unincorporated Los Angeles County community of Marina del Rey. Parcel OT is located to the east of Palawan Way between Washington Boulevard and Admiralty Way, and is an approximately 2.12-acre site with dimensions of approximately 260 feet fronting Admiralty Way and 355 feet traversing from Washington Boulevard to Admiralty Way. Parcel 21 is located on the north side of Panay Way and east of Via Marina. The development on Parcel 21, known as Holiday Harbor Courts, would be on an approximately 2.55-acre site that measures approximately 741 feet in width along the frontage of Panay Way and approximately 150 feet in depth from Panay Way to the water.

On Parcel OT, the project proposes to construct a 114-unit congregate-care retirement facility and 5,000 square feet of ground floor retail use, as shown in Table ES-1. Parcel OT is currently occupied by a public parking lot containing 186 spaces. The project proposes to replace 92 of the 186 parking spaces on the Parcel OT site. In addition, Parcel OT will provide approximately 43 parking spaces for the congregate-care retirement facility and 22 parking spaces for the retail use, for a total of 157 on-site parking spaces. The remaining 94 public parking spaces are proposed to be relocated to Parcel 21. It should be noted that while all of the existing 186 public parking spaces are occasionally used for special events, Mothers Beach represents the only regular use for these spaces. The relocation of 94 spaces to Parcel 21 is expected to provide safer and more convenient public parking for Mothers Beach as visitors will no longer have to cross two public streets, as is currently the case with the public parking on Parcel OT.

Table ES-1
Proposed Development on Parcel OT

Land Use	Proposed Development
Congregate-Care Retirement Facility	114 Units
Retail	5,000 Sq. Ft.

Vehicular access to the parking facilities on Parcel OT will be provided from an existing driveway that extends between Washington Boulevard and Admiralty Way and located on the west side of this parcel, and from a new driveway off of Washington Boulevard. In addition, the Parcel OT site will also have one ingress-only driveway and one egress-only driveway on Admiralty Way. The two driveways on Admiralty Way will have access to the porte cochere area that is located in front of the proposed congregate-care retirement facility.

The Parcel 21 site is currently occupied by two structures and paved parking areas. The two existing structures contain a total of 22,048 square feet of commercial uses including a 16,000 square foot health club, 2,916 square feet of retail and 3,132 square feet of marine commercial offices. The paved parking areas serve the commercial structures and also provide parking for boaters using the adjacent docks. In anticipation of the proposed project, all existing development on Parcel 21 is proposed to be demolished. The project will consists of the replacement of existing on-site uses, the removal and transfer of uses from Parcel 20 (marine commercial office space and yacht club), and the development of additional uses (marine commercial offices). Development on Parcel 21 would result in a net reduction of 6,000 square feet of health club uses and a net increase of 6,000 square feet of marine commercial office space. Table ES-2 summarizes the proposed development on Parcel 21.

Table ES-2
Net New Proposed Development on Parcel 21

Land Use	Existing Development		Proposed Development	Net Area Increase/ (Decrease)
	LUP Parcel 20 (sq. ft.)	LUP Parcel 21 (sq. ft.)	LUP Parcel 21 (sq. ft.)	(sq. ft.)
Health Club	0	16,000	10,000	(6,000)
Retail (1)	0	2,916	2,916	0
Marine Commercial Offices	0	0	6,000	6,000
Marine Commercial Offices (2)	0	3,132	3,132	0
Marine Commercial Offices (3)	2,300	0	2,300	0
Yacht Club (3)	5,000	0	5,000	0

(1) Ship Store.

(2) Existing tenants: California Sailing Academy, Golden West Yachts, Club Natique and South Sea Publishing.

(3) Existing development from Parcel 20 will be removed and transferred to Parcel 21. Requires Land Use Plan (LUP) amendment to transfer land use between adjacent parcels.

Parking on Parcel 21 will be provided in an attached multi-level parking structure. The parking structure will have approximately 447 spaces, including 94 replacement parking spaces for Parcel OT. The parking facility will also have direct access to the commercial structure, and will have close access to the marina slips as well as Mother's Beach. Vehicular access to the parking facility will be available on Panay Way via two driveways. Full left- and right-turn access will be allowed at the two driveways.

Following completion and occupancy, the proposed development on Parcel OT would generate a total of approximately 387 net daily trips, including 10 net trips during the AM peak hour and 41 net trips during the PM peak hour. The proposed Parcel 21 development would result in a trip generation reduction of approximately 109 net daily trips, including an increase of 2 net trips during the AM peak hour and a decrease of 11 net trips during the PM peak hour. The combined project development on both sites would generate a total of approximately 496 net daily trips, including 12 net trips during

the AM peak hour and 30 net trips during the PM peak hour. This traffic study shows that project traffic will not produce significant impacts at any study intersections.

In addition, the project does not significantly affect the overall Marina del Rey Phase II trip cap limits allowed by the Land Use Plan (LUP), and will not trigger the need for any system-wide Category 1 (local Marina del Rey) roadway improvements prior to its construction. However, the Marina del Rey Local Coastal Program is proposed by the applicant to be amended. The amendment would relocate, but not add, trips between Marina del Rey Parcels. Specifically, the proposed project is requesting to transfer the development potential of 114 hotel rooms and 5,000 square feet of office space from the Admiralty DZ 7 to the Oxford DZ 6, where Parcel OT is located. Also, the MUZ would allow for these uses to be utilized as a retirement facility and retail use, with parking. This minor amendment is required so that the project will be consistent with the Phase II Marina del Rey Land Use Plan (LUP) development allowances for Development Zone 6, which Parcel OT occupies.

The specific transportation and circulation improvements identified in the Marina del Rey Specific Plan Transportation Improvement Program (TIP) are designed to fully mitigate the traffic generation of the Phase II development in Marina del Rey. In order to fund the recommended TIP roadway improvements, all projects within the Marina, including the proposed development, are required to pay a traffic mitigation fee imposed by the County of Los Angeles pursuant to the TIP. This fee is intended to fund the Category 1 (local Marina) and Category 3 (regional) roadway improvements described in the TIP, by providing "fair share" contributions toward the improvements, based on the amount of project PM peak hour trips.[*] These improvements address local traffic generated in and confined to the Marina, as well as trips that leave or pass through the

[*] Category 2 roadway improvements are reserved for Area A, which is DZ 15 and is the part of the Playa Vista Development within the Marina.

Marina (regional trips). The County's traffic mitigation fee structure is currently $5,690 per PM peak hour trip. Based on the expected project trip generation of 30 net new PM peak hour trips, the project would be required to pay $170,700 in trip mitigation fees.

Although the project itself would not significantly impact traffic conditions at any of the area intersections, an analysis of cumulative traffic impacts at the study intersections indicates that traffic resulting from total development throughout the project vicinity, including the proposed project, could produce significant impacts at 11 of the 14 locations analyzed. The TIP improvements are designed to address traffic growth due to cumulative development within and surrounding the Marina. However, the County acknowledges that traffic growth within the project vicinity has outpaced the projections upon which the TIP trip fees were based, and therefore, an analysis of cumulative impacts with respect to the effectiveness of the proposed TIP improvements was requested.

The intersection improvement measures recommended in the TIP to address cumulative traffic impacts in the project vicinity are shown in Appendix B and described below.

- Washington Boulevard and Via Marina/Ocean Avenue – No feasible physical improvements are identified in the TIP that remain available to mitigate this potential cumulative impact. However, the County of Los Angeles Department of Public Works has identified an improvement at the nearby intersection of Washington Boulevard and Palawan Way that would provide additional egress from the Marina, reducing traffic volumes on the northbound approach of Via Marina at this intersection, and providing mitigation for the cumulative impacts. The proposed improvement would reconstruct the intersection of Washington Boulevard and Palawan Way to allow for dual northbound left-turns onto westbound Washington Boulevard, and install a new traffic signal at that

intersection. The improvement will provide an additional means of accessing westbound Washington Boulevard from westbound Admiralty Way, reducing the existing high northbound volumes at Washington Boulevard and Via Marina/Ocean Avenue. (See "Washington Boulevard and Palawan Way" below for additional details.)

In addition, the Marina del Rey TIP also identified an improvement at the intersection of Via Marina and Admiralty Way that will enhance traffic flow between Admiralty Way and Via Marina south of Admiralty Way within the Marina, reducing the northbound right-turn traffic volumes on Via Marina at Washington Boulevard. This improvement would reconstruct the Admiralty Way/Via Marina intersection to realign Admiralty Way as a "through roadway" with the southern leg of Via Marina. The northern leg of Via Marina, south of Washington Boulevard, will intersect into Admiralty Way in a "T" configuration. The striping for turning movements at the reconfigured intersection will be constructed as dual left-turn and dual/triple right-turn movements. As a result, northbound traffic volumes on Via Marina would need to turn left (instead of making a through movement) at Admiralty Way to access eastbound Washington Boulevard. Due to the high left-turn volume on northbound Via Marina at Admiralty Way, some of these traffic volumes would reroute along eastbound Admiralty Way and turn left at Palawan Way.

- Washington Boulevard and Palawan Way – Install a new traffic signal at this intersection (as described above as "in lieu" mitigation for the cumulative impact at Washington Boulevard and Via Marina/Ocean Avenue). The south leg of the intersection should be realigned to reduce the angle of the northbound right-turn only lane, and provide a more perpendicular approach, plus provide northbound dual left-turn lanes.

While this improvement is currently being investigated by the County for implementation as a new TIP- type measure, funded by fair share contributions by projects within Marina del Rey, it is not currently included in the TIP improvement program. As such, the proposed project would be conditioned to contribute "fair share" funding to this improvement above and beyond the previously identified traffic mitigation fees. As indicated in Table 12, the project will contribute 3.8 percent of the impact at this location. Cost estimates for this improvement are currently being finalized, but are expected to be approximately $332,500, with a project responsibility of $12,635.

- Lincoln Boulevard and Washington Boulevard – No feasible physical improvements are currently available to mitigate this potential cumulative impact. However, regional transportation improvements being considered include the future extension of the Marina Freeway (SR 90) westward to connect with Admiralty Way. The extension, slated for the year 2011, will help alleviate traffic congestion in the area, including at the key intersection of Lincoln Boulevard and Washington Boulevard. This measure is identified in Appendix G of the Marina del Rey Local Implementation Program and must receive approval from the Board of Supervisors, the City of Los Angeles and Caltrans.

  However, it should be noted that a short-term cumulative traffic impact could remain at this location if the extension of the SR-90 or another measure of equal effectiveness is not implemented by the time the anticipated cumulative traffic growth occurs. Furthermore, if the extension of the SR-90 is not constructed at all (due to not having concurrent approval by the Board of Supervisors, the City of Los Angeles and Caltrans, or for other reasons) or

another measure of equal effectiveness is not identified, a significant cumulative traffic impact would remain at this location.

- Admiralty Way and Via Marina – Reconstruct the intersection to provide for a realignment of Admiralty Way as a "through roadway" with the southern leg of Via Marina. As described above, the northern leg of Via Marina, south of Washington Boulevard, will intersect into Admiralty Way in a "T" configuration. The striping for turning movements at the reconfigured intersection will be constructed as dual left-turn and dual/triple right-turn movements. This improvement is identified in the Marina del Rey TIP, and will enhance traffic flow within the Marina.

- Admiralty Way and Palawan Way – Restripe the southbound approach to convert the through lane into a left/through shared lane. Restripe the northbound approach to provide an exclusive left-turn only lane, in addition to a shared right-turn/through lane. In addition, add a third westbound through lane to Admiralty Way within the existing right-of-way by moving the median and restriping Admiralty Way. These measures are identical to or consistent with the improvements in the Marina del Rey TIP.

- Admiralty Way and Bali Way – Add a third westbound through lane to Admiralty Way within the existing right-of-way by moving the median and restriping Admiralty Way, as identified in the Marina del Rey TIP.

- Admiralty Way and Mindanao Way – Widen northbound Admiralty Way to provide a right-turn lane at Mindanao Way. Install dual left-turn lanes on Admiralty Way for southbound travel at the approach to Mindanao Way. The dual left-turn lanes on Admiralty Way will enhance egress from the Marina at Mindanao Way, and has already been approved as part of a previous project

(Marina Two). On Mindanao Way, convert the left-turn/through shared lane to a left/through/right shared lane in the westbound direction. In addition, modify the traffic signal at this intersection to accommodate the dual left-turn movement on Admiralty Way and optimize the signal operation at this location and at adjacent intersections.

- Lincoln Boulevard and Marina Expressway (SR 90) – Extend Route 90 to connect to Admiralty Way across Lincoln Boulevard. The extension would reconstruct and expand the at-grade intersection, providing additional capacity for all approaches. This improvement is currently included in the TIP roadway improvements funded by the trip fee.

  However, it should be noted that a short-term cumulative traffic impact could remain at this location if the extension of the SR-90 or another measure of equal effectiveness is not implemented by the time the anticipated cumulative traffic growth occurs. Furthermore, if the extension of the SR-90 is not constructed at all (due to not having concurrent approval by the Board of Supervisors, the City of Los Angeles and Caltrans, or for other reasons) or another measure of equal effectiveness is not identified, a significant cumulative traffic impact could remain at this location.

- Lincoln Boulevard and Bali Way – No feasible physical improvements are currently available to mitigate this potential cumulative impact. However, regional transportation improvements being considered include the future extension of the Marina Freeway (SR 90) westward to connect with Admiralty Way. The extension, slated for the year 2011, will help alleviate traffic congestion in the area, including at the intersection of Lincoln Boulevard and Bali Way. The SR-90 extension is identified in Appendix G of the Marina del

Rey Local Implementation Program and must receive approval from the Board of Supervisors, the City of Los Angeles and Caltrans.

However, it should be noted that a short-term cumulative traffic impact could remain at this location if the extension of the SR-90 or another measure of equal effectiveness is not implemented by the time the anticipated cumulative traffic growth occurs. Furthermore, if the extension of the SR-90 is not constructed at all (due to not having concurrent approval by the Board of Supervisors, the City of Los Angeles and Caltrans, or for other reasons) or another measure of equal effectiveness is not identified, a significant cumulative traffic impact could remain at this location.

- Lincoln Boulevard and Mindanao Way – No feasible physical improvements are currently available to mitigate this potential cumulative impact. However, regional transportation improvements being considered include the future extension of the Marina Freeway (SR 90) westward to connect with Admiralty Way. The extension, slated for the year 2011, will help alleviate traffic congestion in the area, including at the intersection of Lincoln Boulevard and Mindanao Way, which currently provides direct access from the SR-90 to Admiralty Way in the Marina. The SR-90 extension is identified in Appendix G of the Marina del Rey Local Implementation Program and must receive approval from the Board of Supervisors, the City of Los Angeles and Caltrans.

  However, it should be noted that a short-term cumulative traffic impact could remain at this location if the extension of the SR-90 or another measure of equal effectiveness is not implemented by the time the anticipated cumulative traffic growth occurs. Furthermore, if the extension of the SR-90 is not constructed at all (due to not having concurrent approval by the Board of Supervisors, the City of Los Angeles and Caltrans, or for other reasons) or

another measure of equal effectiveness is not identified, a significant cumulative traffic impact could remain at this location.

- Lincoln Boulevard and Fiji Way – No feasible physical improvements are currently available to mitigate this potential cumulative impact. However, regional transportation improvements being considered include the future extension of the Marina Freeway (SR 90) westward to connect with Admiralty Way. The extension, slated for the year 2011, will help alleviate traffic congestion in the area, including at the intersection of Lincoln Boulevard and Fiji Way. The SR-90 extension is identified in Appendix G of the Marina del Rey Local Implementation Program and must receive approval from the Board of Supervisors, the City of Los Angeles and Caltrans.

  However, it should be noted that a short-term cumulative traffic impact could remain at this location if the extension of the SR-90 or another measure of equal effectiveness is not implemented by the time the anticipated cumulative traffic growth occurs. Furthermore, if the extension of the SR-90 is not constructed at all (due to not having concurrent approval by the Board of Supervisors, the City of Los Angeles and Caltrans, or for other reasons) or another measure of equal effectiveness is not identified, a significant cumulative traffic impact could remain at this location.

The implementation of these cumulative mitigation measures will result in a reduction of all cumulative impacts. All "With Cumulative Development Plus Mitigation" traffic conditions that can be evaluated will have cumulative impacts reduced to a less than significant level. It should be noted that since the design of the proposed SR-90 extension has not been determined, calculation of the exact benefits to specific intersections for which the extension is identified in the Marina del Rey Land Use Plan (LUP) as mitigation cannot be made at this time. The County is currently preparing an

Environmental Impact Report for this roadway improvement that will identify the anticipated benefits to the Lincoln Boulevard corridor as a result of the SR-90 extension to Admiralty Way.

In summary, the cumulative mitigation measures include measures specifically identified in the TIP, including funding for larger long-term improvements such as the planned Marina Expressway (SR-90) extension to Admiralty Way that will increase area-wide traffic capacity and help alleviate existing and future congestion in the study area. If these measures are not installed, significant cumulative traffic impacts may remain.

The improvements described above, with the exception of the new traffic signal at the intersection of Washington Boulevard and Palawan Way and the conversion of the left-turn/through shared lane to a left/through/right shared lane on Mindanao Way in the westbound approach at Admiralty Way, are identical to or consistent with the area-wide roadway improvements identified in Appendix G (Transportation Improvement Program) of the Marina del Rey Local Implementation Program, and funded through payment of the traffic impact fees. Installation of the recommended measures will fully mitigate the effects of cumulative traffic growth, including project traffic, in the study area. The project is responsible for its “fair share” portion of implementation of these cumulative improvements through payment of the $170,700 trip fees, as described above, plus the pro-rata share for the new traffic signal and roadway improvement at Washington Boulevard and Palawan Way (i.e., 3.8% x $332,500 = $12,635) and the restriping of the westbound approach of Mindanao Way at Admiralty Way.

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INTRODUCTION

The proposed project is the development of Parcel OT, located east of Palawan Way between Washington Boulevard and Admiralty Way, and Parcel 21 (including the removal and transfer of some uses from Parcel 20), located on the north side of Panay Way east of Via Marina, in the Marina del Rey portion of the County of Los Angeles. The County of Los Angeles has requested that a traffic study be conducted, and Crain & Associates has been retained to assess the potential impacts of the proposed development on the surrounding street system. This report presents the results of an analysis of existing conditions as well as projected traffic conditions before and after completion of the project. The analysis incorporates a detailed evaluation of existing and future traffic conditions at the following 14 study intersections.

1. Washington Boulevard/Ocean Avenue/Via Marina
2. Washington Boulevard/Palawan Way
3. Lincoln Boulevard/Washington Boulevard
4. Admiralty Way/Via Marina
5. Admiralty Way/Palawan Way
6. Via Marina/Panay Way
7. Via Marina/Marquesas Way
8. Admiralty Way/Bali Way
9. Admiralty Way/Mindanao Way
10. Admiralty Way/Fiji Way
11. Lincoln Boulevard/Marina Expressway
12. Lincoln Boulevard/Bali Way
13. Lincoln Boulevard /Mindanao Way
14. Lincoln Boulevard / Fiji Way

The intersections are located within the area surrounding the project sites, and were selected for detailed analyses as they are expected to be those locations most directly impacted by the proposed project's traffic generation. The selected locations include

intersections under the control of the County of Los Angeles, the City of Los Angeles, Caltrans, or more than one of these jurisdictions. The location of the project sites and the study intersections are shown on Figure 1, Project Site Vicinity and Study Intersection Locations.

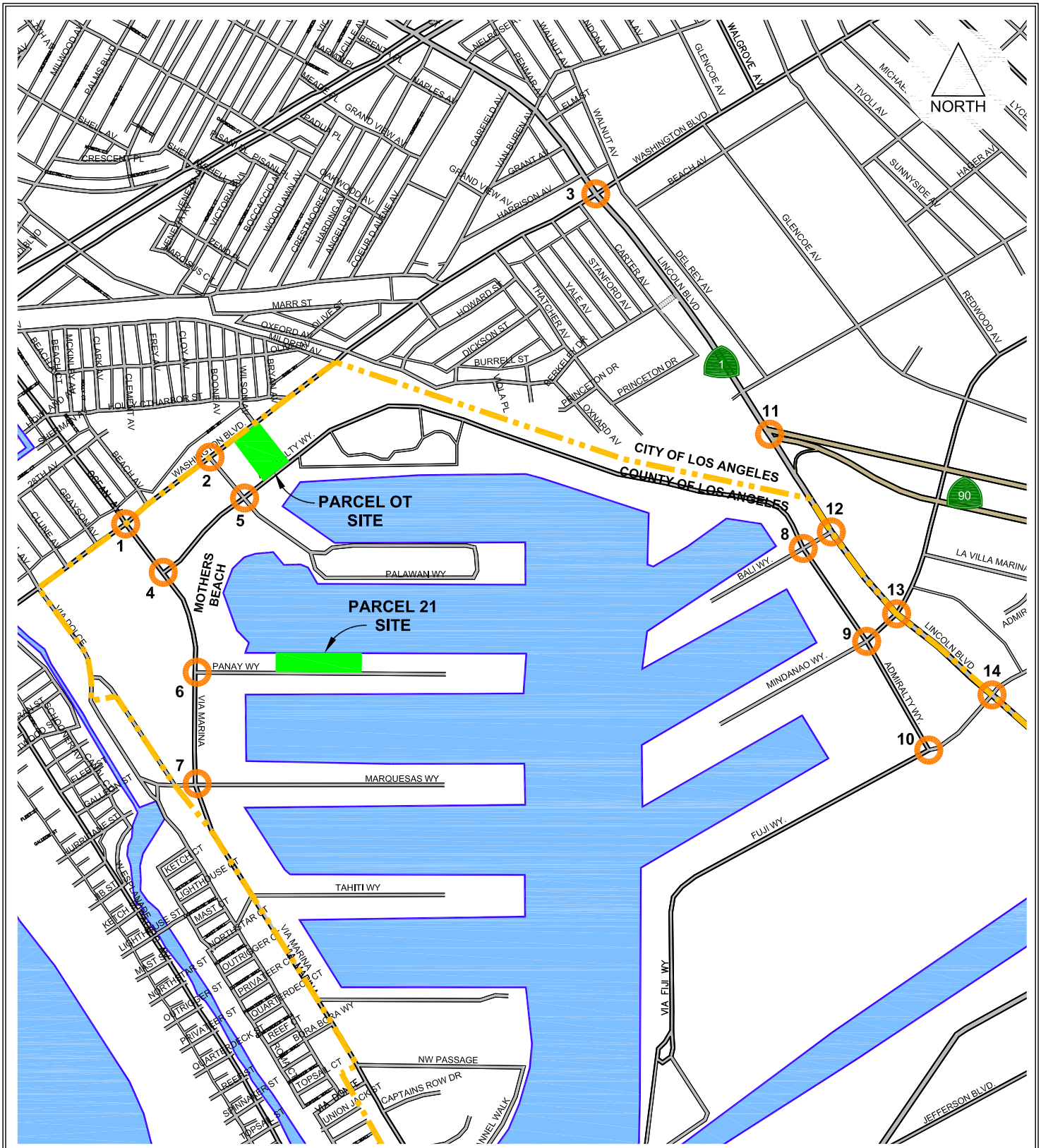

FIGURE 1

4/12/2007

FN: MARINA DEL REY PARCEL OT GOLDRICH & KEST\PARCEL OT AND 21\SITEVIC AND STUDY-INTS

PROJECT SITE VICINITY AND
STUDY INTERSECTION LOCATIONS

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PROJECT DESCRIPTION

The project under consideration is the development of Parcels OT and 21, located in the unincorporated Los Angeles County community of Marina del Rey. Parcel OT is located to the east of Palawan Way between Washington Boulevard and Admiralty Way, and is an approximately 2.12-acre site with dimensions of approximately 260 feet fronting Admiralty Way and 355 feet traversing from Washington Boulevard to Admiralty Way. Parcel 21 is located on the north side of Panay Way and east of Via Marina. The development on Parcel 21, known as Holiday Harbor Courts, would be on an approximately 2.55-acre site that measures approximately 741 feet in width along the frontage of Panay Way and approximately 150 feet in depth from Panay Way to the water.

Parcel OT

The project proposes to construct a 114-unit congregate-care retirement facility and 5,000 square feet of ground floor retail use on Parcel OT, as summarized in Table 1(a). Parcel OT is currently occupied by a public parking lot containing 186 spaces. The project proposes to replace on-site 92 of the 186 public parking spaces currently on the Parcel OT site. The remaining 94 parking spaces are proposed to be relocated to Parcel 21. It should be noted that while all of the existing 186 spaces are occasionally used for special events, Mothers Beach represents the only regular use for these spaces. The relocation of 94 public spaces to Parcel 21 is expected to provide safer and more convenient parking for Mothers Beach as visitors will no longer have to cross two public streets, as is currently the case with the public parking on Parcel OT.

Table 1(a)
Proposed Development on Parcel OT

Land Use	Proposed Development
Congregate-Care Retirement Facility	114 Units
Retail	5,000 Sq. Ft.

Parking on the Parcel OT site will be available by a 116-space upper ground parking level and a 41-space lower ground parking level. The upper ground parking level will serve the congregate care retirement facility and the lower ground parking level will serve the retail use. In addition, the 92 replacement spaces will be located on both levels. It should be noted that resident parking will be designated and gated in the structure. The public replacement parking spaces will be clearly marked with appropriate signage for easy access.

Vehicular access will be provided from an existing driveway located on the west side of the Parcel OT site and from a new driveway off of Washington Boulevard. The existing driveway extends between Washington Boulevard and Admiralty Way. Access to the upper and lower ground parking levels will be available along the existing driveway approximately 170 feet north of Admiralty Way and approximately 140 feet south of Washington Boulevard, respectively. Currently, the existing driveway has full left- and right-turn access at Washington Boulevard. As part of the project, the left-turn access from westbound Washington Boulevard to the existing driveway would be prohibited. At Admiralty Way, the driveway is restricted to “right-in/right-out” operation due to the raised median island on Admiralty Way. The driveway access at Admiralty Way will remain the same with the proposed project. The new driveway on Washington Boulevard will align with Wilson Avenue and will provide access for the lower ground parking level only. The left-turn egress operation at the new driveway will be prohibited.

In addition to the three project driveways to the parking structure, the Parcel OT site will also have one ingress-only driveway and one egress-only driveway on Admiralty Way. These two driveways will have access to the porte cochere area that is located in front of the proposed congregate-care retirement facility. Access will be restricted to right-turn-only due to the raised median on Admiralty Way. The project site layout for Parcel OT is shown in Figures 2(a) and 2(b).

Parcel 21

The Parcel 21 site is currently occupied by two structures and paved parking areas. The two existing structures contain a total of 22,048 square feet of commercial uses including a 16,000 square foot health club, 2,916 square feet of retail and 3,132 square feet of marine commercial offices. The paved parking areas serve the commercial structures and also provide parking for boaters using the adjacent docks. In anticipation of the proposed project, all existing development on Parcel 21 is proposed to be demolished and replaced with the development shown in Table 1(b).

As shown in Table 1(b), the project will consists of the replacement of existing on-site uses, the removal and transfer of uses from Parcel 20 (marine commercial office space and yacht club), and the development of additional uses (marine commercial offices) on Parcel 21. Development on this parcel would result in a net reduction of 6,000 square feet of health club uses and a net increase of 6,000 square feet of marine commercial office space.

Parking on the Parcel 21 site is proposed to be provided in an attached multi-level parking structure. The parking structure will have approximately 447 spaces, including 94 replacement public parking spaces from Parcel OT. The parking facility would also have direct access to the commercial structure, and have close access to the marina slips as well as Mother's Beach.

Table 1(b)
Net New Proposed Development on Parcel 21

Land Use	Existing Development		Proposed Development	Net Area Increase/ (Decrease)
	LUP Parcel 20 (sq. ft.)	LUP Parcel 21 (sq. ft.)	LUP Parcel 21 (sq. ft.)	(sq. ft.)
Health Club	0	16,000	10,000	(6,000)
Retail (1)	0	2,916	2,916	0
Marine Commercial Offices	0	0	6,000	6,000
Marine Commercial Offices (2)	0	3,132	3,132	0
Marine Commercial Offices (3)	2,300	0	2,300	0
Yacht Club (3)	5,000	0	5,000	0

(1) Ship Store.

(2) Existing tenants: California Sailing Academy, Golden West Yachts, Club Natique and South Sea Publishing.

(3) Existing development from Parcel 20 will be removed and transferred to Parcel 21. Requires Land Use Plan (LUP) amendment to transfer land use between adjacent parcels.

Vehicular access to the parking facility would be available on Panay Way via two driveways. Full left- and right-turn access would be allowed at the two driveways. The project site layout for Parcel 21 is shown in Figure 2(c).

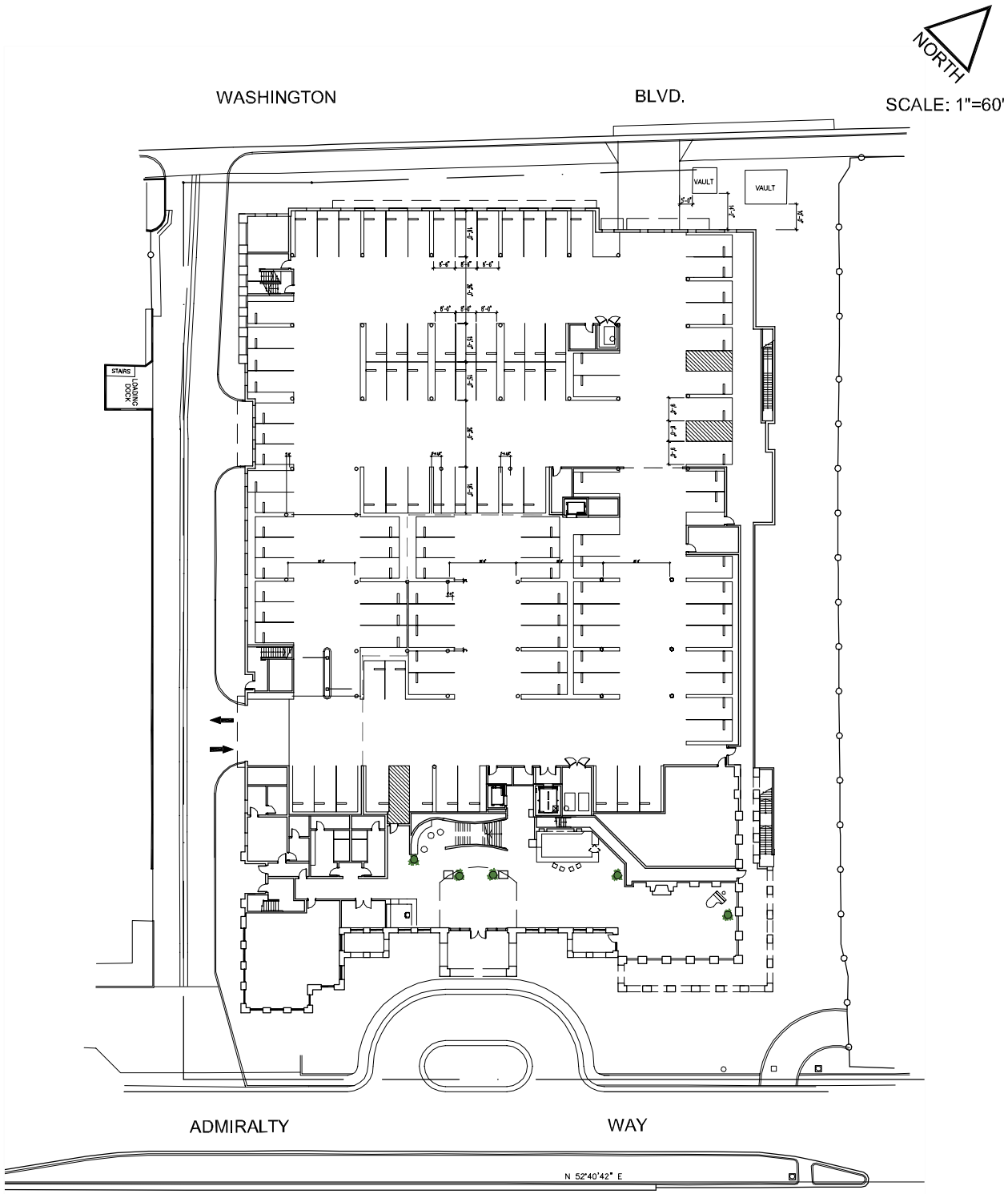

FIGURE 2(a)

1/25/2007

FN: MARINA DEL REY PARCEL OT GOLDRICH & KEST\PARCEL OT AND 21\SITEPLAN (PARCEL OT UPPER LEVEL)

PROJECT SITE LAYOUT
UPPER GROUND LEVEL ON PARCEL OT

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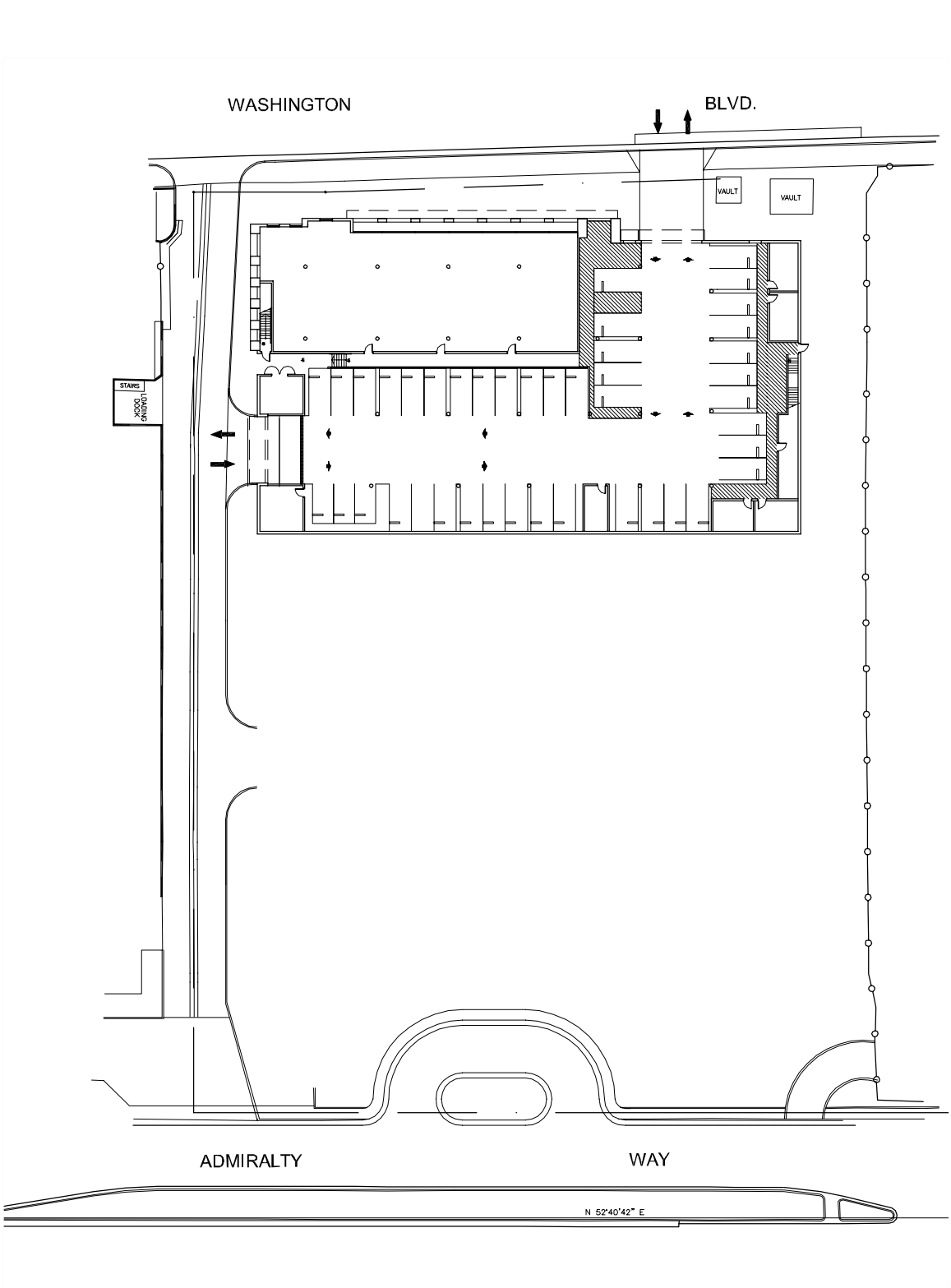

FIGURE 2(b)

1/25/2007

FN: MARINA DEL REY PARCEL OT GOLDRICH & KEST\PARCEL OT AND 21\SITEPLAN (PARCEL OT LOWER LEVEL)

PROJECT SITE LAYOUT
LOWER GROUND LEVEL ON PARCEL OT

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NORTH

SCALE: 1" = 80'

FIGURE 2(c)

1/25/2007

FN: MARINA DEL REY PARCEL OT GOLDRICH & KEST\PARCEL OT AND 21\SITEPLAN (PARCEL 21)

PROJECT SITE LAYOUT ON PARCEL 21

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ENVIRONMENTAL SETTING

The proposed project is located in the unincorporated community of Marina del Rey, in the County of Los Angeles. The project sites are served by the regional facilities of Lincoln Boulevard (State Route 1), the Marina Freeway/Expressway (State Route 90) and the San Diego Freeway (Interstate Route 405). The San Diego Freeway has an interchange at the Marina Freeway, approximately four miles east of the sites. The Marina Freeway/Express way provides surface street access at Culver Boulevard (currently being reconstructed as a freeway interchange), Mindanao Way, and at its western terminus at Lincoln Boulevard.

Most of the area surrounding the project sites has been developed, with the exception of the Ballona Creek Wetlands, south of Culver Boulevard in Playa del Rey and Westchester, although some of the Ballona Creek Wetlands is currently undergoing development. Surrounding areas to the north and east have been developed as single- and multi-family residential communities. Commercial areas are situated along nearby Washington Boulevard, throughout Marina del Rey along and off of Admiralty Way, and along the Lincoln Boulevard corridor to the east.

Freeways

The San Diego Freeway (Interstate 405) is the most important traffic facility in the area. This freeway traverses north-south through the Greater Los Angeles metropolitan area, and provides convenient project access, via the regional freeway system, to all other areas of the Los Angeles region. This route is also an important link to the other parts of California. The San Diego Freeway, in this vicinity, is a nine- or ten-lane facility, depending on the segment, and currently carries in excess of 298,000 vehicles per day (VPD). A high-occupancy vehicle (HOV) lane is at present being added to this facility. The San Diego Freeway provides a full interchange with the western portion of the

Marina Freeway/Expressway. Northbound-to-eastbound, and westbound-to-southbound movements are not allowed at this interchange.

The Marina Freeway/Expressway (State Route 90) is a short regional facility serving a roughly east-west alignment between Slauson Avenue (east of Sepulveda Boulevard) and Lincoln Boulevard. The elevated freeway sections of this facility, between Culver Boulevard on the west and the Slauson Avenue terminus on the east, provides a three-lane per direction configuration, with additional lanes provided at the interchange with the San Diego Freeway. Surface street access ramps are currently provided only from Sepulveda Boulevard (to the eastbound Marina Freeway), and at Centinela Avenue (full ramp set). However, the freeway is being extended and an interchange is now being built at Culver Boulevard. Additional extension of the freeway to Admiralty Way is also being planned. This portion of the Marina Freeway carries more than 75,000 VPD.

The at-grade expressway portion of the facility, between Culver Boulevard and Lincoln Boulevard, exhibits a two-lane per direction configuration, with localized flarings at intersections to accommodate additional left and/or right-turn lanes. The Expressway is a divided roadway, with no crossover traffic permitted except from the cross street intersections with Culver Boulevard and Mindanao Way.

Streets and Highways

Important surface highway facilities in the area near the proposed project include Washington Boulevard, Lincoln Boulevard, and Admiralty Way. Washington Boulevard is designated as a Class II Major Highway on the General Plan for the City of Los Angeles. Lincoln Boulevard is designated as a Class I Major Highway south of Washington Boulevard and a Class II Major Highway north of Washington Boulevard. Admiralty Way is a collector facility that traverses along the northern and eastern edges of Marina del Rey between Via Marina, just to the west of Parcel OT and northwest of Parcel 21, and Fiji Way near Lincoln Boulevard. Admiralty Way provides the project's most direct access

to/from the Marina Freeway/Expressway (via Mindanao Way), and other regional travel facilities.

Washington Boulevard is an east-west Class II Major Highway that forms the northern boundary of the Parcel OT site. In the project vicinity, Washington Boulevard is approximately 80 feet wide, and provides two through lanes in each direction, plus full left-turn channelization at most cross streets. Bicycle lanes are provided and on-street parking is allowed along Washington Boulevard in the project vicinity.

Admiralty Way is a four-lane collector facility, serving as a "frontage road" around the north and east portions of the Marina, between Via Marina on the west and Fiji Way on the southeast. Admiralty Way provides two lanes per direction plus left-turn channelization at key intersections. A raised center median exists along the length of Admiralty Way. Admiralty Way "tees" at both ends, into Fiji Way on the south and into Via Marina to the west.

Via Marina is generally a north-south facility that serves the western portion of Marina del Rey. Via Marina extends from the water entrance to the Marina north to Washington Boulevard (where it aligns with Ocean Avenue) and then the roadway becomes Venice Way, bends to the west, and terminates at Pacific Avenue. Via Marina provides two to three through lanes in each direction plus left-turn channelization at key intersections.

Lincoln Boulevard (State Route 1) is developed to a typical width of 80 feet north of Washington Boulevard and a variable width (80 to 96 feet wide) roadway on the segment between Washington Boulevard and Culver Boulevard. South of the Culver Boulevard overpass, Lincoln Boulevard widens to provide three through lanes in each direction plus a raised median island. In the project area, this facility is striped to provide a six-lane roadway with left-turn channelization (designated or permissive left-turn lanes) at most intersections. A raised median island exists on Lincoln Boulevard

from Fiji Way north to the Marina Expressway intersection. On-street parking is prohibited on this portion of Lincoln Boulevard at all times, but is allowed on a time-restricted basis on both sides of the street north of Maxella Avenue.

Palawan Way is designated a local street. This facility provides two lanes per direction on the segment between Admiralty Way and Washington Boulevard, separated by a raised median island. However, at the "tee" intersection with Washington Boulevard, northbound Palawan Way narrows to provide a right-turn lane only. This intersection is unsignalized, but is instead controlled by a STOP sign on the Palawan Way approach. Conversely, at the signalized intersection with Admiralty Way, Palawan Way provides three lanes, including a left-turn only lane, a through lane, and a right-turn only lane. South of Admiralty Way, Palawan Way provides access to restaurant and commercial uses.

Panay Way is designated a local street and provides direct access to the Parcel 21 site. This roadway also provides access to the Marina del Rey "Basin C" and "Basin D" areas. Panay Way provides one lane in each direction.

Marquesas Way is designated a local street. This two-lane facility is located opposite Via Dolce at Via Marina, and provides access to the "Basin B" and "Basin C" areas.

Bali Way is a short local street providing access from Lincoln Boulevard and Admiralty Way to the Marina del Rey "Basin F" and "Basin G" areas. Bali Way provides only a single lane in each direction.

Mindanao Way is a Secondary Highway providing two lanes in each direction, although some sections are widened to permit additional traffic lanes and/or turn-lane channelization, particularly at the Marina Expressway and Lincoln Boulevard intersections. At Lincoln Boulevard, Mindanao Way provides dual left-turn channelization. East of Alla Road, Mindanao Way changes names to become Short

Avenue, which terminates at Centinela Avenue approximately 2/3 of a mile east of Alla Road. West of Lincoln Boulevard, Mindanao Way crosses Admiralty Way to provide access to Burton Chase Park and the Marina del Rey "Basin G" berths. Mindanao Way also provides the closest surface street link to the Marina Expressway to the east in the project area (other than the somewhat circuitous route using the Lincoln Boulevard connection).

Fiji Way is designated a local street. This facility is discontinuous and provides one lane per direction plus on-street parking from east of Lincoln Boulevard to the eastern terminus at La Villa Marina. West of Lincoln Boulevard, Fiji Way typically provides two lanes per direction, and serves as access to the "Fisherman's Village" portion of Marina del Rey, as well as to residential development and the U.S. Coast Guard Harbor Patrol station near the Ballona Creek "point". On-street parking is prohibited west of Lincoln Boulevard.

All of the study intersections are traffic signal-controlled, with the exception of Washington Boulevard and Palawan Way, which is a "tee" intersection and STOP sign controlled for the Palawan Way approach. Additionally, all of the signalized intersections are upgraded with the City of Los Angeles' Automated Traffic Surveillance and Control (ATSAC) and second generation Adaptive Traffic Control System (ATCS) traffic signal coordination systems. These signal coordination systems monitor and evaluate traffic demands throughout the study area in real time, and adjust the traffic signal timings and phasings accordingly to maximize traffic capacity.

Existing Traffic Volumes

Traffic volume count data were obtained from recent counts conducted in 2006 and 2007 by The Traffic Solution (an independent traffic data collection company) and Crain & Associates personnel, except for the counts at the intersection of Washington

Boulevard and Palawan Way that was conducted in October 2005. (Traffic count data was also collected in 2007 at this location but was found to be lower than the 2005 counts. To be conservative, the higher 2005 counts were used for this intersection.)

Counts conducted in 2005 and 2006 were growth factored by 0.6 percent, compounded annually, to estimate year 2007 traffic conditions. The traffic data sheets are contained in Appendix A. Additionally, San Diego Freeway and Marina Freeway/Expressway count data were obtained from the California Department of Transportation (Caltrans) publication. Existing AM and PM peak hour traffic volumes at the study intersections are shown on Figures 3(a) and 3(b), respectively, and are summarized for the key area roadways on the following pages.

The Marina Expressway, east of Mindanao Way, carries approximately 52,000 vehicles per day (VPD). Peak hour directional traffic volumes in this area are approximately 1,400 vehicles per hour (VPH) northbound and 1,700 VPH southbound during the AM peak hour, and about 1,400 VPH northbound and 1,700 VPH southbound in the PM peak hour.

Washington Boulevard, near Lincoln Boulevard, accommodates nearly 32,000 VPD. Peak hour directional traffic volumes in this area are approximately 1,300 VPH eastbound and 1,100 VPH westbound in the morning peak hour, and 2,000 VPH eastbound and 1,800 VPH westbound in the afternoon peak hour.

Admiralty Way near Via Marina exhibits daily traffic of approximately 18,000 VPD, including peak hour traffic of 1,100 VPH southbound and 1,200 VPH northbound in the morning peak hour, and 1,000 VPH northbound and 1,100 VPH southbound in the afternoon peak hour.

Lincoln Boulevard is one of the most heavily traveled highways in the area, carrying approximately 60,000 VPD. Directional peak hour traffic volumes on Lincoln Boulevard

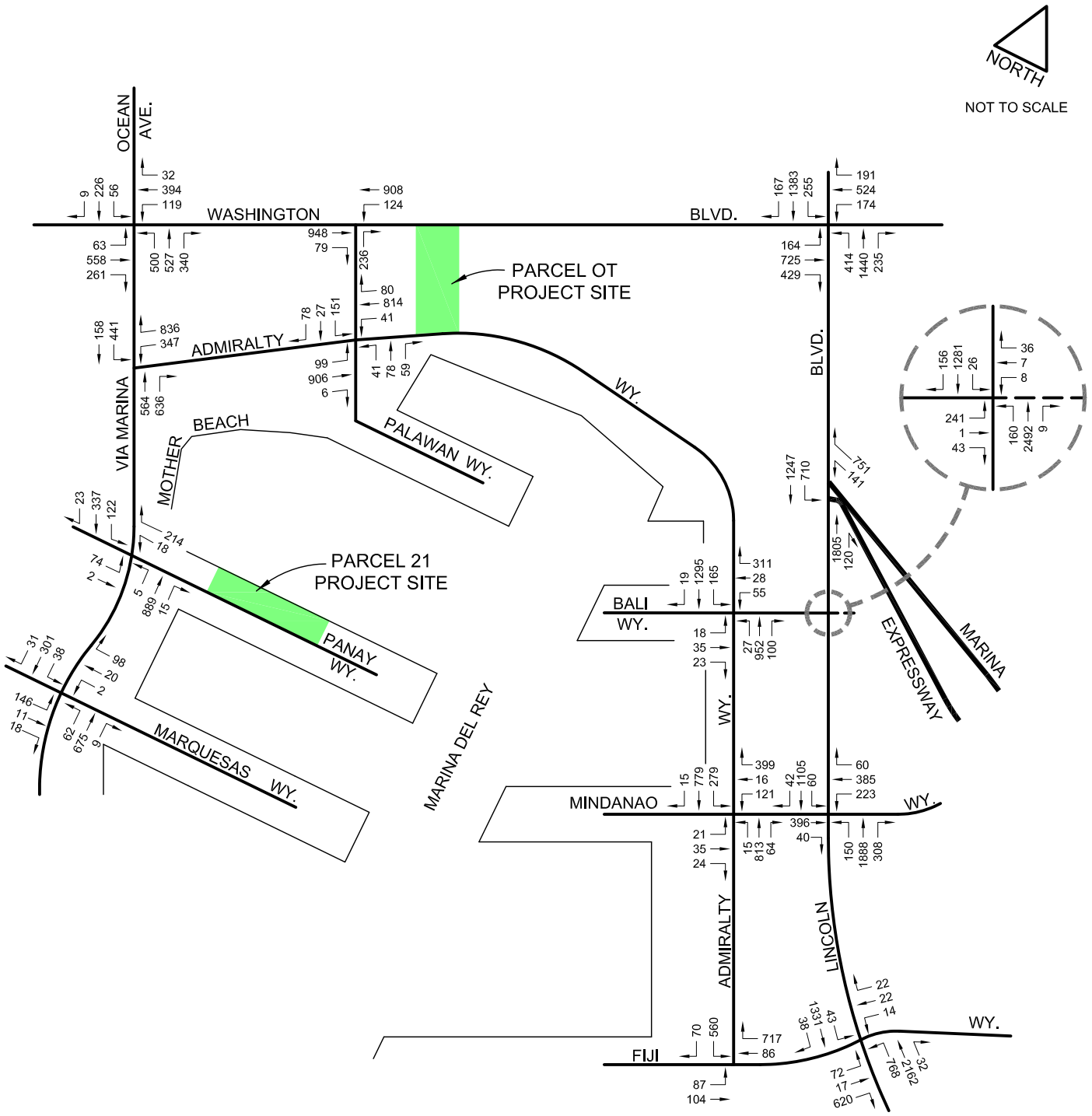

FIGURE 3(a)

2/26/2007

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\AM2007

EXISTING (2007) TRAFFIC VOLUMES
AM PEAK HOUR

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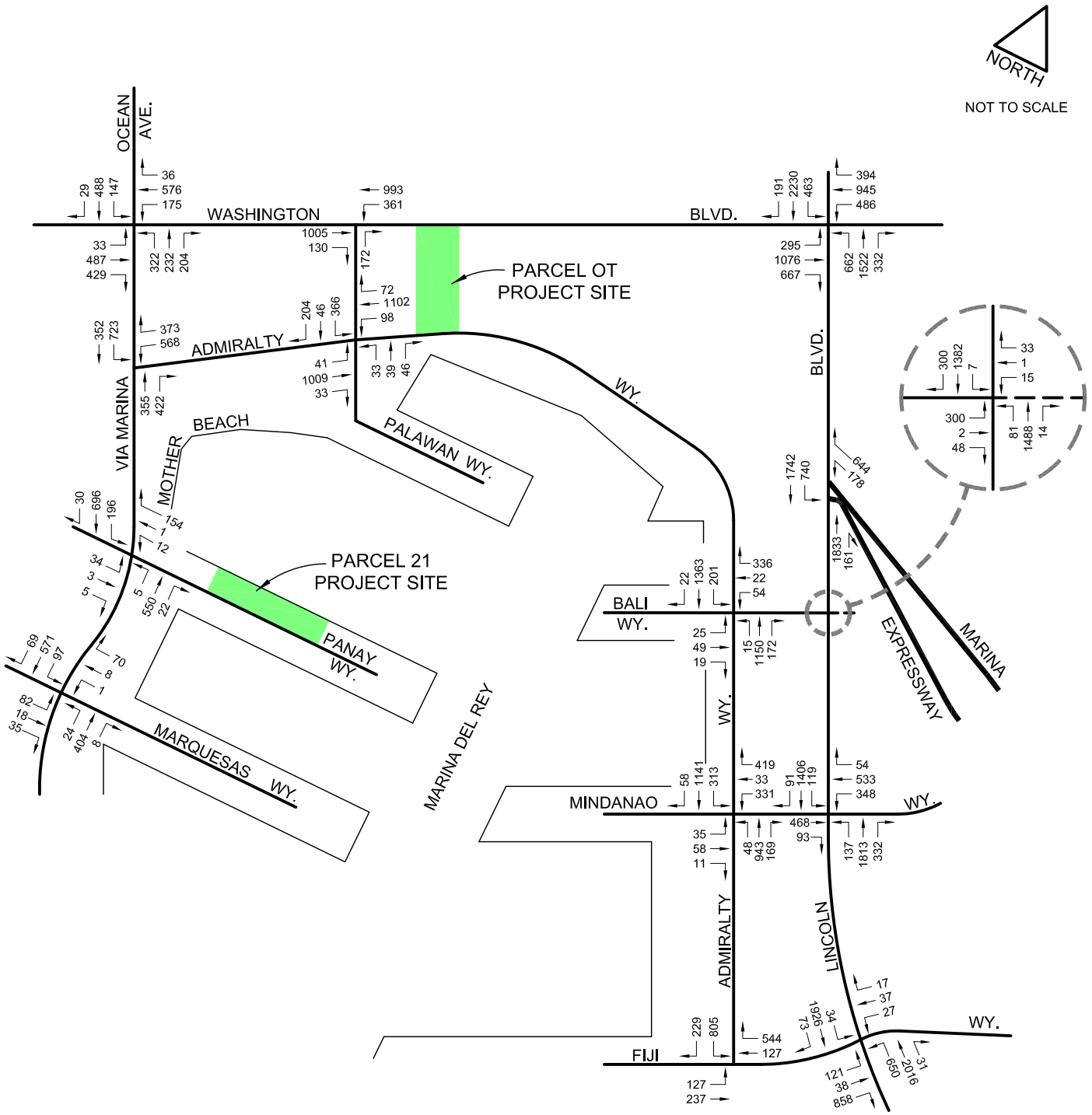

FIGURE 3(b)

2/26/2007

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\PM2007

EXISTING (2007) TRAFFIC VOLUMES
PM PEAK HOUR

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south of the Marina Freeway are approximately 2,600 VPH northbound and 1,800 VPH southbound during the AM peak hour, and approximately 2,300 VPH southbound and 2,200 VPH northbound in the PM peak hour.

Via Marina, south of Admiralty Way, experiences about 14,200 VPD, with approximately 1,200 VPH northbound and 500 VPH southbound during the morning peak hour and approximately 800 VPH northbound and 900 VPH southbound during the afternoon peak hour.

Palawan Way, between Washington Boulevard and Admiralty Way, accommodates about 5,800 VPD. Directional peak hour traffic volumes are approximately 240 VPH northbound and 260 VPH southbound during the morning peak hour and approximately 170 VPH northbound and 620 VPH southbound during the afternoon peak hour.

Panay Way carries about 3,100 VPD, including directional peak hour volumes of approximately 230 VPH westbound and 140 VPH eastbound during the AM peak hour and approximately 220 VPH eastbound and 170 VPH westbound during the PM peak hour.

Marquesas Way carries approximately 1,000 VPD. Directional peak hour traffic volumes are approximately 120 VPH westbound and 60 VPH eastbound during the morning peak hour and approximately 80 VPH westbound and 120 VPH eastbound during the afternoon peak hour.

Bali Way is traveled by an estimated 5,100 VPD, with peak hour directional volumes of 360 VPH westbound and 290 VPH eastbound in the AM, and 400 VPH westbound and 390 VPH eastbound in the PM.

Mindanao Way, between Lincoln Boulevard and the Marina Expressway, exhibits daily traffic of nearly 15,500 VPD, including approximately 900 VPH eastbound and 700 VPH

westbound during the AM peak hour and approximately 1,000 VPH westbound and 950 VPH eastbound during the PM peak hour.

Fiji Way, west of Lincoln Boulevard, carries about 12,800 VPD, with directional peak hour volumes of over 800 VPH westbound and 700 VPH eastbound during the morning peak hour and approximately 1,000 VPH eastbound and 800 VPH westbound during the evening peak hour.

Public Transit

The Los Angeles County Metropolitan Transportation Authority (Metro) has established an extensive grid system of bus routes throughout the Los Angeles region, including the project vicinity, and adjacent jurisdictions such as the City of Los Angeles and the City of Culver City also provide transit service through the Marina del Rey study area. In the project area, several bus routes pass by within convenient walking distance of the project sites, along Washington Boulevard and Admiralty Way. These bus routes, which provide the closest routes serving the project sites, are described in the following section.

Metro Line 108 provides east-west service between Marina del Rey and Pico Rivera. In the study area, Line 108 operates a one-way loop route through the Marina, then travels primarily along Mindanao Way/Short Avenue, Centinela Avenue, Jefferson Boulevard, and Slauson Avenue between the Marina and Pico Rivera. Line 108 also serves Fox Hills Mall and the adjacent office developments east of Sepulveda Boulevard. In the Marina, this line operates on weekdays with headways of approximately 30 to 45 minutes. Weekend and holiday service is also provided on a limited schedule, with approximately 60 minute headways throughout the day.

LADOT Commuter Express Line 437 travels eastbound from Marina del Rey to Downtown Los Angeles during the morning peak commute period and westbound

from Downtown during the afternoon peak commute period. In the project area, this line travels along Pacific Avenue, Via Marina and Admiralty Way, continuing on Mindanao Way and Alla Road to Culver Boulevard through Culver City. Stops nearest the project sites are provided on Via Marina at Panay Way and Marquesas Way, and on Admiralty Way at Palawan Way. Line 437 operates Monday through Friday only, on headways of approximately 15 to 30 minutes during the AM and PM peak commute periods.

Culver City Line 1 runs between the Venice community on the west and the West Los Angeles Transit Center on Washington Boulevard at Fairfax Avenue on the east. Line 1 travels south from Windward Avenue along Pacific Avenue to Washington Boulevard, where it continues along Washington Boulevard, with stops provided through Marina del Rey, Mar Vista, and Culver City. Line 1 buses operate on weekdays, with limited weekend and holiday service. In the project vicinity, this Line provides stops on Washington Boulevard at Via Marina and at Wilson Avenue on headways of approximately 15 to 30 minutes.

In addition to these key transit routes that are within walking distance of the project sites, other bus routes that also serve the Marina del Rey community (e.g. along or near Lincoln Boulevard) include the Culver City Lines 2 and 7, and the Santa Monica Line 3 and Rapid 3. Many more bus routes are also available via transfers to other routes or transit providers. When transfer opportunities are considered, the project is well served by public transit. Thus, it is expected that some of the trips generated by the proposed project could choose to utilize public transportation as their primary travel mode instead of private vehicles.

Analysis of Existing Traffic Conditions

An analysis of current traffic conditions was conducted on the streets and highways serving the project area. Detailed traffic analyses of existing conditions were performed

at the 14 intersections noted previously in this report. The traffic analysis was performed through the use of established traffic engineering techniques. Recent traffic information was obtained from counts of the study intersections. Information pertaining to intersection geometrics, parking restrictions, and signal operations were obtained through recent field surveys of the study locations so as to reflect any recent changes in traffic demand patterns. The lane configurations and signal operations at the study intersections are shown in Appendix B.

The methodology used in this study for the analysis and evaluation of traffic operations at each study intersection is based on procedures outlined in Circular Number 212 of the Transportation Research Board.[1] In the discussion of Critical Movement Analysis for signalized intersections, procedures have been developed for determining operating characteristics of an intersection in terms of the "Level of Service" provided for different levels of traffic volume and other variables, such as the number of signal phases. The term "Level of Service" describes the quality of traffic flow. Levels of Service A to C operate quite well. Level D typically is the level for which a metropolitan area street system is designed. Level E represents volumes at or near the capacity of the highway which might result in stoppages of momentary duration and fairly unstable flow. Level F occurs when a facility is overloaded and is characterized by stop-and-go traffic with stoppages of long duration.

A determination of the Level of Service at an intersection, where traffic volumes are known or have been projected, can be obtained through a summation of the critical movement volumes at that intersection. Once the sum of critical movement volumes has been obtained, the values indicated in Table 2 can be used to determine the applicable Level of Service.

---

[1] Interim Materials on Highway Capacity, Circular Number 212, Transportation Research Board, Washington, D.C., 1980.

Table 2
Critical Movement Volume Ranges*
For Determining Levels of Service

Level of Service	Maximum Sum of Critical Volumes (VPH) Two Phase	Three Phase	Four or More Phases
A	900	855	825
B	1,050	1,000	965
C	1,200	1,140	1,100
D	1,350	1,275	1,225
E	1,500	1,425	1,375
F	----------Not Applicable----------		

* For planning applications only, i.e., not appropriate for operations and design applications.

"Capacity" represents the maximum total hourly vehicle volume movement in the critical lanes which has a reasonable expectation of passing through an intersection under prevailing roadway and traffic conditions. For planning purposes, capacity equates to the maximum value of Level of Service E, as indicated in Table 2. The Critical Movement Analysis (CMA) indices used in this study were calculated by dividing the sum of critical movement volumes by the appropriate capacity value for the type of signal control present or proposed at the study intersections. Thus, the Level of Service corresponding to a range of CMA values is shown in Table 3.

By applying this analysis procedure to the study intersections, the Critical Movement Analysis (CMA) value and the corresponding Levels of Service (LOS) for existing traffic conditions were calculated. Those values, for existing (2007) AM and PM peak hour conditions, are summarized in Table 4.

Table 3
Level of Service
As a Function of CMA Values

Level of Service	Description of Operating Characteristics	Range of CMA Values
A	Uncongested operations; all vehicles clear in a single cycle.	≤ 0.60
B	Same as above.	$>0.60, \leq 0.70$
C	Light congestion; occasional backups on critical approaches.	$>0.70, \leq 0.80$
D	Congestion on critical approaches, but intersection functional. Vehicles required to wait through more than one cycle during short peaks. No long-standing lines formed.	$>0.80, \leq 0.90$
E	Severe congestion with some long-standing lines on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements.	$>0.90, \leq 1.00$
F	Forced flow with stoppages of long duration.	> 1.00

Table 4
Critical Movement Analysis Summary
Existing (2007) Traffic Conditions

No.	Intersection	AM Peak Hour CMA	AM Peak Hour LOS	PM Peak Hour CMA	PM Peak Hour LOS
1.	Washington Blvd. & Ocean Ave./Via Marina	0.714	C	0.768	C
2.	Washington Blvd. & Palawan Wy.	0.643	B	0.719	C
3.	Lincoln Blvd. & Washington Blvd.	0.775	C	1.337	F
4.	Admiralty Wy. & Via Marina	0.701	C	0.751	C
5.	Admiralty Wy. & Palawan Wy.	0.424	A	0.604	B
6.	Via Marina & Panay Wy.	0.347	A	0.254	A
7.	Marquesas Wy. & Via Marina	0.262	A	0.181	A
8.	Admiralty Wy. & Bali Wy.	0.459	A	0.577	A
9.	Admiralty Wy. & Mindanao Wy.	0.626	B	0.743	C
10.	Admiralty Wy. & Fiji Wy.	0.257	A	0.372	A
11.	Lincoln Blvd. & Marina Expressway	0.679	B	0.721	C
12.	Lincoln Blvd. & Bali Wy.	0.651	B	0.512	A
13.	Lincoln Blvd. & Mindanao Wy.	0.724	C	0.849	D
14.	Lincoln Blvd. & Fiji Wy.	0.587	A	0.732	C

PROJECT TRAFFIC

The following section describes the methodology used and results of the calculations for traffic generation, distribution and assignment for the project.

Traffic Generation

Vehicle trip generation rates for various types of developments within the Marina are specified in Appendix G (Transportation Improvement Program -- TIP) of the Marina del Rey Local Implementation Program which is in effect for the project sites. This document provides the PM peak hour trip rates for land uses including the proposed project's congregate-care retirement facility, specialty retail and marine commercial office components. However, the TIP does not provide a PM peak hour trip rate for health club uses. Furthermore, the TIP also does not specify daily and AM peak hour trip generation rates for any of the proposed uses. Thus, daily and AM peak hour trip rates for the proposed uses and the PM peak hour trip rate for the health club were derived from the current edition of Trip Generation, published by the Institute of Transportation Engineers (ITE)[2]. This document is the current industry standard for trip generation data. For trip rates that were not available in the Trip Generation manual, trip rates from the San Diego Traffic Generators[3] were assumed. The trip rates used in the traffic analysis for the proposed project are listed in Table 5.

The site generation rates shown below were selected in accordance with TIP procedures. The base trip rates for the daily and AM peak hour periods present "worst case" trip generation conditions applicable only to suburban locations, as the Trip Generation rates do not account for such trip-reducing factors as multi-purpose

[2] Trip Generation, 7th Edition, Institute of Transportation Engineers, Washington, D.C., 2003.
[3] San Diego Traffic Generators, San Diego Association of Governments (SANDAG), 2002.

Table 5
Project Trip Generation Rates

Congregate Care Facility (per dwelling unit) – Land Use 253
Daily: T = 2.02 (U)
AM Peak Hour: T = 0.06 (U); I/B = 59%, O/B = 41%
PM Peak Hour: [1] T = 0.17 (U); I/B = 55%, O/B = 45%

Specialty Retail (per 1,000 square feet) – Land Use 814
Daily: T = 44.32 (A)
AM Peak Hour:[2] T = 1.2 (A); I/B = 60%, O/B = 40%
PM Peak Hour:[1] T = 4.44 (A); I/B = 43%, O/B = 57%

Health/Fitness Club (per 1,000 square feet) – Land Use 492
Daily: T = 32.93 (A)
AM Peak Hour: T = 1.21 (A); I/B = 42%, O/B = 58%
PM Peak Hour: T = 4.05 (A); I/B = 51%, O/B = 49%

General Office Building (per 1,000 square feet) – Land Use 710
Daily: T = 11.01 (A)
AM Peak Hour: T = 1.55 (A); I/B = 88%, O/B = 12%
PM Peak Hour: [1] T = 2.21 (A); I/B = 16%, O/B = 84%

Where:
T = Trip Ends I/B = Inbound Trip Percent
U = Units O/B = Outbound Trip Percent
A = Building area in 1,000's square feet

[1] PM peak hour trip generation rate from Marina del Rey Land Use Plan, County of Los Angeles, February 8, 1996.
[2] AM peak hour trip generation rate not provided in ITE Trip Generation manual. Assumed AM peak hour trip generation rate from San Diego Traffic Generators, San Diego Association of Governments (SANDAG), 2002.

Source: Trip Generation, 7th Edition, Institute of Transportation Engineers, Washington D.C., 2003, except as footnoted above.

(internal), transit, walk-in and pass-by trips. These factors play a significant role in determining the actual traffic-generating characteristics of a particular project. Project trip adjustments were deemed appropriate based on the characteristics of the project sites. Due to the distance between Parcel OT and Parcel 21, the trip adjustments were

applied to each site individually. The specific trip reductions were determined according to anticipated operations of the two sites.

Project-related trip reductions are expected to occur as a result of “multi-purpose”, or “internal” trips. “Internal” trips are those trips solely within the project sites which result from travel to that site for multiple purposes. This type of trip generally occurs at integrated “mixed-use” developments containing a variety of uses. Discounts are taken for these internal trips as they do not add traffic to the surrounding street system.

The use of public transportation is an important consideration in the evaluation of the project’s trip-making potential. There are several transit routes that serve the project sites and the surrounding area. These lines, as described previously, provide transit users with many options when transfer possibilities are considered.

“Walk-in” trip discounts were also considered for this project. These trips are those already occurring in the project vicinity, but which have other nearby attractions as their specified destinations. These trips account for “built-in” patronage and subsequent traffic reductions for both the project specifically and the Marina del Rey area in general. These trips occur with or without the development of the proposed project. They are not directly site-oriented, but provide walk-in patronage from other local destinations, thereby reducing site trips.

Project trip discounts also result from the presence of “pass-by” trips. These are trips that result in an interim stop at the project site during an existing or previously planned trip. These interim stops may be for a planned purpose (such as a visit to a video store on the way home from work), or they may be spur-of-the-moment “impulse” trips (for carry-out food items). This type of pass-by trip is site-oriented, and does not add traffic to the surrounding roadway network.

The trip adjustments were discussed with and approved by the County of Los Angeles Department of Public Works (DPW) staff. The trip discounts were applied to the trip generation for the daily and AM peak hour periods. Trip generation discounts were not assumed for the PM peak hour because PM peak hour trip generation rates were obtained from the Marina del Rey Local Coastal Program which derived trip generation rates from actual survey data of Marina del Rey sites. The trip generation discount factors are therefore assumed to be inherent in the PM peak hour rates.

Applying the trip generation rates shown in Table 5 and the trip discounts described above, the traffic expected to be generated by the project was calculated, and is summarized in Table 6. As shown in this table, the Parcel OT component of the proposed project is expected to generate approximately 387 net new trips per day, including about 10 trips occurring during the morning peak hour, and 41 trips occurring during the evening peak hour. The proposed redevelopment on Parcel 21 would result in a net decrease of approximately 109 trips per day, including a net increase of about 2 trips occurring during the morning peak hour, and a net decrease of about 11 trips occurring during the evening peak hour. The two proposed sites combined are expected to generate a total of approximately 278 net new daily trips, including about 12 trips occurring during the morning peak hour, and 30 trips occurring during the evening peak hour. This net project trip generation will be added to the project area roadway network once the proposed project is completed and fully occupied.

It should be noted that a manual count of the existing Parcel OT parking lot was conducted during the AM and PM peak hours in order to evaluate the replacement of parking spaces from Parcel OT to Parcel 21. As described in a previous section, the existing parking lot on Parcel OT currently has 186 spaces. Approximately 92 spaces will be replaced on Parcel OT and the remaining 94 spaces will be replaced on Parcel

Table 6
Project Trip Generation

Use/Description	Size		Daily	AM Peak Hour I/B	AM Peak Hour O/B	AM Peak Hour Total	PM Peak Hour I/B	PM Peak Hour O/B	PM Peak Hour Total
Parcel OT									
Proposed Uses									
Congregate Care Retirement Facility	114	unit	230	4	3	7	10	9	19
Specialty Retail	5,000	sq. ft.	222	4	2	6	10	12	22
Subtotal			452	8	5	13	20	21	41
Less Internal Trip Capture*									
Congregate Care Retirement Facility	10%		(23)	(1)	0	(1)	0	0	0
Specialty Retail	10%		(22)	(1)	0	(1)	0	0	0
Driveway & Adjacent Intersection Trips (Parcel OT)			**407**	**6**	**5**	**11**	**20**	**21**	**41**
Less Pass-by Trips (% of External Auto) *									
Specialty Retail	10%		(20)	(1)	0	(1)	0	0	0
Net Area Intersection Trips (Parcel OT)			**387**	**5**	**5**	**10**	**20**	**21**	**41**
Parcel 21**									
Net New Project Uses									
Health Club	(6,000)	sq. ft.	(198)	(3)	(4)	(7)	(12)	(12)	(24)
Marine Commercial Offices	6,000	sq. ft.	66	8	1	9	2	11	13
Parking Relocation from Parcel OT to Parcel 21	94	spaces	0	0	0	0	0	0	0
Subtotal			(132)	5	(3)	2	(10)	(1)	(11)
Less Transit/Walk-in *									
Health Club	5% / 10%		30	0	1	1	0	0	0
Marine Commercial Offices	5% / 5%		(7)	(1)	0	(1)	0	0	0
Net New Project Trips (Parcel 21)			**(109)**	**4**	**(2)**	**2**	**(10)**	**(1)**	**(11)**
Total Net Project Trips (Parcels OT and 21)			**278**	**9**	**3**	**12**	**10**	**20**	**30**

Note:

* Trip generation discounts are not assumed for the PM peak hour. PM peak hour trip generation rates obtained from the Marina del Rey Local Coastal Program which derived trip generation rates from actual survey data of Marina del Rey sites. The trip generation discount factors are therefore assumed to be inherent in these rates.

** Uses relocated from Parcel 20 to Parcel 21 will not have any net change in trip generation and were not included in this table.

21. Based on the manual count, the existing Parcel OT parking lot currently has approximately two inbound trips and one outbound trip during the morning peak hour and nine inbound trips and zero outbound trips during the afternoon peak hour. For this analysis, it was assumed that all of the AM and PM peak hour trips from the existing Parcel OT lot would shift to Parcel 21 since these off-site spaces are expected to provide more convenient and safe parking for Mothers Beach visitors. (All of the existing 186 spaces may be used for some special events. However, Mothers Beach represents the only regular use for these spaces.) The manual count sheet is found in Appendix A.

Trip Distribution

Determination of the geographic distribution of generated trips was the next step in the process. A primary factor affecting trip distribution is the relative distribution of recreation, residential and retail centers which residents, patrons and employees of the project would be drawn. Another key factor is the availability of roadway access to and from the sites. Data from the Los Angeles Regional Transportation Study (LARTS) forecasts, as well as information presented in the current Los Angeles County Congestion Management Plan (CMP), were analyzed in order to estimate regional traffic distribution. Lastly, actual vehicle turning movements in and around the project vicinity were observed, and general geographic trip distribution characteristics were developed. The percentage split of trips, by direction, is shown in Table 7.

Traffic Assignment

The general geographic trip distribution percentages shown in Table 7 were then assigned to specific travel routes in the study area. These assignment percentages are shown in Figure 4 and are assumed to be the same during both the AM and PM peak

Table 7
Directional Trip Distribution

	Parcel OT		
	Retirement		
Direction	**Facility**	**Retail**	**Parcel 21**
North	20%	25%	15%
East	55%	35%	55%
South	20%	30%	22%
West	5%	10%	8%
Total:	100%	100%	100%

hours. Based on these directional distribution percentages, the number of project trips along each roadway was calculated. The traffic assignments for the AM and PM peak hour project traffic on the nearby street system are shown in Figures 5(a) and 5(b), Net Project Traffic Volumes. In addition, the traffic counts from the existing Parcel OT lot were assigned to the local roadway network and re-distributed to Parcel 21 in order to determine the net traffic impacts of replacing the 94 spaces from Parcel OT to Parcel 21. It was assumed that the traffic shift would only affect the five study intersections located on Via Marina at Washington Boulevard, Admiralty Way and Panay Way, and on Palawan Way at Washington Boulevard and Admiralty Way due to the close proximity of the existing Parcel OT lot to Parcel 21. Appendix D shows the traffic volume shifts for the AM and PM peak hours. The results of the project traffic assignment shown in Figures 5(a) and 5(b) and the traffic volume shifts from Appendix D provide the necessary level of detail to conduct the traffic analysis. Figures 5(c) and 5(d) contain these volumes for the AM and PM peak hour, respectively.

Project Access

Vehicular access for the Parcel OT site would be available directly from Washington Boulevard and Admiralty Way, as well as from an existing two-way driveway that extends between these two roadways. Parcel OT will provide parking via an upper

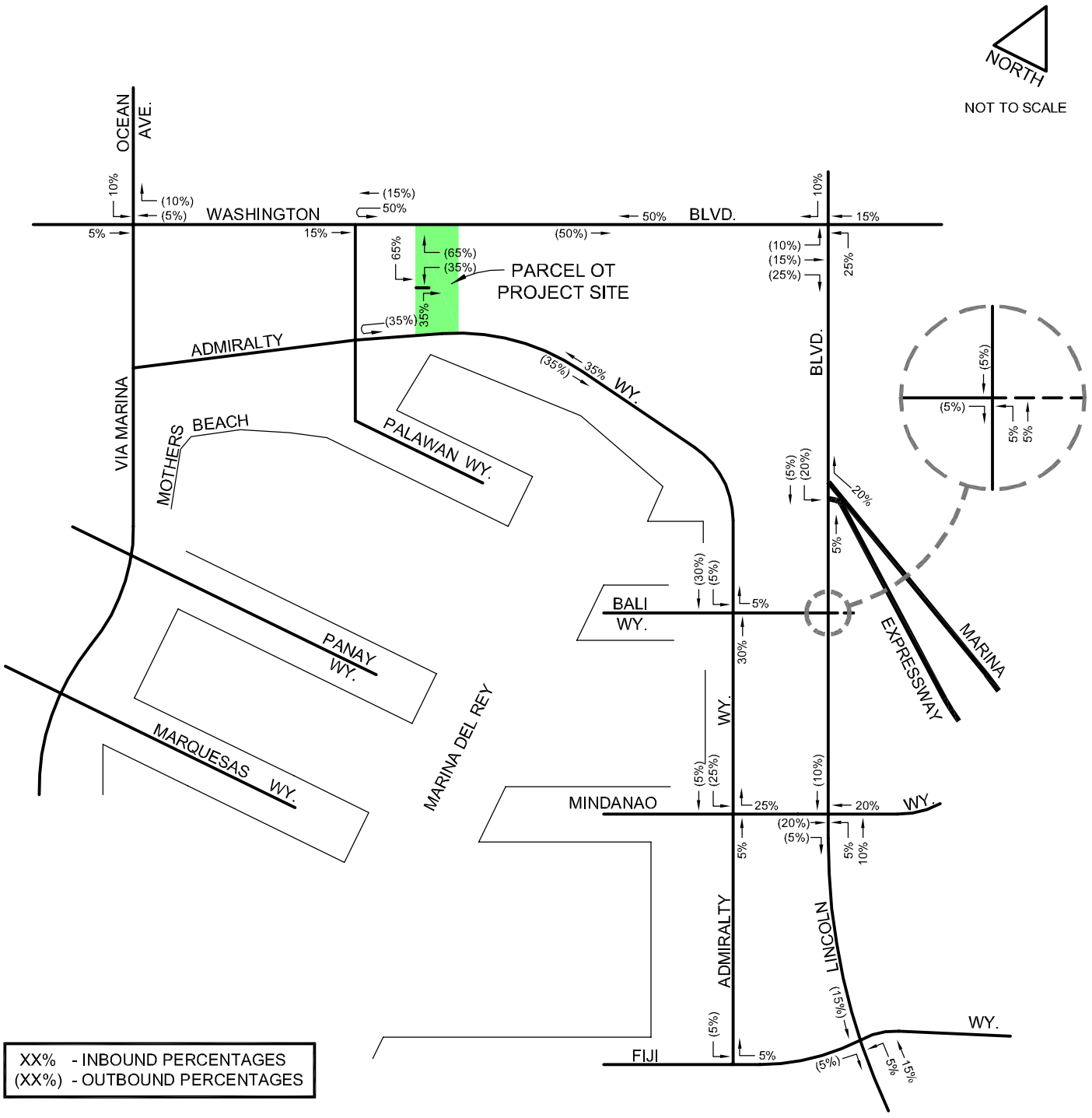

FIGURE 4(a)

1/25/2007

FN: MARINA DEL REY PARCEL OT GOLDRICH & KEST\PARCEL OT AND 21\PROJ-DIST (PCL OT RETIRE FAC)

TRIP DISTRIBUTION PERCENTAGES
RETIREMENT FACILITY ON PARCEL OT

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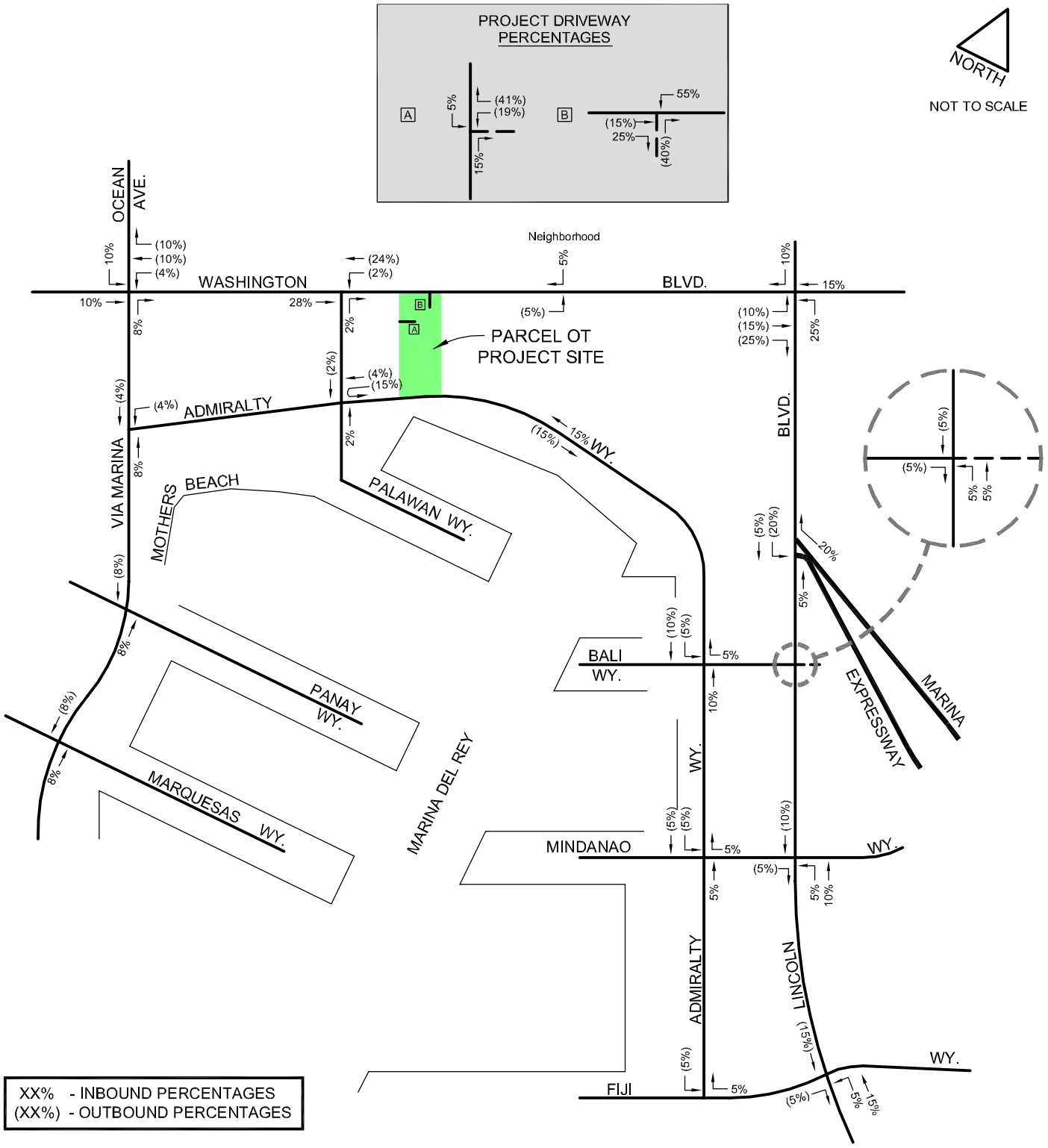

FIGURE 4(b)

1/25/2007

FN: MARINA DEL REY PARCEL OT GOLDRICH & KEST\PARCEL OT AND 21\PROJ-DIST (PCL OT RETAIL)

TRIP DISTRIBUTION PERCENTAGES
RETAIL COMPONENT ON PARCEL OT

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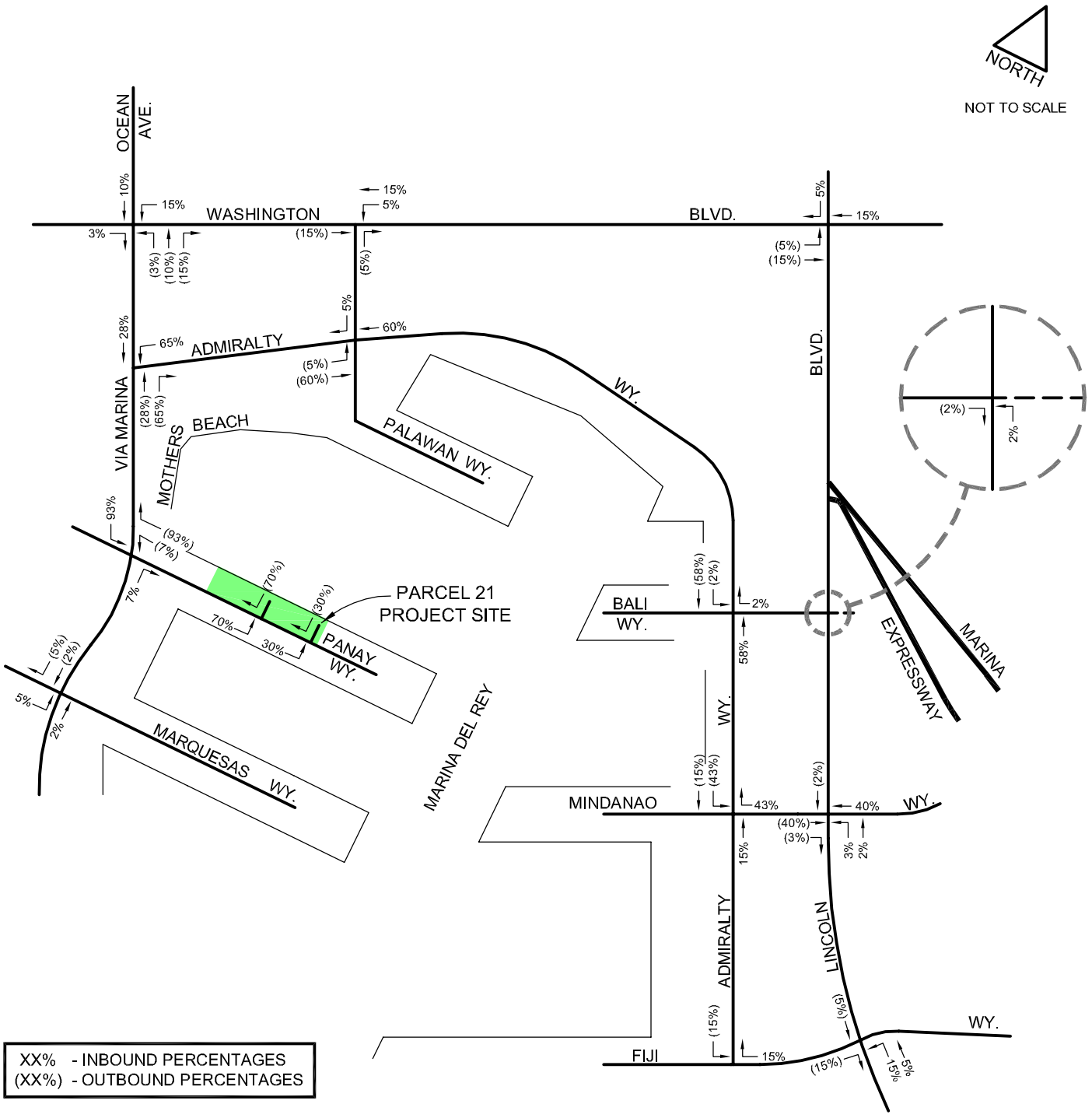

FIGURE 4(c)

1/25/2007

FN: MARINA DEL REY PARCEL OT GOLDRICH & KEST\PARCEL OT AND 21\PROJ-DIST (PCL 21)

TRIP DISTRIBUTION PERCENTAGES
PARCEL 21

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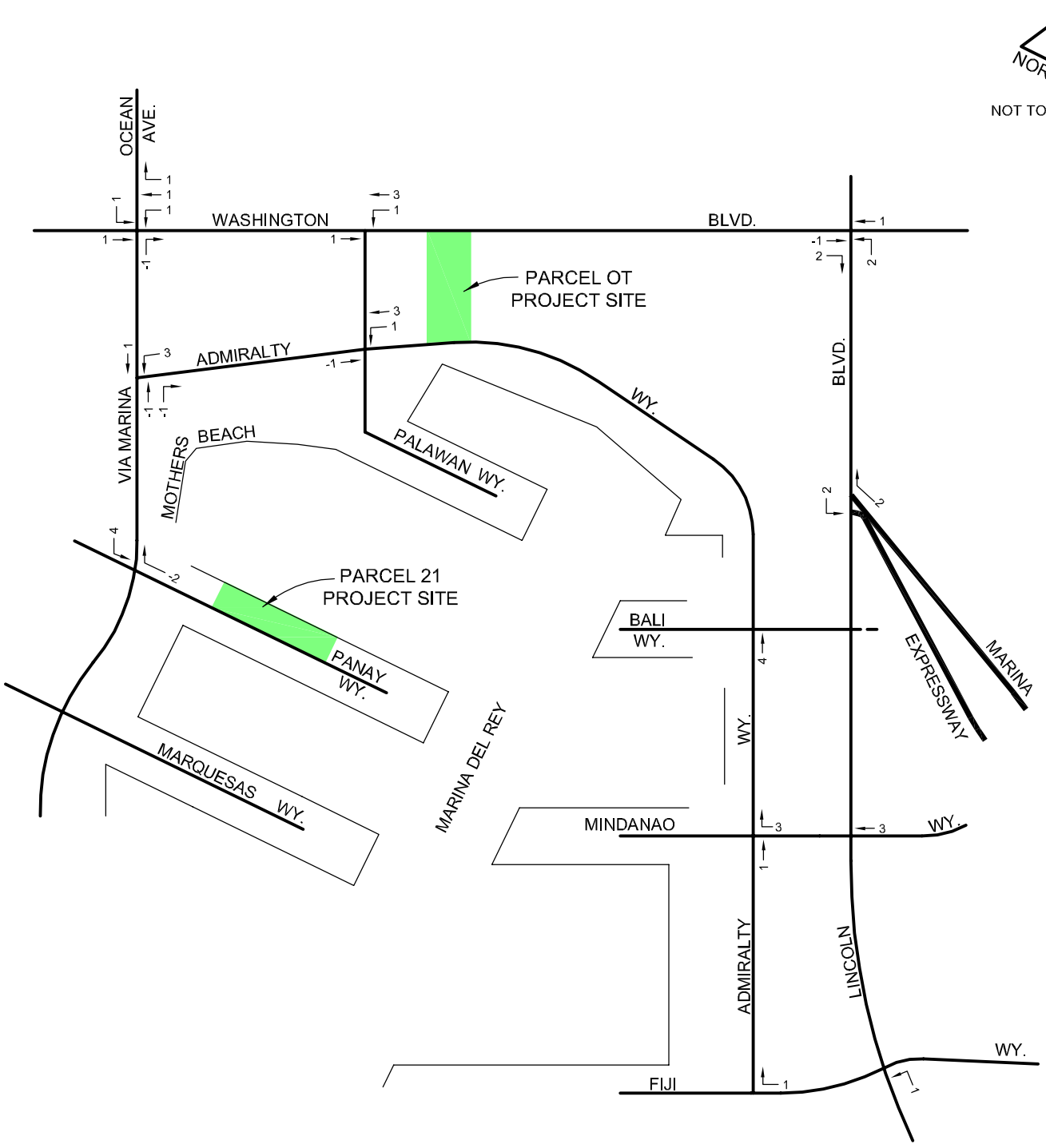

FIGURE 5(a)

1/25/2007

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\AM\PRJVOL

TOTAL NET PROJECT GENERATED TRAFFIC VOLUMES
AM PEAK HOUR

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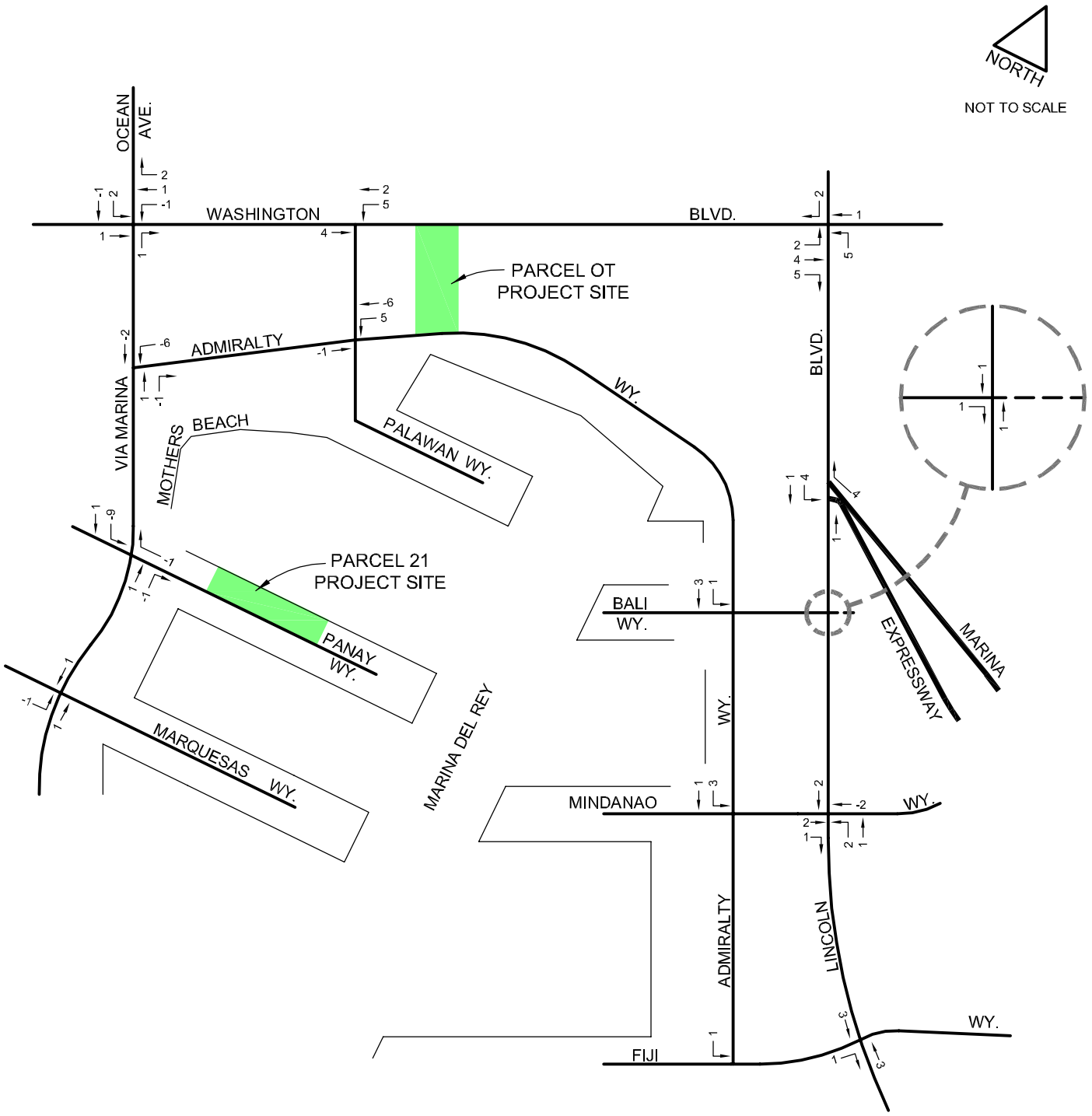

FIGURE 5(b)

1/25/2007

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\PM\PRJVOL

TOTAL NET PROJECT GENERATED TRAFFIC VOLUMES
PM PEAK HOUR

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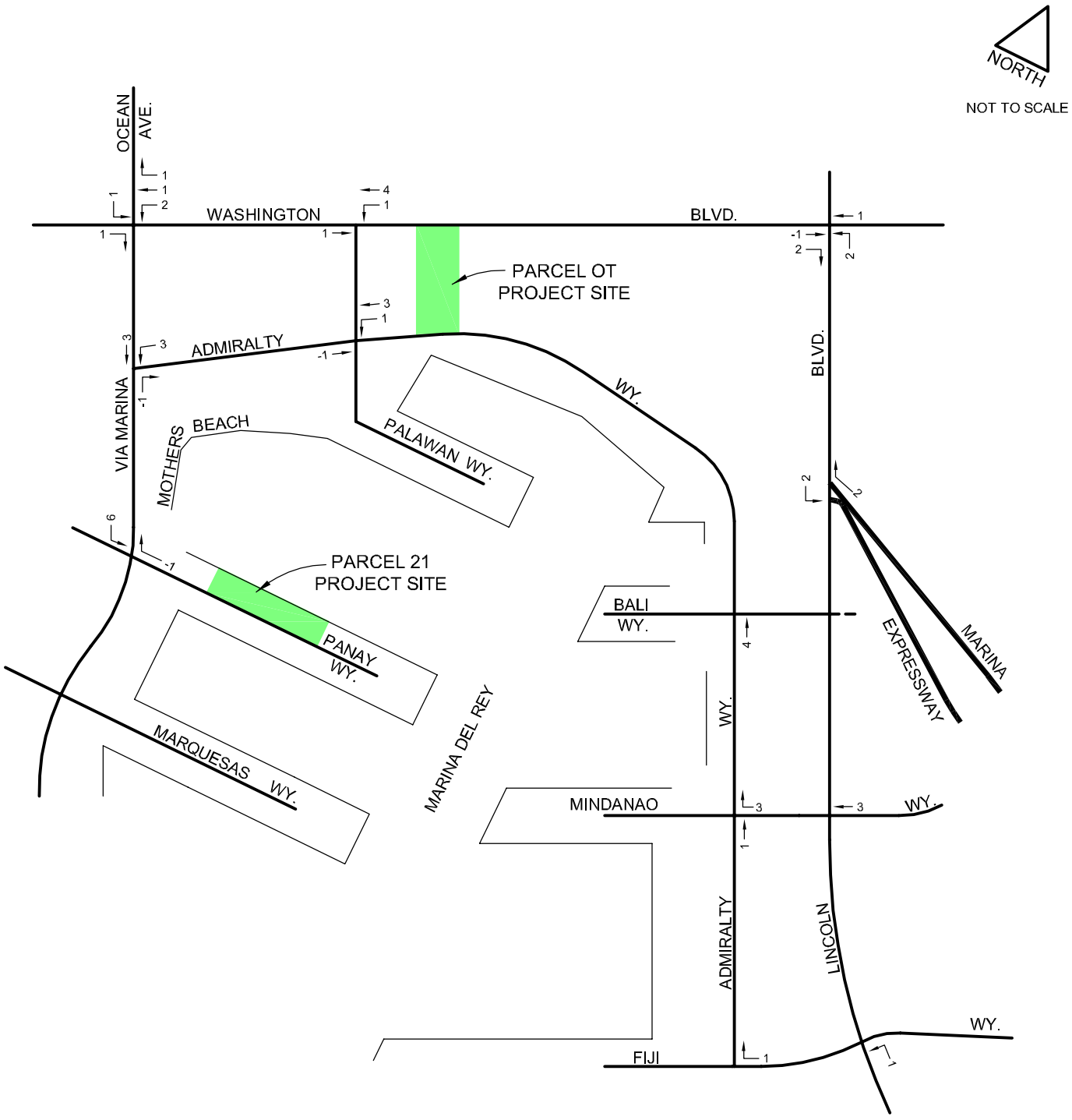

FIGURE 5(c)

1/24/2007

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\AM\PRJVOL(PARKING SPACE)

PROJECT NET TRAFFIC VOLUMES
INCLUDING PARKING SPACE RELOCATION IMPACTS
AM PEAK HOUR

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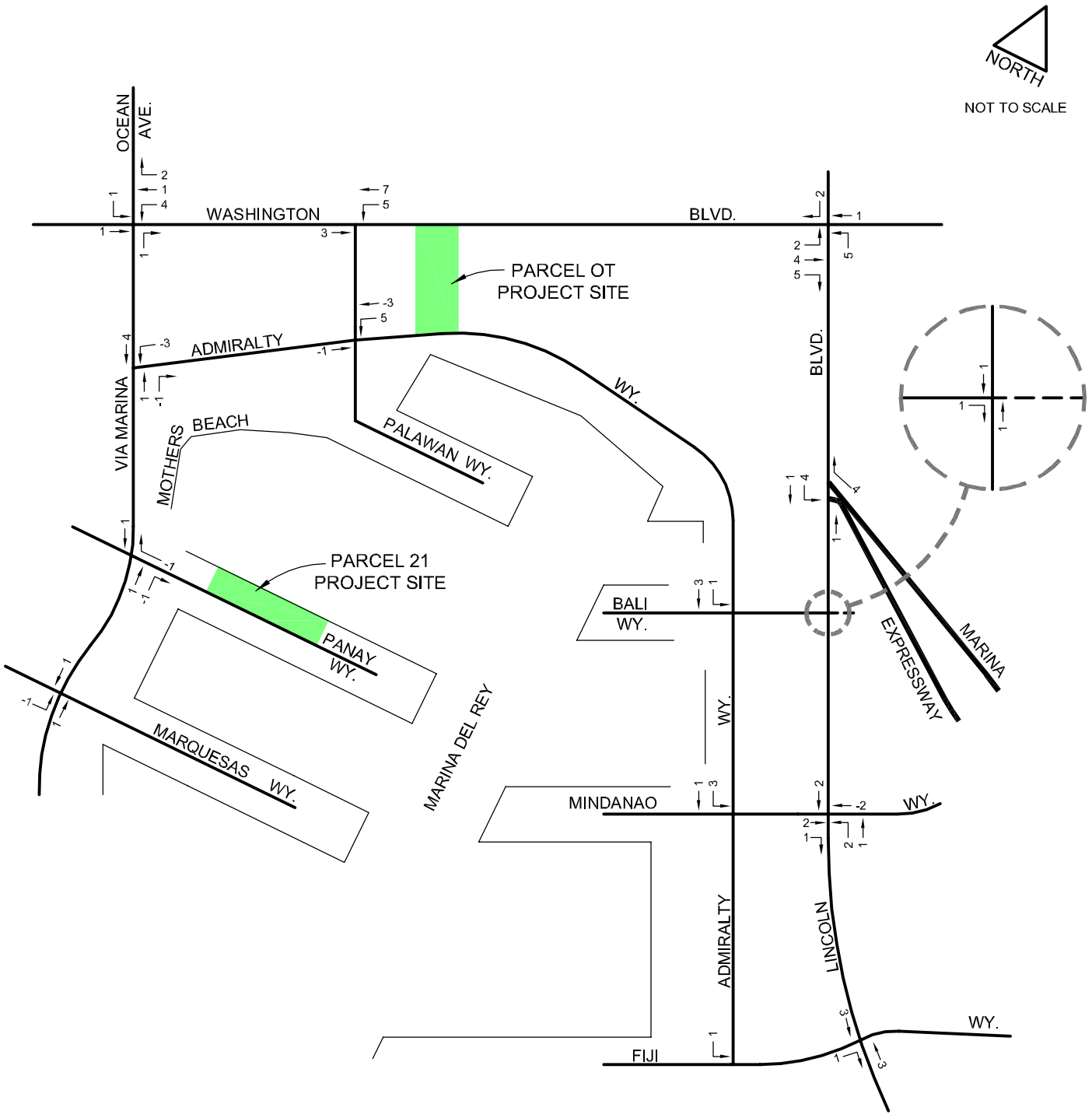

FIGURE 5(d)

1/25/2007

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\PM\PRJVOL(PARKING SPACE)

PROJECT NET TRAFFIC VOLUMES
INCLUDING. PARKING SPACE RELOCATION IMPACTS
PM PEAK HOUR

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ground and a lower ground parking levels. Access to the upper ground parking level will be located off of the existing driveway approximately 170 feet north of Admiralty Way.

Currently, the existing Parcel OT driveway provides full left- and right-turn access at Washington Boulevard. As part of the project, the left-turn access from westbound Washington Boulevard to the existing driveway would be prohibited. At Admiralty Way, the Parcel OT driveway is restricted to "right-in/right-out" operation due to the raised median island on Admiralty Way. The driveway access at Admiralty Way will remain the same with the proposed project. Parcel OT vehicular access to the lower ground parking level will also be provided from the existing driveway and from a new driveway located off of Washington Boulevard. From the existing driveway, access for the lower ground parking level will be located approximately 140 feet south of Washington Boulevard. The new Parcel OT driveway on Washington Boulevard will align with Wilson Avenue. All turning operations will be available between the new driveway and Washington Boulevard, except the left-turn egress operation at the new driveway that will be prohibited.

In addition to the three project driveway locations, the Parcel OT site would also have one ingress-only driveway and one egress-only driveway on Admiralty Way. These two driveways will provide access to the porte cochere area which is to be located in front of the hotel. Access will be restricted to right-turn-only due to the raised median on Admiralty Way.

Vehicular access to the parking facility located on Parcel 21 would be available on Panay Way via two driveways. Both Parcel 21 driveways will provide one ingress lane and one egress lane. Full left- and right-turn access will be allowed at the two driveways.

Project Parking

Parking for the proposed project will be available on both Parcel OT and Parcel 21. Parcel OT will provide a total of 157 spaces, including 116 spaces on an upper ground parking level and 41 spaces on a lower ground parking level. The upper ground parking level will provide 43 spaces for the congregate-care retirement facility. These resident parking spaces will be designated and gated in the structure. The lower ground parking level will provide 22 spaces for the retail use. Table 8(a) shows a summary of the number of parking spaces that will be provided on Parcel OT. In addition to providing parking for the proposed residential and retail uses on Parcel OT, the proposed project would involve the replacement of existing public parking spaces. Parcel OT is currently occupied by a 186-space public parking lot. This public lot will be removed in anticipation of the proposed development on this parcel. The project proposes to replace 92 of the 186 existing parking spaces on Parcel OT. These 92 spaces will be clearly marked with appropriate signage for easy access. The remaining 94 public spaces to be removed will be relocated to Parcel 21, which is located to the south of Parcel OT on Panay Way. Thus, all of the existing 186 spaces will be replaced and located on either of these parcels. It should be noted that while all of the existing 186 spaces may be used for occasional special events, Mothers Beach represents the only regular use for these spaces. The relocation of 94 spaces to Parcel 21 is expected to provide safer and more convenient parking for Mothers Beach as visitors will no longer have to cross two public streets, as is currently the case with the public parking on Parcel OT.

Parking for Parcel 21 will be available in an attached multi-level parking structure located on this parcel. The parking structure will have a total of approximately 447 spaces, including the 94 replacement parking spaces from Parcel OT, as noted previously. Table 8(b) summarizes the amount of parking that will be provided for each project land use on Parcel 21.

Table 8(a)
Project Parking Summary for Parcel OT

Component/Size			Parking Ratio	Spaces Required	Spaces Provided
114	unit	Congregate-Care Retirement Facility	0.36 spaces per unit*	41	43
5	ksf	Retail	4 spaces per ksf	20	22
		Replacement Parking Spaces**		92	92
		Total Spaces to be Provided		153	157

* Parking rate based on parking demand observed at Palm Court, a retirement facility site located in Culver City, that is similar to the proposed congregate-care retirement facility.

** The existing 186-space public parking lot will be removed in anticipation of the project. Approximately 92 spaces will be replaced on Parcel OT and the remaining 94 spaces will be relocated to Parcel 21.

The parking requirement for the proposed project is based on the rates from the Los Angeles County parking code. For Parcel OT, the project will provide 22 spaces for the retail use, or 2 spaces above the code requirement. For the proposed congregate-care retirement facility, this component is unique since it will provide transportation services to residents via limousines that will dramatically reduce the need to own and park a vehicle. As a result, the proposed retirement facility is not expected to operate like a traditional congregate-care retirement facility. Since no rates are set in the parking code for retirement facilities that provide this type of transportation service, the parking rate was based on parking observations at a similar retirement facility site located in Culver City that provides transportation services to residents. The Culver City site has 98 units and provides 35 parking spaces. Observation shows that there is sufficient parking at the Culver City site. To be conservative, it was assumed that the parking rate would equal the number of spaces provided divided by the number of units at the Culver City facility, or 0.36 spaces per unit. Based on the parking rate of 0.36 spaces per unit, the proposed congregate-care retirement facility would require approximately 41 spaces. The project proposes to provide 43 spaces for the retirement facility, or a

Table 8(b)
Project Parking Summary for Parcel 21

Component/Size			Parking Ratio	Spaces Required	Spaces Provided
Replacement for Parcel 21					
2,916	sf	Retail	4.0 spaces per ksf	12	12
3,132	sf	Marina Commercial Office	2.5 spaces per ksf	8	11
10,000	sf	Health Club Replacement	*	16	20
				36	43
Replacement from Parcel 20					
5,000	sf	Yacht Club	**	106	106
2,300	sf	Marina Commercial Office	2.5 spaces per ksf	6	6
				112	112
New Uses					
6,000	sf	Marina Commercial Office	2.5 spaces per ksf	15	15
Replacement Boaters Parking					
94	Slips	From Parcel 21	0.75 spaces per boat slip	71	71
149	Slips	From Parcel 20	0.75 spaces per boat slip	112	112
				183	183
Replacement Parking from Parcel OT				94	94
Total				**440**	**447**

* The 16 parking spaces that currently serve the existing 16,000 square feet health club will be replaced by 20 spaces for the reduced 10,000 square feet health club.

** The 106 parking spaces will serve as replacement spaces for the existing yacht club.

surplus of 2 parking spaces above the number of parking spaces required. Thus, sufficient parking will also be provided for the congregate-care retirement facility.

The amount of parking required for the Parcel 21 site is summarized in Table 8(b). This table shows that Parcel 21 will require a total of 163 spaces for the proposed uses, 183 spaces for the replacement of boater parking, and 94 replacement spaces from Parcel OT, for a total parking requirement of 440 spaces. As described previously, Parcel 21 will provide a total of approximately 447 on-site parking spaces. Thus, Parcel 21 will provide a surplus of approximately seven spaces above the number required. Therefore, no parking spillover or parking-related impacts are expected.

FUTURE TRAFFIC CONDITIONS

Other developments in the study vicinity could add traffic to the project area. For this reason, the analysis of future traffic conditions has been expanded to include potential traffic from yet undeveloped or unoccupied projects. Briefly, the methodology for estimating future traffic volumes was as follows: First, current traffic volumes were determined by traffic counts (as described in a preceding section). Next, a traffic growth factor of 0.6 percent, compounded annually, was applied to the existing traffic volumes to produce "With Ambient Growth" traffic estimates for the future study year of 2014. The annual growth rate of 0.6 percent was estimated to be the growth rate for the study area and was agreed to with the County of Los Angeles DPW. The year 2014 was chosen as the study year, as the development will likely be constructed and fully occupied within this seven-year time frame. Traffic expected to be generated by the proposed project, as calculated earlier in this report, was then added to the baseline traffic volumes to form the year 2014 "With Ambient Growth Plus Project" conditions, to determine any traffic effects directly attributable to the project's development. In addition, the replacement of existing parking spaces from Parcel OT to Parcel 21 would result in a traffic shift at the study intersections near these two parcels. This traffic shift was also considered as a result of the project's development. Finally, trips resulting from nearby "related projects" reasonably expected to be developed within the study timeline were analyzed as an incremental addition to the 2014 "With Ambient Growth Plus Project" scenario, to estimate the future "With Cumulative Project" traffic conditions.

Traffic Growth

Based on an analysis of the trends in traffic growth in this portion of the Los Angeles basin over the last several years, an annual traffic growth factor of 0.6 percent was

determined to be applicable by the County of Los Angeles DPW. The growth factor was used to account for increases in traffic resulting from projects not yet proposed or outside of the study area. This growth factor, compounded annually, was applied to the 2007 traffic volumes to develop an estimate of 2014 baseline volumes.

Related Projects

In addition to the use of the 0.6 percent annual growth rate, listings of potential related projects located in the study area were obtained from the Los Angeles County Regional Planning Department, the City of Los Angeles Department of Transportation, and from the Cities of Santa Monica and Culver City. From a review of these lists, it was determined that traffic from 43 projects near the study sites could produce additional traffic at the 14 study intersections. The locations of the related projects are shown in Figure 6.

A description and an estimate of the daily and peak hour traffic volumes expected to be generated by these related projects are summarized in Table 9. The trip-making estimates for the related projects are based on Coastal Transportation Corridor Specific Plan (CTCSP) and Appendix G (Transportation Improvement Program -- TIP) of the Marina del Rey Local Implementation Program PM trip rates, supplemented by data obtained from the ITE rates and equations, or from previously prepared traffic studies or other environmental documentation. Related project traffic was assigned to the area roadway system using a procedure identical to the methodology described previously for determining the proposed project's traffic assignments. Note that project number 17, Playa Vista Phase 1, is currently approximately 30 percent completed and occupied. Thus, a trip reduction of 30 percent was assumed for this related project when the related project trips were assigned to the network.

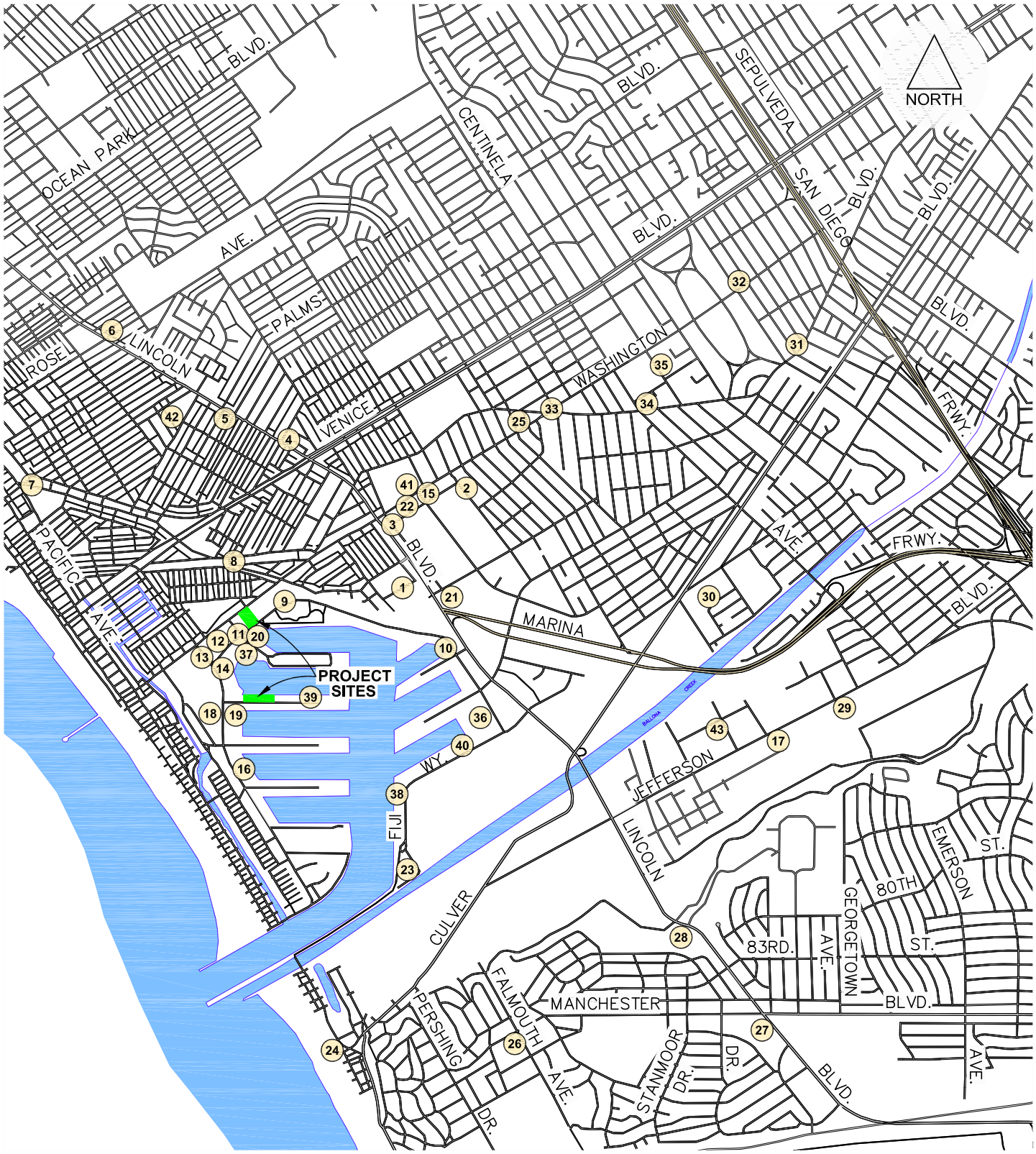

FIGURE 6

4/12/2007

FN: MARINA DEL REY PARCEL OT GOLDRICH & KEST\PARCEL OT AND 21\RELPROJS (PCLS OT AND 21)

RELATED PROJECTS LOCATION MAP

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Table 9
Related Projects Descriptions and Trip Generation

Map No.	Location (Address)	Size	Unit	Description	Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
1.	NWC Princeton Dr./Carter Av. [1]	298	du	Apartment	860	(70)	103	47	(79)
		(24,000)	*sf*	*Light Manufacturing (to be removed)*					
		(21,600)	*sf*	*Office (to be removed)*					
		(40,000)	*sf*	*Auto Service/Repair (to be removed)*					
2.	4055, 4063 & 4071 S. Redwood Av.	140	du	Condominium	820	11	51	66	32
3.	4004 S. Lincoln Bl.	98	du	Condominium	574	7	36	46	23
		6,020	sf	Retail	267	4	3	13	17
					841	**11**	**39**	**59**	**40**
4.	2005 Lincoln Bl.	6	vfp	Service Station w/ Convenience Store	977	30	30	11	11
5.	1430 Lincoln Bl.	188,600	sf	Retail	10,257	140	89	501	543
		280	du	Apartment	1,882	29	114	127	69
					12,139	**169**	**203**	**636**	**613**
6.	115 Lincoln Bl.	8,800	sf	Shopping Center (addition)	378	5	4	61	67
7.	901 Abbott Kinney Bl. [2]	57	rm	Hotel	757	19	11	33	24
		1,200	sf	Retail					
		4,300	sf	Restaurant					
8.	2100 Abbot Kinney Bl.	15,180	sf	Office	167	21	3	7	36
9.	4333 Admiralty Wy.	600	du	Condominium	3,516	45	219	133	63

Table 9 (continued)
Related Projects Descriptions and Trip Generation

Map No.	Location (Address)	Size	Unit	Description	Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
10.	4363 Lincoln Bl. [3]	158	du	Condominium	386	0	47	53	18
		3,178	sf	Specialty Retail					
		(48,000)	*sf*	*Car Rental Facility (to be removed)*					
11.	NWC Admiralty Wy./Palawan Wy. [4]	179	du	Apartment	650	11	51	34	24
	(Parcels 140)	*(64)*	*du*	*Apartment (to be removed)*	*(233)*	*(4)*	*(18)*	*(12)*	*(9)*
					417	**7**	**33**	**22**	**15**
12.	514-586 Washington Bl. [5]	6,236	sf	Retail	18	1	0	1	1
	bet. Via Marina/Palawan Wy.	*(5,750)*	*sf*	*Retail (to be removed)*					
	(Parcel 97)								
13.	S/s Washington Bl.	72	du	Apartment	484	7	30	16	7
	bet. Via Marina/Via Dolce	400	st	Restaurant (10,000 sf)	1,144	6	6	64	36
	(Parcel 95/LLS)	22,400	sf	Retail	993	16	11	43	56
		(9,130)	*sf*	*Office (to be removed)*	*(101)*	*(12)*	*(2)*	*(3)*	*(17)*
		(165)	*st*	*Restaurant (to be removed)*	*(472)*	*(3)*	*(2)*	*(26)*	*(15)*
		(7,500)	*sf*	*Drive-in Bank (to be removed)*	*(1,849)*	*(52)*	*(41)*	*(17)*	*(16)*
					199	**(38)**	**2**	**77**	**51**
14.	S/s Admiralty Wy., E/s Via Marina	147	rm	Hotel	1,201	50	32	23	29
	(Parcel IR)								
15.	13340 Washington Bl.	41	du	Condominium	240	3	15	14	7

Table 9 (continued)
Related Projects Descriptions and Trip Generation

Map No.	Location (Address)	Size	Unit	Description	Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
16.	E/s Via Marina (Parcels 10R, FF and 9U) [6]	526	du	Apartment	3,104	87	166	132	96
		174	slip	Boat Dock					
		288	rm	Hotel					
		1.47	acre	Public Park					
		(136)	*du*	*Apartment (to be removed)*					
		(184)	*slip*	*Boat Dock (to be removed)*					
17.	South of Jefferson Bl., E/o Lincoln Bl.	3,206,950	sf	Office	38,733	2,455	1,540	1,777	3,217
	(Playa Vista Phase I)	3,246	du	Condominium					
		35,000	sf	Retail					
		120,000	sf	Community Serving Uses					
18.	W/s Via Marina (Parcel 100 and 101) [7]	544	du	Apartment	2,154	34	156	120	57
		(202)	*du*	*Apartment (to be removed)*	*(1,354)*	*(13)*	*(57)*	*(45)*	*(21)*
					800	**21**	**99**	**75**	**36**
19.	E/s Via Marina	940	du	Apartment	1,785	31	140	106	46
	bet. Panay Wy./Marquesas Wy. [8]	82	du	Senior Apartment					
	(Parcels 12, 15)	4,000	sf	Retail					
		6,000	sf	Commercial					
		439	slip	Boat					
20.	S/s Admiralty Wy., E/s Palawan Wy.	351	du	Apartment	2,359	36	143	78	36
	(Parcel 33/NR)	24,300	sf	Retail	1,077	17	12	46	62
		266	seat	Restaurant (10,000 sf)	761	4	4	45	22
		(1,067)	*seat*	*Restaurant (to be removed)*	*(3,052)*	*(17)*	*(15)*	*(179)*	*(88)*
					1,145	**40**	**144**	**(10)**	**32**

Table 9 (continued)
Related Projects Descriptions and Trip Generation

Map No.	Location (Address)	Size	Unit	Description	Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
21.	E/o Lincoln Bl. Betw. SR90 & Maxella Av. [9]			Villa Marina Mixed-Use Project	903	11	84	73	10
		244	du	Condominium					
		9,000	sf	Shopping Center					
		(21,038)	*sf*	*Shopping Center (to be removed)*					
22.	13464 W. Washington Bl. [10]	81	du	Condominium	1,401	11	32	83	75
		37,041	sf	Retail					
		(22)	*rm*	*Motel (to be removed)*					
		(7,525)	*sf*	*Retail (to be removed)*					
		(8,500)	*sf*	*Industrial (to be removed)*					
23.	Southern terminus of Fiji Wy. (Parcel 64) [11]	478	du	Multi-family Residential	1,106	17	76	58	30
		500	sf	Restaurant					
		34	slip	Boat					
		(224)	*du*	*Apartment (to be removed)*					
24.	NWC Pacific Av./Culver Bl. [12]	35	du	Townhome	548	16	24	34	22
		2,000	sf	Retail					
		2,000	sf	Restaurant					
25.	12801-23 Washington Bl.	12	du	Live/Work	81	1	5	5	2
		12	du	Apartment	81	1	5	5	2
					162	**2**	**10**	**10**	**4**
26.	8030-8040 Manchester Av.	204	du	Apartment	1,371	21	83	93	50

Table 9 (continued)
Related Projects Descriptions and Trip Generation

Map No.	Location (Address)	Size	Unit	Description	Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
27.	8601 Lincoln Bl. [13]	547	du	Apartment	905	(128)	136	124	(10)
		17,000	sf	Shopping Center					
		4,000	sf	Retail					
		5,000	sf	High-Turnover Restaurant					
		3,000	sf	Quality Restaurant					
		(500)	*rm*	*Hotel (to be removed)*					
		(10,420)	*sf*	*Retail (to be removed)*					
		(10,590)	*sf*	*Office (to be removed)*					
		(4,800)	*sf*	*High-Turnover Restaurant (to be removed)*					
28.	7400 80th St. [14]	120	du	Single-Family Residential	1,220	25	70	82	46
29.	South of the intersection of Jefferson Bl./ Westlawn Av. [15]	175,000	sf	Office	24,220	577	1,049	1,275	1,027
		2,600	du	Apartment					
		150,000	sf	Retail					
		40,000	sf	Community Serving Uses					
30.	12700 Braddock Dr.	134,557	sf	Warehouse	667	50	11	54	161
		1,357	sf	Office	15	2	0	1	3
		(58,323)	*sf*	*University of CA laundry building (to be removed)*	*(223)*	*(33)*	*(10)*	*(17)*	*(30)*
					459	**19**	**1**	**38**	**134**
31.	11501-11509 Washington Bl.	2	du	Apartment	13	0	1	1	0
		950	sf	Office	37	4	1	14	66
		2,359	sf	Retail	105	2	1	3	3
					155	**6**	**3**	**18**	**69**

Table 9 (continued)
Related Projects Descriptions and Trip Generation

Map No.	Location (Address)	Size	Unit	Description	Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
32.	11611 Washington Pl.	20	du	Senior Day Care Facility (9,970 sf)	43	1	0	2	1
		(9,970)	*sf*	*Furniture manufacturing/warehouse (to be removed)*	*(38)*	*(5)*	*(2)*	*(3)*	*(4)*
					5	**(4)**	**(2)**	**(1)**	**(3)**
33.	4025 Wade St.	4	du	Condominium	23	0	2	2	1
34.	12337-12449 Washington Bl.			Phase A					
		12,070	sf	Commercial	535	8	6	15	18
		60	du	Condominium	352	4	22	21	10
				Phase B					
		3,890	sf	Commercial	172	3	2	5	6
		18	du	Condominium	105	1	7	6	3
					1,164	**16**	**37**	**47**	**37**
35.	4061 Grand View Bl.	70	du	Assisted Living Facility	151	2	2	7	5
36.	W/O Lincoln Bl., N/O Fiji Wy. (Parcels 50&83)	4,700	sf	Retail	208	4	2	9	12
37.	SWC Admiralty Wy. & Palawan Wy.	111	rm	Hotel	907	38	24	18	21
	(Parcel 27)	*(42)*	*rm*	*Hotel (to be removed)*	(343)	(15)	(9)	(7)	(8)
					564	**23**	**15**	**11**	**13**

Table 9 (continued)
Related Projects Descriptions and Trip Generation

Map No.	Location (Address)	Size	Unit	Description	Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
38.	West of Fiji Wy. Near Terminus - Fisherman's Village [16]	132	rm	Hotel	2,375	41	57	114	95
		1,230	seat	Restaurant					
	(Parcels 55/56/W)	24,250	sf	Retail					
		5,200	sf	Office					
		26	slip	Boat					
		(12,984)	*sf*	*Retail/Commercial (to be removed)*					
		(16,149)	*sf*	*Restaurant (to be removed)*					
		(17)	*slip*	*Boat (to be removed)*					
39.	N/O Panay Wy., E/O Via Marina (Parcel 20, Phase II)	26,000	sf	DBH Office	286	35	5	10	47
40.	N/s Fiji Wy., W/o Admiralty Wy.	345	Vessel	Dry Stack Storage Facility	995	15	28	17	30
	(Parcel 52/GG)	30	Vessel	Mast Up Storage Space	86	1	3	1	3
		1,500	sf	Sheriff Boatwright Facility	-	-	-	-	-
					1,081	**16**	**31**	**18**	**33**
41.	13365 Washington Boulevard	5,000	sf	Retail	222	4	2	6	8
		19	du	Condominium	111	1	7	7	3
					333	**5**	**9**	**13**	**11**
42.	841 California Ave.	420	st	High School	718	119	53	28	31
43.	5401 Beethoven St.	420	st	Private School (K-8)	N/A	208	170	120	136

Table 9 (continued)
Related Projects Descriptions and Trip Generation

Sources:

[1] Traffic Analysis for a Proposed 298-unit Residential Development on Princeton Drive in the Oxford Triangle Neighborhood of the City of Los Angeles, Crain & Associates, Revised January 2004.

[2] Los Angeles Department of Transportation Traffic Study Memorandum of Understanding (MOU), The Ambrose Hotel, Crain & Associates, April 17, 2006.

[3] Los Angeles Department of Transportation Scoping for Traffic Study for Marina del Rey Mixed-Use Platt Project, Crain & Associates, May 22, 2006.

[4] Traffic Analysis for a Proposed 179-unit Residential Development at 4160 Admiralty Way (Parcels 140) in Marina del Rey, Crain & Associates, September 2003.

[5] Traffic Analysis for 6,236 sf Retail Development at 514-586 Washington Boulevard, between Via Marina and Palawan Way, in Marina del Rey, Crain & Associates, November 2002.

[6] Traffic Analysis for Proposed Residential and Hotel Development on Parcels 10R, FF and 9U in Marina del Rey, Crain & Associates, January 2007.

[7] Traffic Analysis for a Proposed 544-unit Residential Development on Parcels 100 and 101 in Marina del Rey, Crain & Associates, August 2005.

[8] Traffic Analysis for 1,201-unit Residential Development on Panay Way, Via Marina, and Marquesas Way in Marina del Rey, Crain & Associates, Revised March 2000, revised per approved development.

[9] Final EIR for The Villa Marina Mixed-Use Project, PCR Services Corporation, March 2005.

[10] Los Angeles Department of Transportation Scoping for Traffic Study for Washington & Glencoe Mixed-use Project, Crain & Associates, October 10, 2006.

[11] Traffic Analysis for a Proposed 478-unit Residential Development on Parcel 64 in Marina del Rey, Crain & Associates, January 2007.

[12] Traffic Analysis for Proposed Mixed-Use Development at Pacific Avenue and Culver Boulevard, Playa del Rey, City of Los Angeles, Crain & Associates, November 2004.

[13] Traffic Impact Study for Residential Mixed-Use Project at Lincoln Boulevard/Manchester Avenue (8601 Lincoln Boulevard), City of Los Angeles, Crain & Associates, November 2002.

[14] Traffic Analysis for 120-unit Single-Family Residential Development Located on 80th Street in the City of Los Angeles, Crain & Associates, January 1998.

[15] Traffic Analysis for The Village at Playa Vista Project, Kaku Associates, Inc. and Raju Associates, Inc., July 2003.

[16] Traffic Study for the Fisherman's Village Retail and Commercial Development Project, Hirsch Green Traffic Consultant, March 2007.

Highway System Improvements

No significant highway improvements in the project area, other than some of the improvements listed as cumulative mitigation, were identified by either the County or City of Los Angeles as on-going or likely to be completed within the year 2014 project development timeline. Therefore, for purposes of analysis of the future traffic conditions, as discussed in the following section, no improvements to the existing roadway system in the study area were assumed. This assumption results in a "worst case" analysis, and more readily identifies locations where improvements should be made in order to provide sufficient roadway capacity to accommodate project traffic.

Impact Significance Criteria

The County of Los Angeles defines a significant traffic impact based on a "stepped scale" as defined in the "Traffic Impact Analysis Report Guidelines" prepared by the DPW.[4] The impact definition recognizes that intersections at high volume-to-capacity ratios are more sensitive to additional traffic than those operating with available surplus capacity. A significant impact is identified as an increase in the CMA value of 0.010 or more, when the final ("With Project") Level of Service is E or F (CMA > 0.900); a CMA increase of 0.020 or more at LOS D (CMA > 0.800 to 0.900), or an increase of 0.040 or more at LOS C (CMA > 0.700 to 0.800). These criteria are summarized in Table 10.

[4] Traffic Impact Analysis Report Guidelines, County of Los Angeles Department of Public Works, January 1, 1997.

Table 10
LADOT Criteria for Significant Traffic Impact

LOS	Final CMA Value	Project-Related Increase in CMA Value
C	0.700 - 0.800	equal to or greater than 0.040
D	> 0.800 - 0.900	equal to or greater than 0.020
E, F	> 0.900	equal to or greater than 0.010

Analysis of Future Traffic Conditions (With and Without Project)

The analysis of future conditions in the project area was performed using the same critical movement analysis procedures described previously. For future project conditions, the roadway system was considered to have no improvements beyond existing conditions.

Traffic volumes used in the analysis of future year conditions were developed as follows:

- As described earlier in the report, future-year traffic volumes for the project vicinity were determined by applying a 0.6 percent per year ambient growth factor to the 2007 traffic volumes, to estimate area traffic growth.
- Traffic volumes generated by the project were combined with these benchmark “Without Project (With Ambient Growth Only)” volumes to form the “With Ambient Growth Plus Project” traffic conditions, and to determine traffic impacts directly attributable to the proposed development. Any traffic shift due to the replacement of the existing parking spaces from Parcel OT to Parcel 21 was also considered.
- Finally, traffic generated by the 43 identified related projects was added to the “With Ambient Growth Plus Project” traffic volumes described above, to produce an estimate of the potential future cumulative traffic conditions within the study area.

It should be noted that a manual count of the existing Parcel OT parking lot was conducted during the AM and PM peak hours in order to evaluate the replacement of parking spaces from Parcel OT to Parcel 21. As described in a previous section, the existing parking lot on Parcel OT currently has 186 spaces. The proposed project will replace 92 of the 186 spaces on Parcel OT. Approximately 94 spaces will be relocated to Parcel 21. In order to determine the net impacts of relocating these 94 spaces, the traffic count from the existing Parcel OT lot was assigned to the local roadway network. In addition, these volumes were re-distributed to Parcel 21. For this analysis, it was assumed that all of the existing trips would shift from Parcel OT to Parcel 21 since the replacement spaces on Parcel 21 are expected to provide more convenient and safe parking for Mothers Beach visitors. (All of the existing 186 spaces are used for occasional special events. But Mothers Beach represents the only regular use for these spaces and typically uses less than one-half of the spaces.) It was also assumed that the traffic shift would only affect the five study intersections located on Via Marina at Washington Boulevard, Admiralty Way and Panay Way and on Palawan Way at Washington Boulevard and Admiralty Way due to the close proximity of the existing Parcel OT lot to Parcel 21. Appendix D shows the traffic volume shifts for the AM and PM peak hours.

The 2014 baseline “Without Project (With Ambient Growth Only)” AM and PM peak hour traffic volumes are shown in Figures 7(a) and 7(b), respectively. Future year 2014 “With Ambient Growth Plus Project” traffic volumes are shown in Figures 8(a) and 8(b) for the AM and PM peak hours, respectively.

The results of the Critical Movement Analysis for future traffic conditions at the study intersections are summarized in Table 11. The table shows that the incremental project traffic will not affect the level of service forecasts at any of the study intersections. The project is also not expected to result in a significant traffic impact at any of the study intersections.

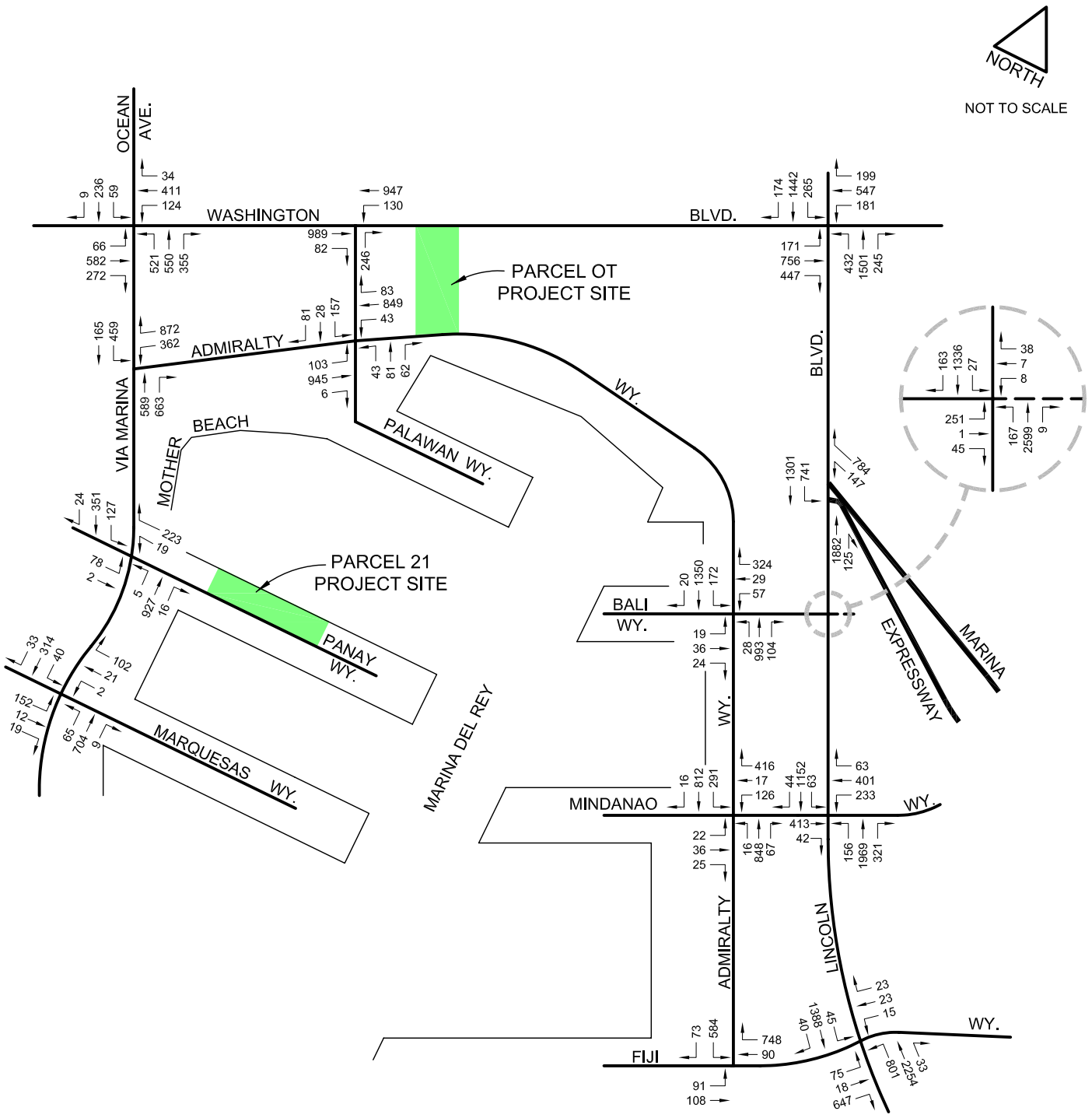

FIGURE 7(a)

6/12/2008

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\2008-6\AM2014WO

FUTURE (2014) TRAFFIC VOLUMES
WITHOUT PROJECT
AM PEAK HOUR

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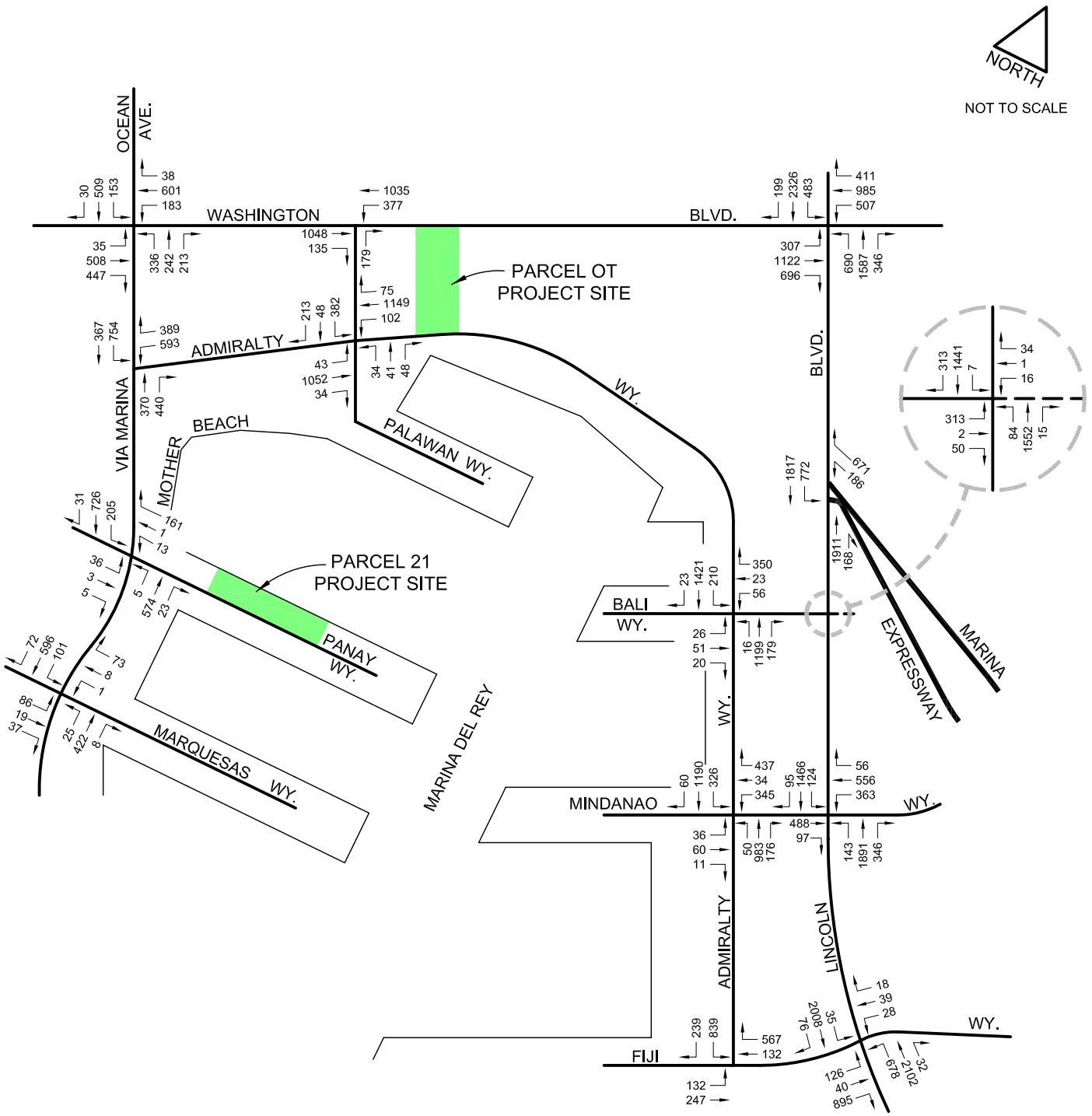

FIGURE 7(b)

6/12/2008

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FUTURE (2014) TRAFFIC VOLUMES
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PM PEAK HOUR

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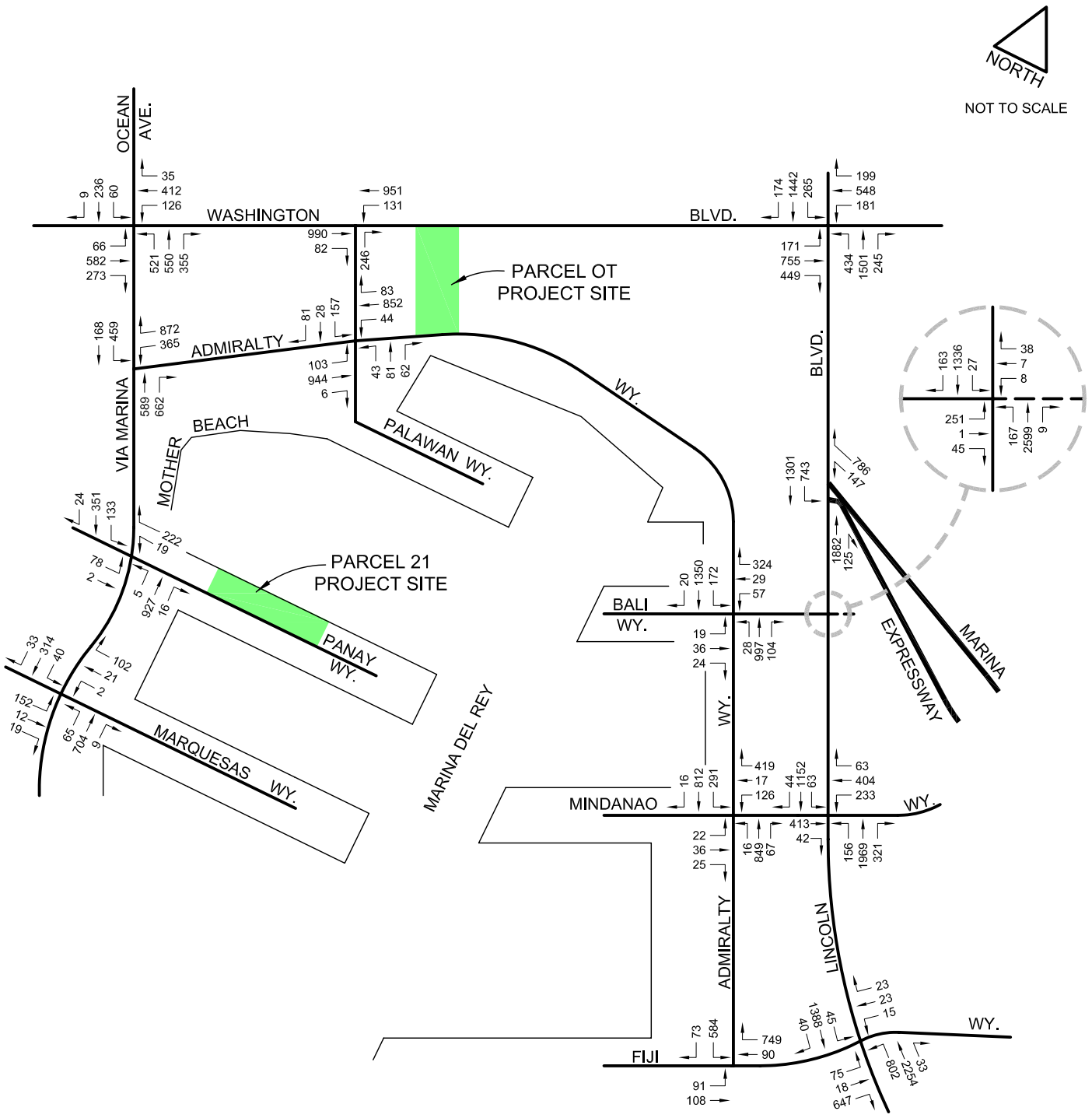

FIGURE 8(a)

6/12/2008

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\2008-6\AM2014WP

FUTURE (2014) TRAFFIC VOLUMES
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AM PEAK HOUR

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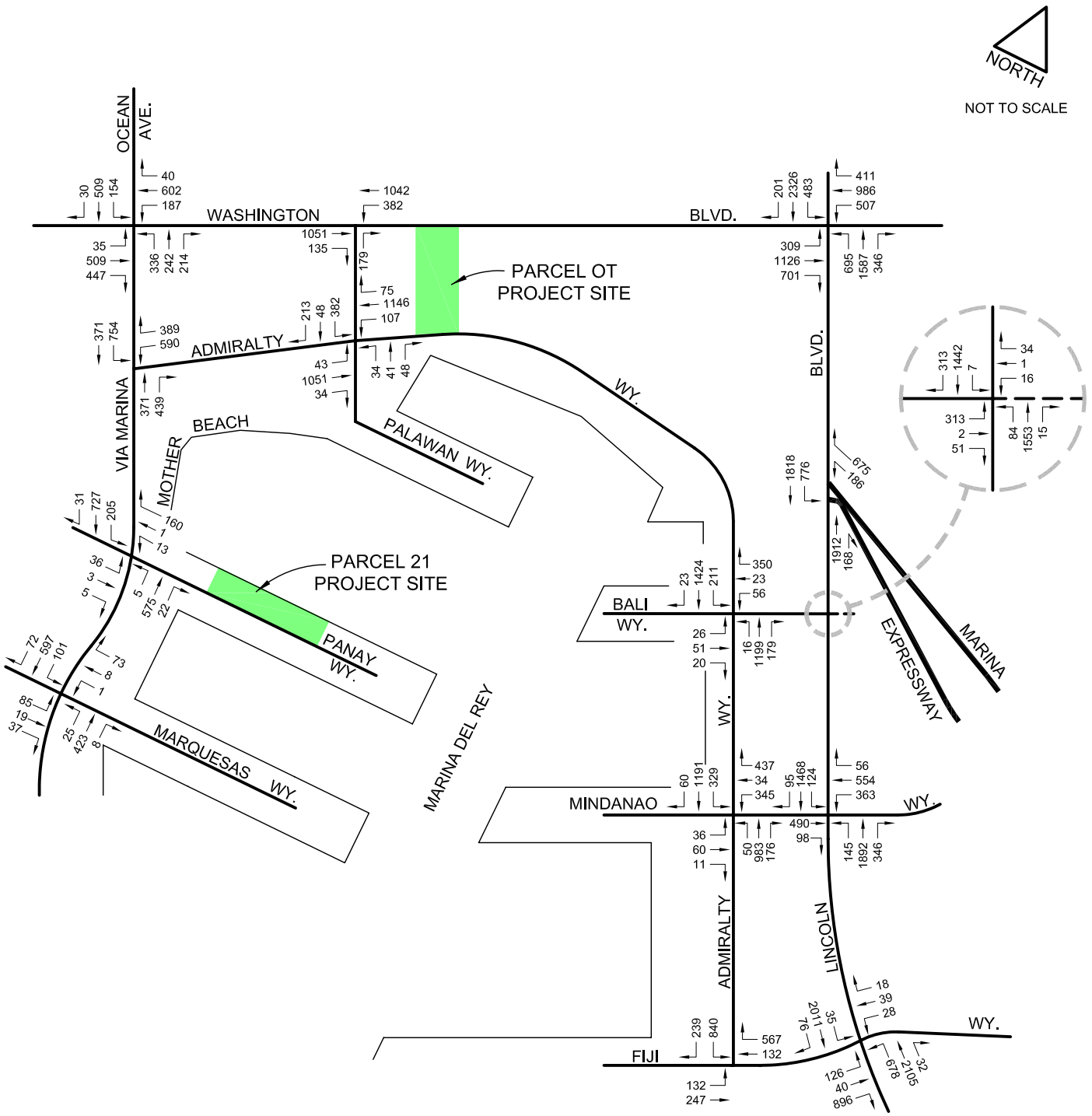

FIGURE 8(b)

6/12/2008

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FUTURE (2014) TRAFFIC VOLUMES
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Table 11
Summary of Critical Movement Analysis
Future (2014) Ambient Growth Traffic Conditions – Without and With Project

No.	Intersection	Peak Hour	With Ambient Growth		With Ambient Growth Plus Project		
			CMA	LOS	CMA	LOS	Impact
1	Washington Boulevard and	AM	0.748	C	0.750	C	0.002
	Via Marina/Ocean Avenue	PM	0.805	D	0.807	D	0.002
2	Washington Boulevard and	AM	0.671	B	0.672	B	0.001
	Palawan Way	PM	0.751	C	0.757	C	0.006
3	Washington Boulevard and	AM	0.813	D	0.813	D	0.000
	Lincoln Boulevard	PM	1.400	F	1.403	F	0.003
4	Admiralty Way and	AM	0.734	C	0.734	C	0.000
	Via Marina	PM	0.788	C	0.787	C	-0.001
5	Admiralty Way and	AM	0.446	A	0.447	A	0.001
	Palawan Way	PM	0.635	B	0.633	B	-0.002
6	Panay Way and	AM	0.362	A	0.363	A	0.001
	Via Marina	PM	0.266	A	0.266	A	0.000
7	Marquesas Way and	AM	0.273	A	0.273	A	0.000
	Via Marina	PM	0.189	A	0.189	A	0.000
8	Admiralty Way and	AM	0.482	A	0.483	A	0.001
	Bali Way	PM	0.607	B	0.607	B	0.000
9	Admiralty Way and	AM	0.658	B	0.660	B	0.002
	Mindanao Way	PM	0.778	C	0.779	C	0.001
10	Admiralty Way and	AM	0.268	A	0.268	A	0.000
	Fiji Way	PM	0.387	A	0.387	A	0.000
11	Lincoln Boulevard and	AM	0.713	C	0.713	C	0.000
	Marina Expressway	PM	0.756	C	0.758	C	0.002
12	Lincoln Boulevard and	AM	0.682	B	0.682	B	0.000
	Bali Way	PM	0.539	A	0.539	A	0.000
13	Lincoln Boulevard and	AM	0.760	C	0.760	C	0.000
	Mindanao Way	PM	0.891	D	0.892	D	0.001
14	Lincoln Boulevard and	AM	0.617	B	0.617	B	0.000
	Fiji Way	PM	0.767	C	0.768	C	0.001

Cumulative Impacts

Traffic resulting from the previously identified 43 related projects would also contribute to impacts at the study intersections. In order to gauge the effects of this additional traffic, an additional level of analysis was conducted. Although the 0.6 percent annual growth factor is expected to fully represent all area traffic increases, for the purposes of conservative analysis, traffic generated from nearby "related projects" was added to these future baseline traffic volumes, to form the basis for the "Without Project" conditions. Further, in order to present a conservative analysis of future conditions, all of the 43 related projects were assumed to be completed and fully occupied by the study year (2014), although in reality, many of the related projects are still speculative, have not yet been approved, or are sufficiently large or complicated that they will not be constructed and fully occupied within the assumed study timeframe.

Figures 9(a) and 9(b) show the anticipated AM and PM peak hour traffic at the study intersections resulting from the expected cumulative development in the study area. The related project traffic volumes were added to the "With Ambient Growth Plus Project" traffic volumes shown previously in Figures 8(a) and 8(b) to obtain projections of the ultimate expected future year 2014 traffic. These cumulative traffic volumes are shown in Figures 10(a) and 10(b) for the AM and PM peak hours, respectively. The analysis of the cumulative traffic conditions was performed using the same CMA methodology described earlier.

The results of the cumulative development analysis are summarized in Table 12. This table shows the impact for the cumulative development including the project. The same criteria that was applied to the project impact is applied to the cumulative impact. As this table also shows, the potential additional traffic resulting from area-wide development would significantly impact 11 of the 14 study intersections, resulting in

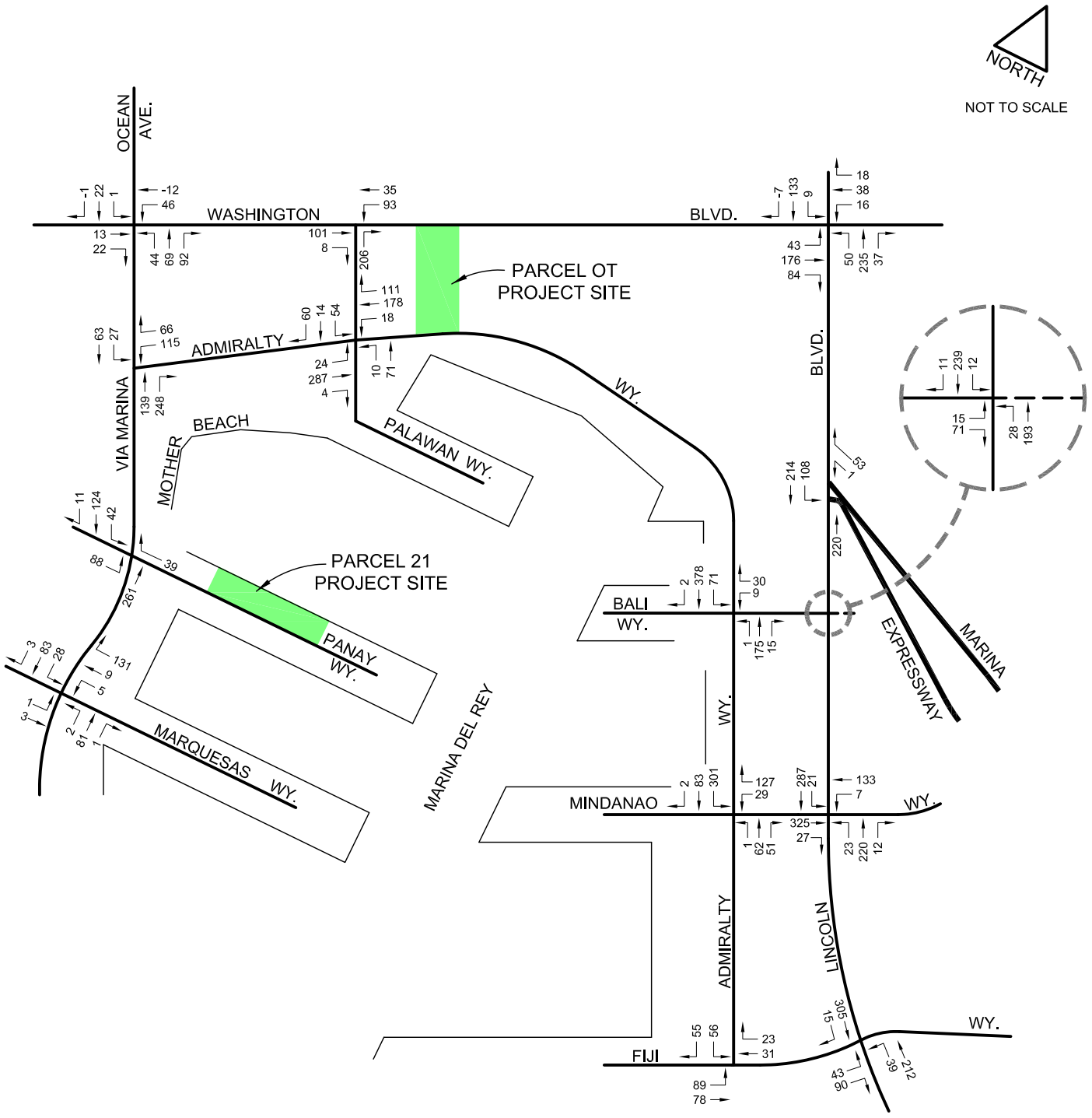

FIGURE 9(a)

4/12/2007

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RELATED PROJECT TRAFFIC VOLUMES
AM PEAK HOUR

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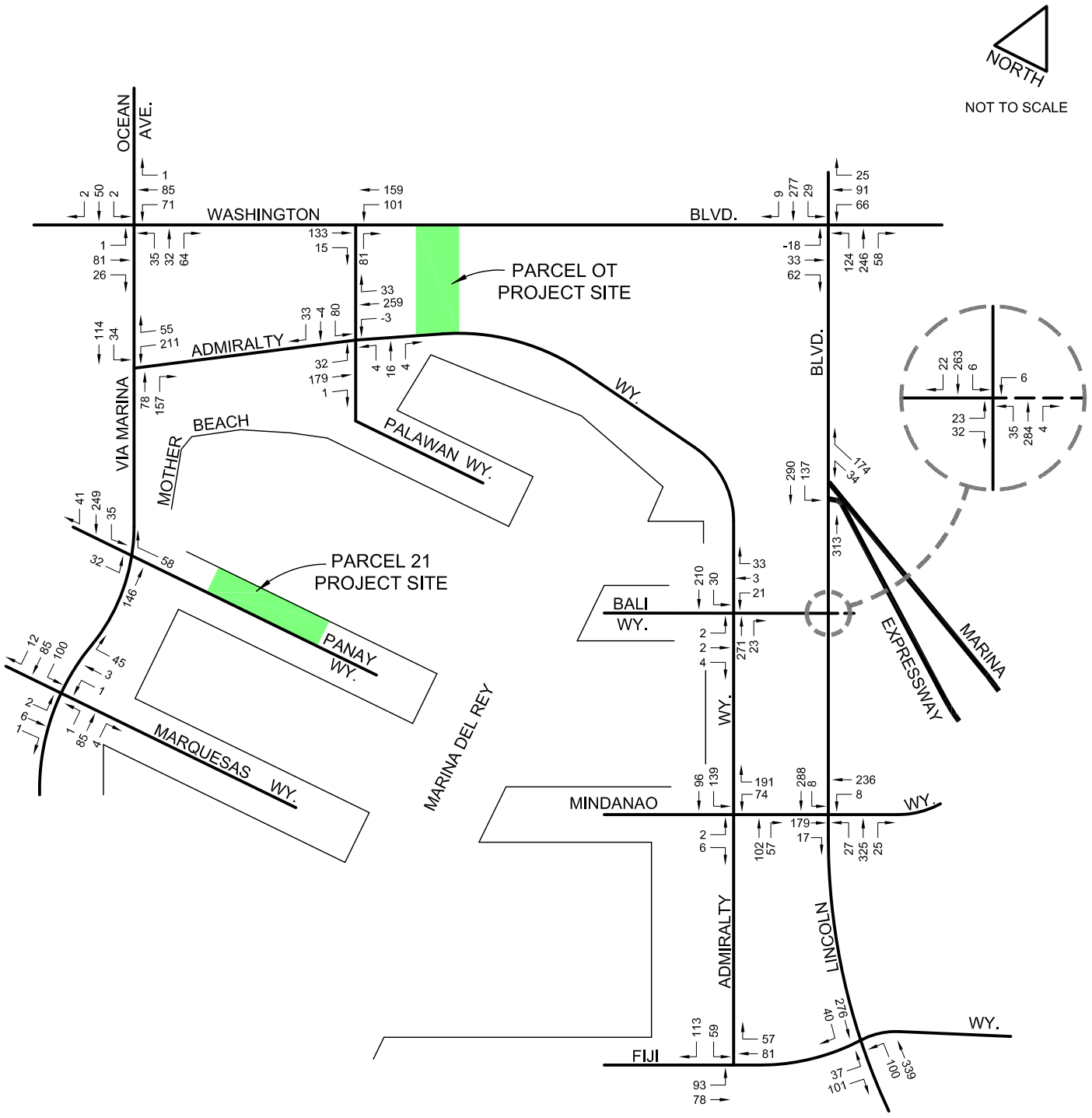

FIGURE 9(b)

4/12/2007

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RELATED PROJECT TRAFFIC VOLUMES
PM PEAK HOUR

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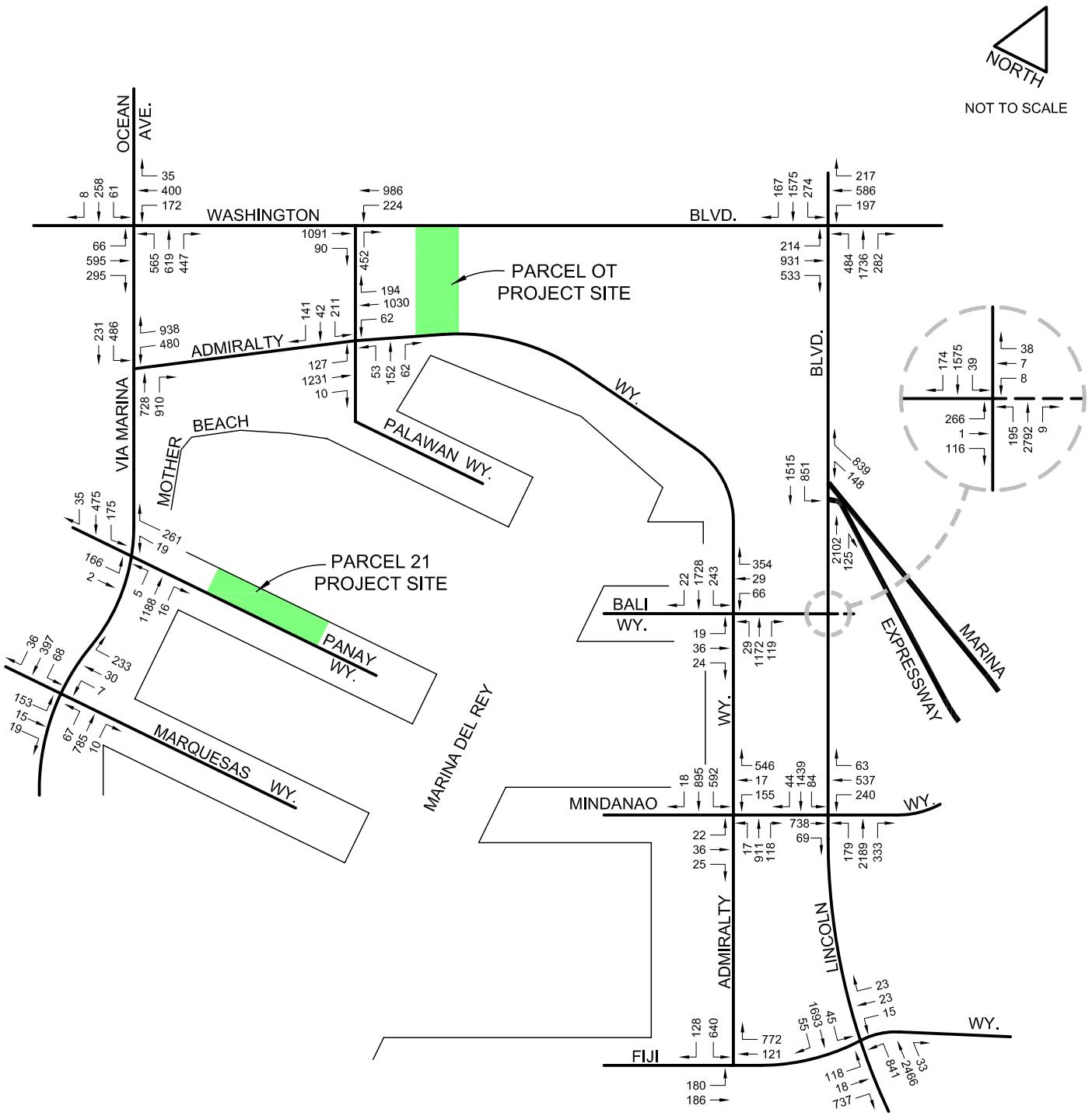

FIGURE 10(a)

6/12/2008

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\2008-6\AM2014WP(CUM)

FUTURE (2014) TRAFFIC VOLUMES
WITH CUMULATIVE PROJECT
AM PEAK HOUR

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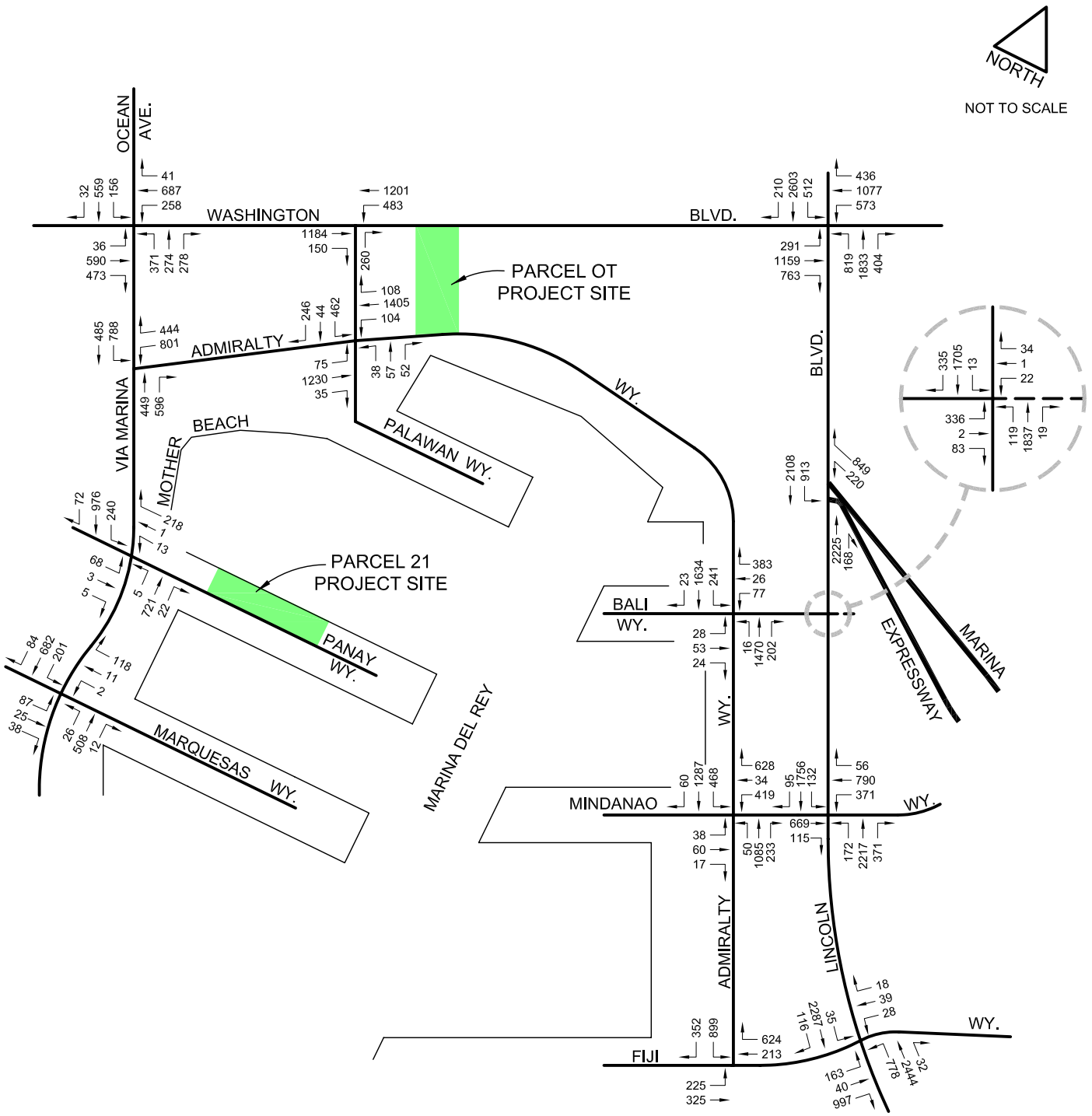

FIGURE 10(b)

6/12/2008

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\2008-6\PM2014WP(CUM)

FUTURE (2014) TRAFFIC VOLUMES
WITH CUMULATIVE PROJECT
PM PEAK HOUR

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Table 12
Summary of Critical Movement Analysis
Future (2014) Traffic Conditions With Cumulative Development

No.	Intersection	Peak Hour	With Ambient Growth		With Ambient Growth Plus Project			With Cumulative Development			Project Percent of Impact
			CMA	LOS	CMA	LOS	Impact	CMA	LOS	Impact	
1	Washington Boulevard and	AM	0.748	C	0.750	C	0.002	0.851	D	0.103 *	1.9%
	Via Marina/Ocean Avenue	PM	0.805	D	0.807	D	0.002	0.924	E	0.119 *	1.7%
2	Washington Boulevard and	AM	0.671	B	0.672	B	0.001	0.925	E	0.254 *	0.4%
	Palawan Way	PM	0.751	C	0.757	C	0.006	0.911	E	0.160 *	3.8%
3	Washington Boulevard and	AM	0.813	D	0.813	D	0.000	0.933	E	0.120 *	0.0%
	Lincoln Boulevard	PM	1.400	F	1.403	F	0.003	1.560	F	0.160 *	1.9%
4	Admiralty Way and	AM	0.734	C	0.734	C	0.000	0.826	D	0.092 *	0.0%
	Via Marina	PM	0.788	C	0.787	C	-0.001	0.920	E	0.132 *	-0.8%
5	Admiralty Way and	AM	0.446	A	0.447	A	0.001	0.623	B	0.177	0.6%
	Palawan Way	PM	0.635	B	0.633	B	-0.002	0.814	D	0.179 *	-1.1%
6	Panay Way and	AM	0.362	A	0.363	A	0.001	0.510	A	0.148	0.7%
	Via Marina	PM	0.266	A	0.266	A	0.000	0.349	A	0.083	0.0%
7	Marquesas Way and	AM	0.273	A	0.273	A	0.000	0.365	A	0.092	0.0%
	Via Marina	PM	0.189	A	0.189	A	0.000	0.255	A	0.066	0.0%
8	Admiralty Way and	AM	0.482	A	0.483	A	0.001	0.609	B	0.127	0.8%
	Bali Way	PM	0.607	B	0.607	B	0.000	0.746	C	0.139 *	0.0%
9	Admiralty Way and	AM	0.658	B	0.660	B	0.002	0.894	D	0.236 *	0.8%
	Mindanao Way	PM	0.778	C	0.779	C	0.001	1.021	F	0.243 *	0.4%
10	Admiralty Way and	AM	0.268	A	0.268	A	0.000	0.348	A	0.080	0.0%
	Fiji Way	PM	0.387	A	0.387	A	0.000	0.521	A	0.134	0.0%
11	Lincoln Boulevard and	AM	0.713	C	0.713	C	0.000	0.806	D	0.093 *	0.0%
	Marina Expressway	PM	0.756	C	0.758	C	0.002	0.897	D	0.141 *	1.4%
12	Lincoln Boulevard and	AM	0.682	B	0.682	B	0.000	0.744	C	0.062 *	0.0%
	Bali Way	PM	0.539	A	0.539	A	0.000	0.645	B	0.106	0.0%
13	Lincoln Boulevard and	AM	0.760	C	0.760	C	0.000	0.963	E	0.203 *	0.0%
	Mindanao Way	PM	0.891	D	0.892	D	0.001	1.057	F	0.166 *	0.6%
14	Lincoln Boulevard and	AM	0.617	B	0.617	B	0.000	0.738	C	0.121 *	0.0%
	Fiji Way	PM	0.767	C	0.768	C	0.001	0.906	E	0.139 *	0.7%

* indicates significant cumulative traffic impact, prior to mitigation, per Los Angeles County Department of Public Works "Traffic Impact Analysis Report Guidelines", January 1, 1997.

some locations near or above capacity. The proposed project will also contribute incrementally to these cumulative impacts, although the project contributions are about 3.8 percent or less of the cumulative impact at all locations.

Impacts on the Regional Transportation System

To address the increasing public concern that traffic congestion was impacting the quality of life and economic vitality of the State of California, the Congestion Management Program (CMP) was enacted by Proposition 111. The intent of the CMP is to provide the analytical basis for transportation decisions through the State Transportation Improvement Program (STIP) process. A Countywide approach has been established by the Metropolitan Transportation Authority, the Local CMP agency, to implement the statutory requirements of the CMP. The Countywide approach includes designating a highway network that includes all state highways and arterials with the County and monitoring the network's level of service standards. This monitoring of the CMP network is one of the responsibilities of local jurisdictions. If level of service standards deteriorate, then local jurisdictions must prepare a deficiency plan to be in conformance with the Countywide plan.

Thus, the potential impacts of project traffic on the regional freeway system were also examined. According to the CMP, a traffic analysis is required at all arterial monitoring intersections where the proposed project will add 50 or more trips during either the AM or PM weekday peak hours. One CMP intersection, Lincoln Boulevard and the Marina Expressway, was identified in the project area. The proposed project is not expected to add 50 or more trips to this intersection during either the AM or PM weekday peak hours. However, this intersection was analyzed due to its close proximity to the project sites. In addition, a traffic analysis is also required at all mainline freeway monitoring locations where the project will add 150 or more trips, in either direction, during either the AM or PM weekday peak hours. A review of the project's net trip generation, as shown previously in Table 6, indicates that the project is not expected to generate 150 trips during either peak hour. The maximum amount of project traffic added to any particular freeway segment would occur along the westbound and eastbound Marina

Expressway/Freeway east of Mindanao Way during the PM peak hour. During this time, the project would add approximately six trips, which is significantly less than the Los Angeles County Congestion Management Program (CMP) threshold of 150 peak hour trips added to any segment of any freeway in a single direction. Based on this information, the impact criteria will not be exceeded, and no significant regional impacts on arterial monitoring intersections and mainline freeway locations will occur. Therefore, no further analysis was conducted.

Consistency With Marina Land Use Plan

New development within Marina del Rey is controlled by the Marina del Rey Land Use Plan (LUP), which is a component of the Los Angeles County Local Coastal Program.[5] This document specifies the amount of allowable new development within the Marina, based on the amount of additional traffic generated and mitigation measures to be installed incrementally with the new development. The new development is divided into two phases, Phase I and Phase II. Phase I has been completed, and is the amount of development considered to be "existing" at the present time. The allowable Phase II development (Second Generation) intensities are above and beyond the amount of existing Marina del Rey development. The Phase II "Buildout" development is allocated to 14 "development zones" within the Marina, with the development potential within each development zone based upon each zone's capacity to accommodate traffic. This determination is, in turn, based upon a traffic study conducted to assess development potential within the Marina, and to identify traffic and circulation improvements ("mitigation measures") necessary to accommodate the increased traffic levels.[6] The

[5] Marina del Rey Land Use Plan, County of Los Angeles Development of Regional Planning, Certified February 8, 1996.

[6] Marina del Rey Traffic Study, Final Report, Prepared for Los Angeles County Department of Regional Planning, DKS Associates in Association with Gruen Associates, January 12, 1991.

allowable Phase II development potential within each of the Marina's 14 development zones is described in the LUP and summarized in Table 13.

Since the adoption of the Marina LUP in 1996, approval for or actual construction of various projects throughout the Marina has occurred, "using up" some of the originally allowable Phase II development potential. None of this approved development has occurred within Development Zone (DZ) 6, site of the proposed project on Parcel OT, and as shown in Table 13, DZ 6 retains its original development allowances for the expansion of the existing fire station. However, some of this approved development has occurred within DZ 4, site of the proposed project on Parcel 21. Table 13 also shows that the original development allowances for DZ 4 included a total of 325 residential dwelling units including 75 congregate care units, a total of 10,000 square feet of visitor-serving retail, and 76 boat slips.

As described previously in this report, the proposed project will construct a 114-unit congregate-care retirement facility and 5,000 square feet of retail use on Parcel OT. However, Parcel OT is zoned to allow "parking" uses, not the residential and retail uses proposed. As a result, the project is requesting to transfer the development potential of 114 hotel rooms and 5,000 square feet of office space from the Admiralty DZ 7 to the Oxford DZ 6, where Parcel OT is located. Also, the MUZ would allow for these uses to be utilized as a retirement facility and retail use, with parking. The MUZ is intended to provide additional flexibility for development of mixed-use projects by combining land use categories on an individual parcel.

Table 13
Phase II Development Potential Allocated by Development Zone

1. **Bora Bora Development Zone**
   610 Dwelling Units

2. **Tahiti Development Zone**
   275 Dwelling Units
   288 Hotel Rooms
   76 Boat Slips

3. **Marquesas Development Zone**
   320 Dwelling Units
   15,000 sq. ft. Visitor-serving Commercial
   76 Boat Slips

4. **Panay Development Zone**
   250 Dwelling Units
   75 Congregate Care units
   10,000 sq. ft. Visitor-serving Commercial
   76 Boat Slips

5. **Palawan/Beach Development Zone**
   180 Dwelling Units
   200 Hotel Rooms
   42,000 sq. ft. Visitor-serving Commercial
   410 Restaurant Seats

6. **Oxford Development Zone**
   Fire Station Expansion

7. **Admiralty Development Zone**
   200 Hotel Rooms
   275 Restaurant Seats
   32,000 sq. ft. Office
   3,000 sq. ft. Library Expansion

8. **Bali Development Zone**
   382 Hotel Rooms
   40,000 sq. ft Conference Center
   75,000 sq. ft. Visitor-serving Commercial
   3,000 sq. ft. Marine Science Center
   500 Restaurant Seats
   Ferry Terminal Site
   86 Boat Slips

9. **Mindanao Development Zone**
   14,500 sq. ft. Visitor-serving Commercial
   26,000 sq. ft. Office

10. **Fisherman's Village Development Zone**
    20,000 sq. ft. Visitor-serving Commercial
    350 Restaurant Seats
    Ferry Terminal Site

11. **Harbor Gateway Development Zone**
    255 Dwelling Units
    34 Boat Slips

12. **Via Marina Development Zone**
    530 Dwelling Units
    30,000 sq. ft. Visitor-serving Commercial
    340 Restaurant Seats

13. **North Shore Development Zone**
    Open space, road frontage buffer

14. **Fiji Way Development Zone**
    2,000 sq. ft. Visitor-serving Commercial

Source: Marina del Rey Land Use Plan, February 8, 1996.

Notes: Non-coastal development may be converted to Hotel, Visitor-Serving Commercial or Marina Commercial uses consistent with the conversion provisions of subsection C5 of Section 22.46.1090.

On Parcel 21, the proposed project will involve the removal of existing uses including a 16,000 square foot health club, 2,916 square feet of retail and 3,132 square feet of marine commercial offices, the transfer of uses (i.e. 2,300 square feet of marine commercial office space and 5,000 square feet of yacht club) from Parcel 20 to Parcel 21, and the development of 11,432 square feet of marine commercial offices, 2,916 square feet of retail, 10,000 square feet health club and 5,000 square feet of yacht club. The project would result in a net reduction of 6,000 square feet of health club uses and a net increase of 6,000 square feet of marine commercial office space on Parcel 21 (See Table 1(b)).

In addition, development of the proposed project would involve the replacement of 186 existing public parking spaces on Parcel OT. The project proposes to replace 92 of the 186 parking spaces on Parcel OT and the remaining 94 parking spaces will be relocated to Parcel 21, located to the south of Parcel OT on Panay Way. As noted in the LUP, the public parking on Parcel OT shall not be converted to uses other than public parking or public park purposes. As noted above, a Plan Amendment is also required in order to allow for the transfer of 94 existing parking spaces from Parcel OT to Parcel 21.

The Marina del Rey Land Use Plan also requires that proposed projects demonstrate compatibility with the Circulation Element of the Plan, based upon a comparison of the amount of trips generated by the allowable development and the trips generated by the proposed project. As noted previously, the Phase II development potential for each zone is based upon the Marina's ultimate capacity to accommodate traffic. To determine the compatibility of the proposed development with the Circulation Element, the PM peak hour trip generation potentials for both the constructed and proposed land uses were computed. The trip generation rates used in this comparison are specified in Table 2 of Appendix G, Transportation Improvement Program (TIP), of the Marina del

Rey Local Implementation Program, which is in turn, a part of the Land Use Plan. These trip rates were used to determine the number of trips attributable to the allowed Phase II development levels, and to assess the need for and effectiveness of the roadway improvements required as part of the Phase II development. The calculation of the number of allowable and proposed PM peak hour trips for DZ 4 is summarized in Tables 14(a) and 14(b), and DZ 6 in Table 14(c).

Table 14(a) shows that the original Phase II development allowances for DZ 4 would allow 148.23 net new PM trips. However, a development transfer of 97 dwelling units from DZ1 to DZ4 was approved as part of the Parcel 20 development. The transfer of the 97 dwelling units would increase the allowable development in DZ4 by 31.62 trips, resulting in a total allowable development of 179.85 trips. It addition, it should be noted that two projects have received approval and have been developed in DZ 4. The first project is the Dolphin Marina project and is located on Parcel 18R, which is in DZ 4. Redevelopment granted on Parcel 18R (Dolphin Marina) included a total of 68 market-rate apartments and 60 seniors apartments/congregate care units, resulting in a net total of 26.97 trips. The second project is the Parcel 20 Development project that included the construction of 98 apartment units and the removal of 1,385 square feet of yacht club uses. Thus, the Parcel 20 project would result in a net increase of 25.80 trips. In addition, the Marina Two Development has also received approval and is planned to be developed in DZ 3 and DZ 4. Within DZ 4, the Marina Two Development will remove 288 existing apartments and 4,400 square feet of existing visitor-serving retail space located on Parcel 15 along Via Marina and Panay Way, and construct 538 new apartments including 47 senior apartments and 8,000 square feet of visitor-serving retail and commercial space. In addition, 253 existing boat slips adjacent to the project parcel will be reconstructed to provide wider, more modern facilities, and the number of slips will ultimately decrease to 212, a net loss of 41 slips. The Marina Two

Table 14(a)
PM Peak Hour Trips
Development Zone 4
Prior to Project

Allowable Phase II Development (Without Proposed Project)

250 dwelling units x 0.326 trips/unit	=	81.50 trips
75 congregate care/seniors units x 0.170 trips/unit	=	12.75 trips
10,000 sq. ft. Retail x 4.440 trips/ksf	=	44.40 trips
76 boat slips x 0.126 trips/slip	=	9.58 trips
A. – Allowable Trips		***148.23 trips***
Development Transfer of 97 units x 0.326 trips/unit as part of Parcel 20 Development (From DZ1 to DZ4)	=	31.62 trips
B. – Allowable Trips With Development Transfer		***179.85 trips***
Less Approved/Constructed Phase II Development		
Dolphin Marina (Parcel 18R)		
68 apartments x 0.326 trips/unit		22.17 trips
60 congregate care/seniors units x 0.080 trips/unit	=	4.80 trips
C. – Net Dolphin Marina Project Trips		***26.97 trips***
Parcel 20 Development		
98 apartments x. 0.326 trips/unit	=	31.95 trips
Less 1,385 sq. ft. yacht club x 4.440 trips/ksf [2]	=	-6.15 trips
D. – Net Parcel 20 Project Trips		***25.80 trips***
Marina Two Development (Parcel 15)		
538 apartments x 0.326 trips/unit	=	175.38 trips
47 senior apartments x 0.100 trips/unit	=	4.70 trips
8,000 sq. ft. visitor-serving retail x 4.440 trips/ksf	=	35.52 trips
212 boat slips x 0.126 trips/slip	=	26.71 trips
Subtotal		242.31 trips
Less 288 apartments x 0.326 trips/unit	=	-93.89 trips
Less 4,400 sq. ft. visitor-serving retail x 4.440 trips/ksf	=	-19.54 trips
Less 253 boat slips x 0.126 trips/slip	=	-31.88 trips
E. – Net Marina Two Project Trips		***97.00 trips***
F. – Total Approved Phase II Zone 4 Development (C+D+E)		**149.77 trips**
Remaining Allowable Phase II Trips (B – F) ***(Without Proposed Project)***		**30.08 trips**

Table 14(b)
PM Peak Hour Trips
Development Zone 4
With Project

A. – Remaining Allowable Phase II Trips Without Project (From Table 14(a))		**30.08 trips**
Proposed Project (Parcel 21)		
Construction		
11,432 sq. ft. marine commercial office x 2.21 trips/ksf	=	25.26 trips
2,916 sq. ft. retail x 4.440 trips/ksf	=	12.95 trips
10,000 sq. ft. health club x 4.05 trips/ksf [1]	=	40.50 trips
5,000 sq. ft. yacht club x 4.440 trips/ksf [2]	=	22.20 trips
B. – Total		**100.91 trips**
Parcel 21 Demolition		
Less 3,132 sq. ft. marine commercial office x 2.21 trips/ksf	=	-6.92 trips
Less 2,916 sq. ft. retail x 4.440 trips/ksf	=	-12.95 trips
Less 16,000 sq. ft. health club x 4.05 trips/ksf [1]	=	-64.80 trips
C. – Total		**-84.67 trips**
Proposed Development Transfers (From Parcel 20)		
2,300 sq. ft. marine commercial office x 2.21 trips/ksf	=	-5.08 trips
5,000 sq. ft. yacht club x 4.440 trips/ksf [2]	=	-22.20 trips
D. – Total		**-27.28 trips**
E. – Net Proposed Project Trips (B+C+D)		**-11.04 trips**
Surplus/(Deficit) DZ 4 Allowable Trips (A – E) (With Proposed Project)	**=**	**41.12 trips**

[1] The trip rate for health club uses is not available in the Marina del Rey Land Use Plan. Thus, the PM peak hour rate was derived from the current edition of Trip Generation, 7th Edition, Institute of Transportation Engineers, Washington D.C., 2003.

[2] The trip rate for yacht club uses is not available in the Marina del Rey Land Use Plan and the current edition of Trip Generation, 7th Edition, Institute of Transportation Engineers, Washington D.C., 2003. Assumed trip rate for specialty retail from the Marina del Rey Land Use Plan.

Development will result in a net total of 97.00 trips in DZ 4. Thus, the combined Dolphin Marina, Parcel 20 Development and Marina Two Development projects would result in a net total of 149.77 trips, and reducing the remaining allowable net PM peak hour trips within DZ 4 to 30.08 trips without the proposed project.

As discussed previously and shown in Table 14(b), the proposed project consists of the replacement of existing on-site uses, the transfer of uses from Parcel 20 (marine commercial office space and yacht club), and the development of additional uses (marine commercial offices). The proposed project would result in a net reduction of 6,000 square feet of health club uses and a net increase of 6,000 square feet of marine commercial office space, and cause a total reduction of 11.04 net PM peak-hour trips within DZ 4. Thus, with the constructed Dolphin Marina and Parcel 20 Development projects, the approved Marina Two Development, and the proposed project, DZ 4 would exhibit a total of 41.12 net remaining allowable Phase II trips.

Table 14(c) shows that the original Phase II development allowances for DZ 6 would allow no net new PM trips. However, as described previously, the proposed project is requesting the transfer of a total of 114 hotel rooms and 5,000 square feet of office space from the Admiralty DZ 7 to the Oxford DZ 6 in order to comply with the LUP trip generation allowances. Therefore, this potential transfer would result in a total trip allowance of 413.47 PM peak hour trips in DZ 6. The proposed project would produce a total of 41.58 net new PM peak hour trips for DZ 6, resulting in a net total of 371.89 trips remaining for other development within the zone. Therefore, the proposed project is compatible with the trip generation limits identified in the Marina del Rey Land Use Plan for DZ 6, assuming the potential transfer of hotel and office development rights from DZ 7 to DZ 6.

Table 14(c)
PM Peak Hour Trips
Development Zone 6

Allowable Phase II Development		
Fire Station Expansion	=	0.00 trips
A. – Total Allowable Trips		**0.00 trips**
Approved/Constructed Phase II Development		
None		
B. – Total Approved Trips		0.00 trips
C. – Remaining Allowable Phase II Trips (A – B)		**0.00 trips**
Proposed Development Transfers		
114 Hotel Rooms x 3.53 trips/room (from DZ 7)		402.42 trips
5,000 sq. ft. Office x 2.21 trips/ksf (from DZ 7)		11.05 trips
D. – Total Proposed Allowable Phase II Trips		***413.47 trips***
Proposed Development (Parcel OT)		
114-unit Retirement Facility x 0.17 trips/unit	=	19.38 trips
5,000 sq. ft. Retail x 4.44 trips/ksf	=	22.20 trips
E. – Net Proposed Project Trips		**41.58 trips**
Surplus/(Deficit) DZ 6 Allowable Trips (C + (D – E))	**=**	**371.89 trips**

Additionally, overall development within the Marina is projected to remain well within acceptable limits. The Marina del Rey Phase II "Buildout" development allowed by the Land Use Plan and the TIP, as summarized in Table 13, produces a total of 2,750 net new PM peak hour trips for the Marina, beyond those trips occurring at the time those documents were certified. The Land Use Plan and its supporting documents were updated and certified most recently in February of 1996. Only three projects have been developed to date under the allowed Phase II development, although several additional developments are pending, approved, or currently being constructed. The developed projects (Dolphin Marina and the Parcel 20 Development within DZ 4, and the Parcel 112 Development within DZ 1) result in an increase of 26.97 PM peak hour trips, an increase of 25.80 PM peak hour trips, and a decrease of 3.87 net PM peak hour trips,

respectively, for a total of 48.90 trips, which is about 1.8 percent of the total allowable Phase II trips. However, several development proposals, including the subject project, have been approved, are under construction, or are currently proceeding through the approval process. These projects will also contribute toward the overall Marina trip cap. As shown in Tables 14(b) and 14(c), the proposed project will generate a total of approximately 30.54 PM peak hour trips (about 1.1 percent of the total allowable). The other currently approved, proposed, or potential projects within the Marina include the Marina Two project (152.34 total trips on both Parcels 12 and 15), the redevelopment of Parcels 95/LLS (128.20 trips), the approved redevelopment of Parcel 97 (2.00 trips), the Parcel 140 residential project (37.49 trips), the Marina Harbor expansion project (87.39 trips on Parcel 64), the Parcel 50 and 83 development (20.86 trips), the Parcel 27 hotel expansion project (24.36 trips), the mixed-use expansion development on Parcels 55, 56 and W (209 trips), the potential DBH Headquarters Office project on Parcel 20, Phase II (57.46 trips), the approved Del Rey Shores Project (111.49 trips on both Parcels 100 and 101), a proposed hotel project on Parcel IR (51.89 trips), The Waterfront project on Parcels 33/NR (22.07 trips), the Boat Central/Pacific Marina Development on Parcels 52/GG (51.38 trips), and the proposed residential and hotel/timeshare resort project on Parcels 10R, FF and 9U (227.54 trips). These developments could potentially add a total of approximately 1183.47 net new trips to the Marina, and including the already developed projects (Dolphin Marina and the Parcel 20 and Parcel 112 Developments) and the subject project, would result in a net total addition of about 1262.91 PM trips, or approximately 46 percent of the total of 2,750 PM peak hour trips allowed under the development and mitigation scenarios approved for Marina del Rey.

This level of overall trip generation from the developed, approved and proposed Marina projects is less than the 50 percent development level at which Category 1 System-

Wide Improvements (as described in the LCP), such as the Admiralty Way improvement to five lanes, are warranted before any additional development can occur. It should also be noted that the proposed project has identified several Category 1 improvements as mitigation measures for the cumulative traffic impacts, described in detail in the Mitigation Measures section of this report.

MITIGATION MEASURES

As described in the preceding section, the development of the proposed project will not result in a significant project traffic impact at any of the study intersections. However, all projects developed within the Marina, including the proposed project, are required to pay a traffic mitigation fee imposed by the County of Los Angeles pursuant to the Marina del Rey Specific Plan Transportation Improvement Program. This fee is intended to fund the Category 1 (local Marina) and Category 3 (regional) roadway improvements described in the TIP, by providing "fair share" contributions toward the improvements, based on the amount of project PM peak hour trips. (Category 2 roadway improvements are reserved for Area A, which is DZ 15 and is the part of the Playa Vista Development within the Marina.) These improvements address local traffic generated in and confined to the Marina, as well as trips which leave or pass through the Marina (regional trips). The County's traffic mitigation fee structure is currently $5,690 per PM peak hour trip. Based on the expected project trip generation of 30 net new PM peak hour trips, the project would be required to pay $170,700 in trip mitigation fees. A portion of these fees is designated toward the Category 3 (regional) transportation improvements.

Although the project itself would not potentially significantly impact traffic conditions at any of the area intersections, an analysis of cumulative traffic impacts at the study intersections indicates that traffic resulting from total development throughout the project vicinity, including the proposed project, could produce significant impacts at 11 of the 14 locations analyzed. The TIP improvements are designed to address traffic growth due to cumulative development within and surrounding the Marina, and therefore, payment of the traffic impact mitigation fee described earlier is intended to mitigate the proposed project's incremental contributions toward cumulative traffic

growth and the resulting impacts in the study area. However, the County acknowledges that traffic growth within the project vicinity has outpaced the projections upon which the TIP trip fees were based, and therefore, an analysis of cumulative impacts with respect to the effectiveness of the proposed TIP improvements was requested.

The recommended intersection improvement measures to address these cumulative traffic impacts are described below.

- Washington Boulevard and Via Marina/Ocean Avenue – No feasible physical improvements are identified in the TIP that remain available to mitigate this potential cumulative impact. However, the County of Los Angeles Department of Public Works has identified an improvement at the nearby intersection of Washington Boulevard and Palawan Way that would provide additional egress from the Marina, reducing traffic volumes on the northbound approach of Via Marina at this intersection, and providing mitigation for the cumulative impacts. The proposed improvement would reconstruct the intersection of Washington Boulevard and Palawan Way to allow for dual northbound left-turns onto westbound Washington Boulevard, and install a new traffic signal at that intersection. The improvement will provide an additional means of accessing westbound Washington Boulevard from westbound Admiralty Way, reducing the existing high northbound volumes at Washington Boulevard and Via Marina/Ocean Avenue. (See "Washington Boulevard and Palawan Way" below for additional details.)

  In addition, the Marina del Rey TIP also identified an improvement at the intersection of Via Marina and Admiralty Way that will enhance traffic flow between Admiralty Way and Via Marina south of Admiralty Way within the Marina, reducing the northbound right-turn traffic volumes on Via Marina at

Washington Boulevard. This improvement would reconstruct the Admiralty Way/Via Marina intersection to realign Admiralty Way as a "through roadway" with the southern leg of Via Marina. The northern leg of Via Marina, south of Washington Boulevard, will intersect into Admiralty Way in a "T" configuration. The striping for turning movements at the reconfigured intersection will be constructed as dual left-turn and dual/triple right-turn movements. As a result, northbound traffic volumes on Via Marina would need to turn left (instead of making a through movement) at Admiralty Way to access eastbound Washington Boulevard. Due to the high left-turn volume on northbound Via Marina at Admiralty Way, some of these traffic volumes would reroute along eastbound Admiralty Way and turn left at Palawan Way.

- Washington Boulevard and Palawan Way – Install a new traffic signal at this intersection (as described above as "in lieu" mitigation for the cumulative impact at Washington Boulevard and Via Marina/Ocean Avenue). The south leg of the intersection should be realigned to reduce the angle of the northbound right-turn only lane, and provide a more perpendicular approach, plus provide northbound dual left-turn lanes.

  While this improvement is currently being investigated by the County for implementation as a new TIP- type measure, funded by fair share contributions by projects within Marina del Rey, it is not currently included in the TIP improvement program. As such, the proposed project would be conditioned to contribute "fair share" funding to this improvement above and beyond the previously identified traffic mitigation fees. As indicated in Table 12, the project will contribute 3.8 percent of the impact at this location. Cost estimates for this improvement are currently being finalized, but are expected to be approximately $332,500, with a project responsibility of $12,635.

- Lincoln Boulevard and Washington Boulevard – No feasible physical improvements are currently available to mitigate this potential cumulative impact. However, regional transportation improvements being considered include the future extension of the Marina Freeway (SR 90) westward to connect with Admiralty Way. The extension, slated for the year 2011, will help alleviate traffic congestion in the area, including at the key intersection of Lincoln Boulevard and Washington Boulevard. This measure is identified in Appendix G of the Marina del Rey Local Implementation Program and must receive approval from the Board of Supervisors, the City of Los Angeles and Caltrans.

  However, it should be noted that a short-term cumulative traffic impact could remain at this location if the extension of the SR-90 or another measure of equal effectiveness is not implemented by the time the anticipated cumulative traffic growth occurs. Furthermore, if the extension of the SR-90 is not constructed at all (due to not having concurrent approval by the Board of Supervisors, the City of Los Angeles and Caltrans, or for other reasons) or another measure of equal effectiveness is not identified, a significant cumulative traffic impact would remain at this location.

- Admiralty Way and Via Marina – Reconstruct the intersection to provide for a realignment of Admiralty Way as a "through roadway" with the southern leg of Via Marina. As described above, the northern leg of Via Marina, south of Washington Boulevard, will intersect into Admiralty Way in a "T" configuration. The striping for turning movements at the reconfigured intersection will be constructed as dual left-turn and dual/triple right-turn movements. This improvement is identified in the Marina del Rey TIP, and will enhance traffic flow within the Marina.

- Admiralty Way and Palawan Way – Restripe the southbound approach to convert the through lane into a left/through shared lane. Restripe the northbound approach to provide an exclusive left-turn only lane, in addition to a shared right-turn/through lane. In addition, add a third westbound through lane to Admiralty Way within the existing right-of-way by moving the median and restriping Admiralty Way. These measures are identical to or consistent with the improvements in the Marina del Rey TIP.

- Admiralty Way and Bali Way – Add a third westbound through lane to Admiralty Way within the existing right-of-way by moving the median and restriping Admiralty Way, as identified in the Marina del Rey TIP.

- Admiralty Way and Mindanao Way – Widen northbound Admiralty Way to provide a right-turn lane at Mindanao Way. Install dual left-turn lanes on Admiralty Way for southbound travel at the approach to Mindanao Way. The dual left-turn lanes on Admiralty Way will enhance egress from the Marina at Mindanao Way, and has already been approved as part of a previous project (Marina Two). On Mindanao Way, convert the left-turn/through shared lane to a left/through/right shared lane in the westbound direction. In addition, modify the traffic signal at this intersection to accommodate the dual left-turn movement on Admiralty Way and optimize the signal operation at this location and at adjacent intersections.

- Lincoln Boulevard and Marina Expressway (SR 90) – Extend Route 90 to connect to Admiralty Way across Lincoln Boulevard. The extension would reconstruct and expand the at-grade intersection, providing additional capacity for all approaches. This improvement is currently included in the TIP roadway improvements funded by the trip fee.

However, it should be noted that a short-term cumulative traffic impact could remain at this location if the extension of the SR-90 or another measure of equal effectiveness is not implemented by the time the anticipated cumulative traffic growth occurs. Furthermore, if the extension of the SR-90 is not constructed at all (due to not having concurrent approval by the Board of Supervisors, the City of Los Angeles and Caltrans, or for other reasons) or another measure of equal effectiveness is not identified, a significant cumulative traffic impact could remain at this location.

- Lincoln Boulevard and Bali Way – No feasible physical improvements are currently available to mitigate this potential cumulative impact. However, regional transportation improvements being considered include the future extension of the Marina Freeway (SR 90) westward to connect with Admiralty Way. The extension, slated for the year 2011, will help alleviate traffic congestion in the area, including at the intersection of Lincoln Boulevard and Bali Way. The SR-90 extension is identified in Appendix G of the Marina del Rey Local Implementation Program and must receive approval from the Board of Supervisors, the City of Los Angeles and Caltrans.

  However, it should be noted that a short-term cumulative traffic impact could remain at this location if the extension of the SR-90 or another measure of equal effectiveness is not implemented by the time the anticipated cumulative traffic growth occurs. Furthermore, if the extension of the SR-90 is not constructed at all (due to not having concurrent approval by the Board of Supervisors, the City of Los Angeles and Caltrans, or for other reasons) or another measure of equal effectiveness is not identified, a significant cumulative traffic impact could remain at this location.

- Lincoln Boulevard and Mindanao Way – No feasible physical improvements are currently available to mitigate this potential cumulative impact. However, regional transportation improvements being considered include the future extension of the Marina Freeway (SR 90) westward to connect with Admiralty Way. The extension, slated for the year 2011, will help alleviate traffic congestion in the area, including at the intersection of Lincoln Boulevard and Mindanao Way, which currently provides direct access from the SR-90 to Admiralty Way in the Marina. The SR-90 extension is identified in Appendix G of the Marina del Rey Local Implementation Program and must receive approval from the Board of Supervisors, the City of Los Angeles and Caltrans.

  However, it should be noted that a short-term cumulative traffic impact could remain at this location if the extension of the SR-90 or another measure of equal effectiveness is not implemented by the time the anticipated cumulative traffic growth occurs. Furthermore, if the extension of the SR-90 is not constructed at all (due to not having concurrent approval by the Board of Supervisors, the City of Los Angeles and Caltrans, or for other reasons) or another measure of equal effectiveness is not identified, a significant cumulative traffic impact could remain at this location.

- Lincoln Boulevard and Fiji Way – No feasible physical improvements are currently available to mitigate this potential cumulative impact. However, regional transportation improvements being considered include the future extension of the Marina Freeway (SR 90) westward to connect with Admiralty Way. The extension, slated for the year 2011, will help alleviate traffic congestion in the area, including at the intersection of Lincoln Boulevard and Fiji Way. The SR-90 extension is identified in Appendix G of the Marina del

Rey Local Implementation Program and must receive approval from the Board of Supervisors, the City of Los Angeles and Caltrans.

However, it should be noted that a short-term cumulative traffic impact could remain at this location if the extension of the SR-90 or another measure of equal effectiveness is not implemented by the time the anticipated cumulative traffic growth occurs. Furthermore, if the extension of the SR-90 is not constructed at all (due to not having concurrent approval by the Board of Supervisors, the City of Los Angeles and Caltrans, or for other reasons) or another measure of equal effectiveness is not identified, a significant cumulative traffic impact could remain at this location.

The effectiveness of these recommended cumulative mitigation measures was evaluated in a supplemental analysis. This "With Cumulative Development Plus Mitigation" analysis utilized the same methodologies and assumptions as described previously, again with the exception that the recommended cumulative improvement measures described above were assumed to be "in place" for the "With Cumulative Development Plus Mitigation" scenario. This assumption also included the redistribution of traffic at several intersections (Via Marina at Washington Boulevard and Admiralty Way, and Palawan Way at Washington Boulevard and Admiralty Way) as a result of anticipated travel pattern changes resulting from the mitigation measure at Washington Boulevard and Palawan Way, and at Via Marina and Admiralty Way. The results of the supplemental "With Cumulative Development Plus Mitigation" analysis are summarized in Table 15.

Table 15
Summary of Critical Movement Analysis
Future (2014) Traffic Conditions With Cumulative Development Plus Mitigation

No.	Intersection	Peak Hour	With Ambient Growth CMA	With Ambient Growth LOS	With Cumulative Development CMA	With Cumulative Development LOS	With Cumulative Development Impact	With Cumulative Dev. Plus Mitigation CMA	With Cumulative Dev. Plus Mitigation LOS	With Cumulative Dev. Plus Mitigation Impact
1.	Washington Boulevard and	AM	0.748	C	0.851	D	0.103 *	0.767	C	0.019
	Via Marina/Ocean Avenue	PM	0.805	D	0.924	E	0.119 *	0.813	D	0.008
2.	Washington Boulevard and	AM	0.671	B	0.925	E	0.254 *	0.663	B	-0.008
	Palawan Way	PM	0.751	C	0.911	E	0.160 *	0.721	C	-0.030
3.	Washington Boulevard and	AM	0.813	D	0.933	E	0.120 *	n/a	--	--
	Lincoln Boulevard	PM	1.400	F	1.560	F	0.160 *			
4.	Admiralty Way and	AM	0.734	C	0.826	D	0.092 *	0.511	A	-0.223
	Via Marina	PM	0.788	C	0.920	E	0.132 *	0.549	A	-0.239
5.	Admiralty Way and	AM	0.446	A	0.623	B	0.177	0.617	B	0.171
	Palawan Way	PM	0.635	B	0.814	D	0.179 *	0.671	B	0.036
8.	Admiralty Way and	AM	0.482	A	0.609	B	0.127	0.609	B	0.127
	Bali Way	PM	0.607	B	0.746	C	0.139 *	0.583	A	-0.024
9.	Admiralty Way and	AM	0.658	B	0.894	D	0.236 *	0.659	B	0.001
	Mindanao Way	PM	0.778	C	1.021	F	0.243 *	0.768	C	-0.010
11.	Lincoln Boulevard and	AM	0.713	C	0.806	D	0.093 *	n/a	--	--
	Marina Expressway	PM	0.756	C	0.897	D	0.141 *			
12.	Lincoln Boulevard and	AM	0.682	B	0.744	C	0.062 *	n/a	--	--
	Bali Way	PM	0.539	A	0.645	B	0.106			
13.	Lincoln Boulevard and	AM	0.760	C	0.963	E	0.203 *	n/a	--	--
	Mindanao Way	PM	0.891	D	1.057	F	0.166 *			
14.	Lincoln Boulevard and	AM	0.617	B	0.738	C	0.121 *	n/a	--	--
	Fiji Way	PM	0.767	C	0.906	E	0.139 *			

* Indicates significant cumulative traffic impact, prior to mitigation, per Los Angeles County Department of Public Works "Traffic Impact Analysis Report Guidelines", January 1, 1997.

"n/a" Indicates final design of proposed SR-90 extension project not available. No specific analysis of effectiveness of this measure possible at this time. However, Los Angeles County is currently preparing environmental analyses to evaluate the impacts of the proposed SR-90 extension project.

As shown in Table 15, the implementation of the cumulative mitigation measures will result in a reduction of all cumulative impacts. All “With Cumulative Development Plus Mitigation” traffic conditions that can be evaluated will have cumulative impacts reduced

to a less than significant level. Table 15 also indicates that, since the design of the proposed SR-90 extension has not been determined, calculation of the exact benefits to specific intersections for which the extension is identified in the Marina del Rey Land Use Plan (LUP) as mitigation cannot be made at this time. The County is currently preparing an Environmental Impact Report for this roadway improvement that will identify the anticipated benefits to the Lincoln Boulevard corridor as a result of the SR-90 extension to Admiralty Way.

In summary, the cumulative mitigation measures include measures specifically identified in the TIP, including funding for larger long-term improvements such as the planned Marina Expressway (SR-90) extension to Admiralty Way that will increase area-wide traffic capacity and help alleviate existing and future congestion in the study area. If these measures are not installed, significant cumulative traffic impacts may remain.

The improvements described above, with the exception of the new traffic signal at the intersection of Washington Boulevard and Palawan Way and the conversion of the left-turn/through shared lane to a left/through/right shared lane on Mindanao Way in the westbound approach at Admiralty Way, are identical to or consistent with the area-wide roadway improvements identified in Appendix G (Transportation Improvement Program) of the Marina del Rey Local Implementation Program, and funded through payment of the traffic impact fees. Installation of the recommended measures will fully mitigate the effects of cumulative traffic growth, including project traffic, in the study area. The project will contribute its “fair share” toward implementation of these cumulative improvements through payment of the $170,700 trip fee, plus the pro-rata share for the new traffic signal and roadway improvement at Washington Boulevard and Palawan Way (i.e., 3.8% x $332,500 = $12,635) and the restriping of the westbound approach of Mindanao Way at Admiralty Way.

APPENDIX A

TRAFFIC COUNT DATA WORKSHEETS

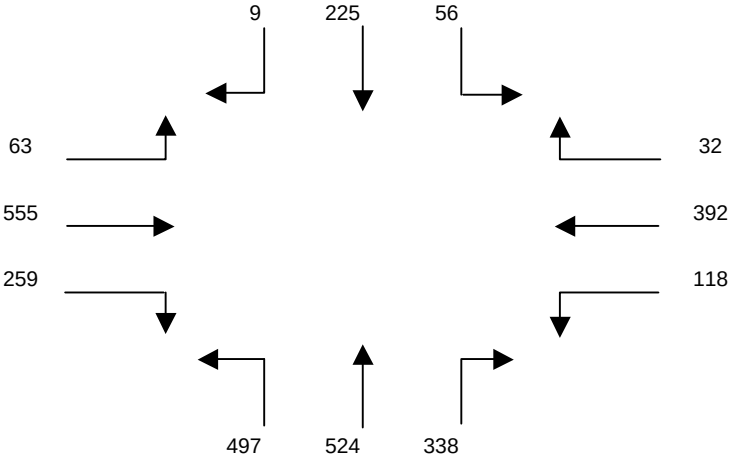
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: CRAIN & ASSOCIATES
PROJECT: MARINA DEL REY PROJECT
DATE: WEDNESDAY, MARCH 01, 2006
PERIOD: 07:00 AM TO 09:00 AM
INTERSECTION: N/S OCEAN AVENUE / VIA MARINA
E/W WASHINGTON BOULEVARD
FILE NUMBER: 5-AM

15 MINUTE TOTALS	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT
700-715	1	37	7	5	65	24	86	82	90	32	102	7
715-730	3	46	10	8	69	19	75	107	103	43	121	9
730-745	2	47	7	10	73	22	70	117	116	46	147	15
745-800	2	69	9	7	99	25	74	122	128	65	139	20
800-815	4	52	13	7	101	31	90	124	119	70	153	19
815-830	2	54	19	9	96	32	80	130	121	57	148	14
830-845	1	50	15	9	96	30	94	148	111	67	115	10
845-900	3	45	14	11	89	33	79	125	96	68	140	7

1 HOUR TOTALS	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTALS
700-800	8	199	33	30	306	90	305	428	437	186	509	51	2582
715-815	11	214	39	32	342	97	309	470	466	224	560	63	2827
730-830	10	222	48	33	369	110	314	493	484	238	587	68	2976
745-845	9	225	56	32	392	118	338	524	479	259	555	63	3050
800-900	10	201	61	36	382	126	343	527	447	262	556	50	3001

A.M. PEAK HOUR
745-845



WASHINGTON BOULEVARD

OCEAN AVENUE / VIA MARINA

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91006
626.446.7978

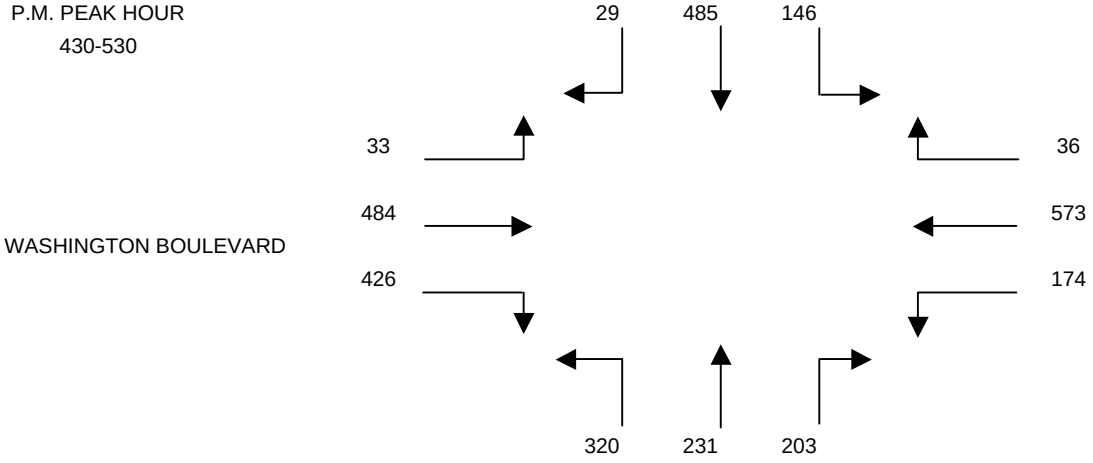
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: CRAIN & ASSOCIATES
PROJECT: MARINA DEL REY PROJECT
DATE: WEDNESDAY, MARCH 01, 2006
PERIOD: 04:00 PM TO 06:00 PM
INTERSECTION: N/S OCEAN AVENUE / VIA MARINA
E/W WASHINGTON BOULEVARD
FILE NUMBER: 5-PM

15 MINUTE	1	2	3	4	5	6	7	8	9	10	11	12
TOTALS	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT
400-415	6	104	27	9	115	34	50	58	68	94	111	11
415-430	6	123	27	6	124	47	45	50	68	105	135	15
430-445	8	116	36	10	144	54	45	62	84	113	131	11
445-500	10	123	42	6	132	41	57	64	77	107	114	7
500-515	6	118	35	9	150	35	48	54	83	100	119	5
515-530	5	128	33	11	147	44	53	51	76	106	120	10
530-545	9	123	34	12	133	37	31	77	63	85	132	11
545-600	9	114	31	10	132	41	36	57	71	111	133	10

1 HOUR	1	2	3	4	5	6	7	8	9	10	11	12	
TOTALS	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTALS
400-500	30	466	132	31	515	176	197	234	297	419	491	44	3032
415-515	30	480	140	31	550	177	195	230	312	425	499	38	3107
430-530	29	485	146	36	573	174	203	231	320	426	484	33	3140
445-545	30	492	144	38	562	157	189	246	299	398	485	33	3073
500-600	29	483	133	42	562	157	168	239	293	402	504	36	3048

P.M. PEAK HOUR
430-530



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ARCADIA, CALIFORNIA 91006
626.446.7978

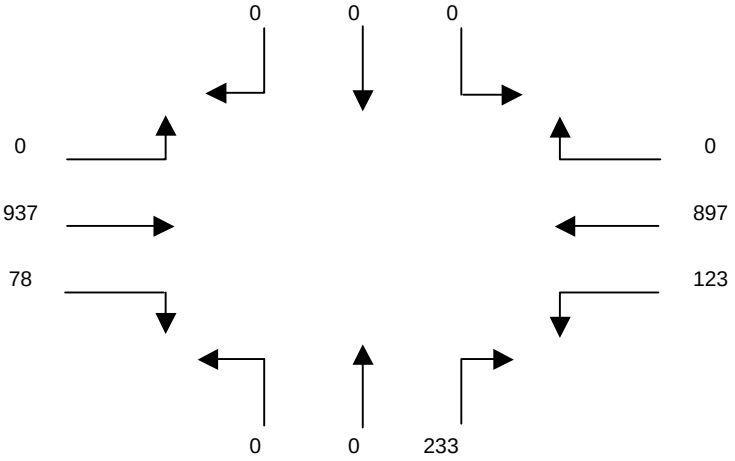
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: CRAIN & ASSOCIATES
PROJECT: MARINA DEL REY PROJECT
DATE: WEDNESDAY, OCTOBER 19, 2005
PERIOD: 07:00 AM TO 09:00 AM
INTERSECTION: N/S PALAWAN WAY
E/W WASHINGTON BOULEVARD
FILE NUMBER: 1-AM

15 MINUTE	1	2	3	4	5	6	7	8	9	10	11	12
TOTALS	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT
700-715	0	0	0	0	185	36	42	0	0	18	202	0
715-730	0	0	0	0	225	22	66	0	0	16	224	0
730-745	0	0	0	0	237	36	68	0	0	23	239	0
745-800	0	0	0	0	216	33	48	0	0	16	235	0
800-815	0	0	0	0	219	32	51	0	0	23	239	0
815-830	0	0	0	0	206	35	59	0	0	19	232	0
830-845	0	0	0	0	199	38	51	0	0	17	222	0
845-900	0	0	0	0	180	23	47	0	0	12	218	0

1 HOUR	1	2	3	4	5	6	7	8	9	10	11	12	
TOTALS	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTALS
700-800	0	0	0	0	863	127	224	0	0	73	900	0	2187
715-815	0	0	0	0	897	123	233	0	0	78	937	0	2268
730-830	0	0	0	0	878	136	226	0	0	81	945	0	2266
745-845	0	0	0	0	840	138	209	0	0	75	928	0	2190
800-900	0	0	0	0	804	128	208	0	0	71	911	0	2122

A.M. PEAK HOUR
715-815



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ARCADIA, CALIFORNIA 91006
626.446.7978

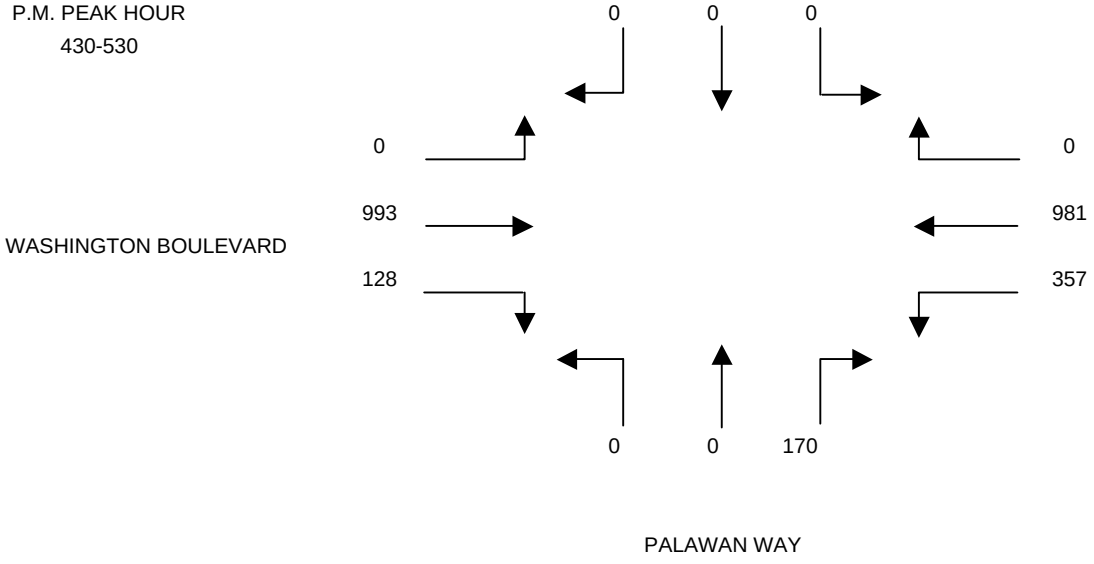
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: CRAIN & ASSOCIATES
PROJECT: MARINA DEL REY PROJECT
DATE: WEDNESDAY, OCTOBER 19, 2005
PERIOD: 04:00 PM TO 06:00 PM
INTERSECTION: N/S PALAWAN WAY
E/W WASHINGTON BOULEVARD
FILE NUMBER: 1-PM

15 MINUTE	1	2	3	4	5	6	7	8	9	10	11	12
TOTALS	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT
400-415	0	0	0	0	219	77	47	0	0	29	226	0
415-430	0	0	0	0	222	61	32	0	0	36	253	0
430-445	0	0	0	0	239	95	45	0	0	29	251	0
445-500	0	0	0	0	244	87	42	0	0	20	259	0
500-515	0	0	0	0	251	88	48	0	0	41	244	0
515-530	0	0	0	0	247	87	35	0	0	38	239	0
530-545	0	0	0	0	232	79	43	0	0	49	231	0
545-600	0	0	0	0	219	71	34	0	0	41	227	0

1 HOUR	1	2	3	4	5	6	7	8	9	10	11	12	
TOTALS	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTALS
400-500	0	0	0	0	924	320	166	0	0	114	989	0	2513
415-515	0	0	0	0	956	331	167	0	0	126	1007	0	2587
430-530	0	0	0	0	981	357	170	0	0	128	993	0	2629
445-545	0	0	0	0	974	341	168	0	0	148	973	0	2604
500-600	0	0	0	0	949	325	160	0	0	169	941	0	2544

P.M. PEAK HOUR
430-530



THE TRAFFIC SOLUTION
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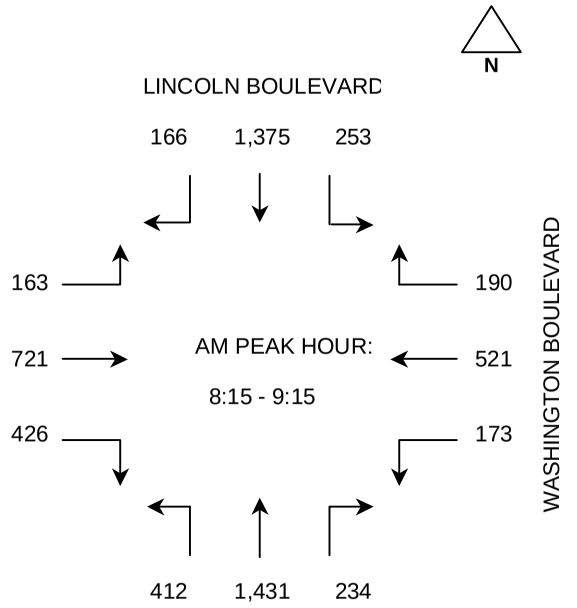
Crain & Associates
2007 Sawtelle Blvd., Suite 4
Los Angeles, CA 90025
Tel: (310) 473-6508

VEHICLE TURNING MOVEMENT COUNT SUMMARY

N/S STREET: LINCOLN BOULEVARD **E/W STREET:** WASHINGTON BOULEVARD
PERIOD: AM PEAK HOUR **DATE:** TUESDAY JUNE 6, 2006

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 7:15	14	87	36	37	121	91	91	406	34	34	234	18	1,203
7:15 - 7:30	15	75	45	36	141	113	90	460	39	30	233	27	1,304
7:30 - 7:45	33	177	65	38	197	133	115	527	49	45	337	34	1,750
7:45 - 8:00	27	116	39	28	150	76	92	353	37	29	244	26	1,217
8:00 - 8:15	31	147	55	21	177	117	117	430	44	42	289	38	1,508
8:15 - 8:30	39	130	52	42	213	107	102	352	57	71	381	38	1,584
8:30 - 8:45	36	132	47	40	107	102	121	353	53	48	322	41	1,402
8:45 - 9:00	54	115	46	43	187	106	94	366	71	70	350	45	1,547
9:00 - 9:15	44	144	45	38	214	111	95	360	53	64	322	42	1,532
9:15 - 9:30	54	117	56	55	210	120	108	350	62	84	269	20	1,505
9:30 - 9:45	54	120	58	39	141	97	111	347	54	61	236	36	1,354
9:45 - 10:00	34	124	68	40	147	96	84	330	46	59	263	47	1,338

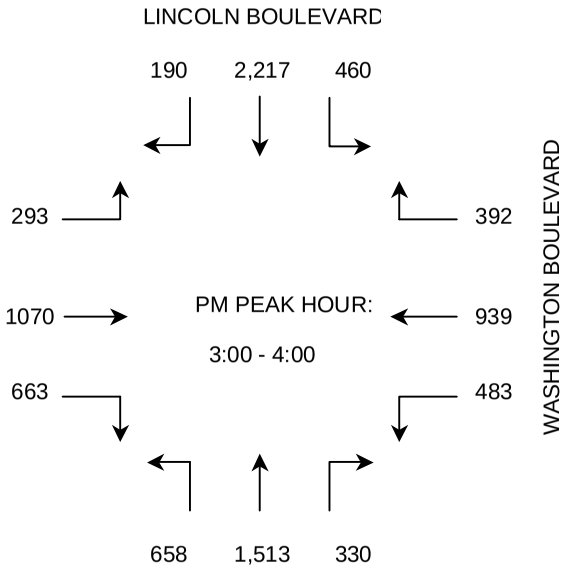
1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 8:00	89	455	185	139	609	413	388	1,746	159	138	1,048	105	5,474
7:15 - 8:15	106	515	204	123	665	439	414	1,770	169	146	1,103	125	5,779
7:30 - 8:30	130	570	211	129	737	433	426	1,662	187	187	1,251	136	6,059
7:45 - 8:45	133	525	193	131	647	402	432	1,488	191	190	1,236	143	5,711
8:00 - 9:00	160	524	200	146	684	432	434	1,501	225	231	1,342	162	6,041
8:15 - 9:15	173	521	190	163	721	426	412	1,431	234	253	1,375	166	6,065 *
8:30 - 9:30	188	508	194	176	718	439	418	1,429	239	266	1,263	148	5,986
8:45 - 9:45	206	496	205	175	752	434	408	1,423	240	279	1,177	143	5,938
9:00 - 10:00	186	505	227	172	712	424	398	1,387	215	268	1,090	145	5,729



PERIOD: PM PEAK HOUR **DATE:** TUESDAY JUNE 6, 2006

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 3:15	136	238	101	79	261	171	192	408	89	140	428	50	2,293
3:15 - 3:30	130	235	105	77	276	162	184	411	83	134	441	44	2,282
3:30 - 3:45	152	287	115	87	345	206	195	492	104	136	600	65	2,784
3:45 - 4:00	65	179	71	50	188	124	87	202	54	50	748	31	1,849
4:00 - 4:15	84	186	65	43	191	118	122	370	91	46	743	26	2,085
4:15 - 4:30	83	183	63	40	173	123	83	259	70	65	325	25	1,492
4:30 - 4:45	70	176	84	30	157	110	92	210	54	86	336	34	1,439
4:45 - 5:00	50	161	59	35	176	117	110	322	58	80	355	35	1,558
5:00 - 5:15	62	183	64	39	176	121	118	338	62	73	394	46	1,676
5:15 - 5:30	70	198	70	40	173	129	119	358	66	64	421	57	1,765
5:30 - 5:45	63	167	73	31	193	128	98	298	64	84	329	50	1,578
5:45 - 6:00	49	205	66	37	189	128	115	333	62	72	358	49	1,663

1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 4:00	483	939	392	293	1,070	663	658	1,513	330	460	2,217	190	9,208 *
3:15 - 4:15	431	887	356	257	1,000	610	588	1,475	332	366	2,532	166	9,000
3:30 - 4:30	384	835	314	220	897	571	487	1,323	319	297	2,416	147	8,210
3:45 - 4:45	302	724	283	163	709	475	384	1,041	269	247	2,152	116	6,865
4:00 - 5:00	287	706	271	148	697	468	407	1,161	273	277	1,759	120	6,574
4:15 - 5:15	265	703	270	144	682	471	403	1,129	244	304	1,410	140	6,165
4:30 - 5:30	252	718	277	144	682	477	439	1,228	240	303	1,506	172	6,438
4:45 - 5:45	245	709	266	145	718	495	445	1,316	250	301	1,499	188	6,577
5:00 - 6:00	244	753	273	147	731	506	450	1,327	254	293	1,502	202	6,682



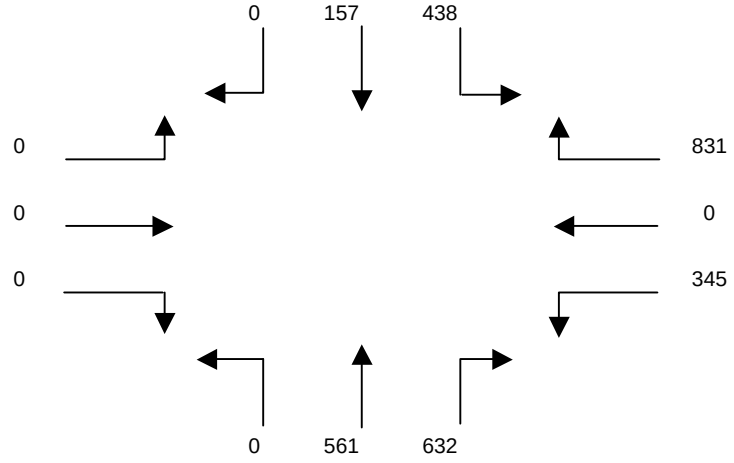
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: CRAIN & ASSOCIATES
PROJECT: MARINA DEL REY PROJECT
DATE: WEDNESDAY, MARCH 01, 2006
PERIOD: 07:00 AM TO 09:00 AM
INTERSECTION: N/S VIA MARINA
E/W ADMIRALTY WAY
FILE NUMBER: 4-AM

15 MINUTE TOTALS	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT
700-715	0	20	83	169	0	57	124	105	0	0	0	0
715-730	0	27	87	159	0	57	147	118	0	0	0	0
730-745	0	41	91	177	0	60	141	102	0	0	0	0
745-800	0	39	109	208	0	91	166	132	0	0	0	0
800-815	0	43	110	211	0	90	166	139	0	0	0	0
815-830	0	40	115	216	0	80	145	152	0	0	0	0
830-845	0	35	104	196	0	84	155	138	0	0	0	0
845-900	0	30	98	158	0	75	144	126	0	0	0	0

1 HOUR TOTALS	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTALS
700-800	0	127	370	713	0	265	578	457	0	0	0	0	2510
715-815	0	150	397	755	0	298	620	491	0	0	0	0	2711
730-830	0	163	425	812	0	321	618	525	0	0	0	0	2864
745-845	0	157	438	831	0	345	632	561	0	0	0	0	2964
800-900	0	148	427	781	0	329	610	555	0	0	0	0	2850

A.M. PEAK HOUR
745-845



VIA MARINA

THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91006
626.446.7978

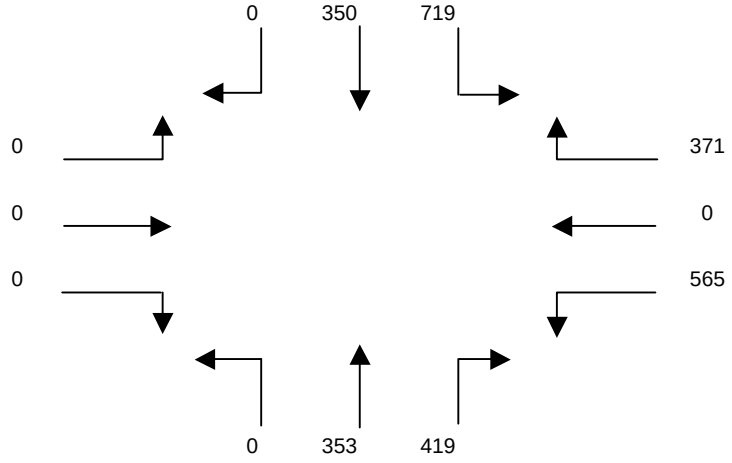
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: CRAIN & ASSOCIATES
PROJECT: MARINA DEL REY PROJECT
DATE: WEDNESDAY, MARCH 01, 2006
PERIOD: 04:00 PM TO 06:00 PM
INTERSECTION: N/S VIA MARINA
E/W ADMIRALTY WAY
FILE NUMBER: 4-PM

15 MINUTE TOTALS	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT
400-415	0	68	127	55	0	123	110	81	0	0	0	0
415-430	0	92	187	99	0	118	107	66	0	0	0	0
430-445	0	109	197	87	0	133	108	87	0	0	0	0
445-500	0	85	175	95	0	138	92	77	0	0	0	0
500-515	0	71	168	106	0	142	110	91	0	0	0	0
515-530	0	85	179	83	0	152	109	98	0	0	0	0
530-545	0	101	182	95	0	143	90	78	0	0	0	0
545-600	0	99	161	105	0	131	89	72	0	0	0	0

1 HOUR TOTALS	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTALS
400-500	0	354	686	336	0	512	417	311	0	0	0	0	2616
415-515	0	357	727	387	0	531	417	321	0	0	0	0	2740
430-530	0	350	719	371	0	565	419	353	0	0	0	0	2777
445-545	0	342	704	379	0	575	401	344	0	0	0	0	2745
500-600	0	356	690	389	0	568	398	339	0	0	0	0	2740

P.M. PEAK HOUR
430-530



THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91006
626.446.7978

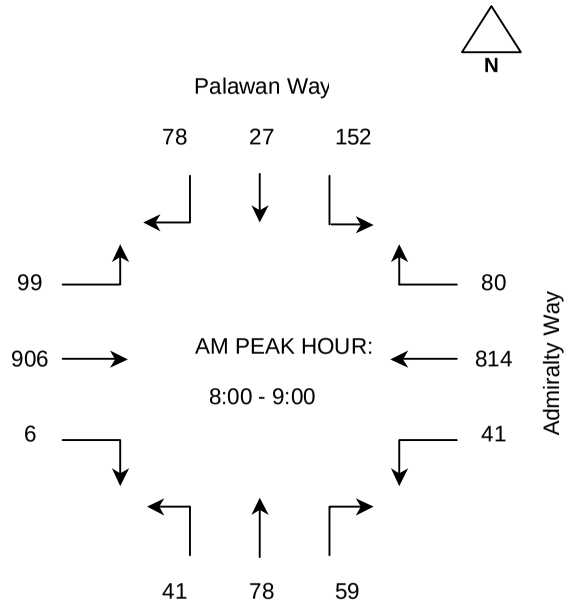
Crain & Associates
2007 Sawtelle Blvd., Suite 4
Los Angeles, CA 90025
Tel: (310) 473-6508

VEHICLE TURNING MOVEMENT COUNT SUMMARY

N/S STREET: Palawan Way **E/W STREET:** Admiralty Way
PERIOD: AM Peak Hour **DATE:** Wednesday January 31, 2007

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 7:15	7	155	7	10	113	2	7	6	3	22	4	6	342
7:15 - 7:30	7	174	12	9	131	1	6	14	8	24	7	11	404
7:30 - 7:45	8	238	20	8	199	2	8	8	21	35	4	9	560
7:45 - 8:00	10	200	23	12	209	1	7	13	17	40	5	11	548
8:00 - 8:15	8	200	22	25	232	0	9	17	14	42	9	17	595
8:15 - 8:30	10	197	20	27	225	2	10	19	17	39	7	20	593
8:30 - 8:45	14	226	21	26	229	3	13	20	15	36	3	19	625
8:45 - 9:00	9	191	17	21	220	1	9	22	13	35	8	22	568
9:00 - 9:15	7	170	15	14	212	2	6	19	12	37	9	25	528
9:15 - 9:30	7	162	13	13	199	3	10	17	10	31	7	20	492
9:30 - 9:45	9	149	21	16	211	4	7	11	7	32	10	21	498
9:45 - 10:00	10	151	16	17	174	5	15	4	8	25	11	20	456

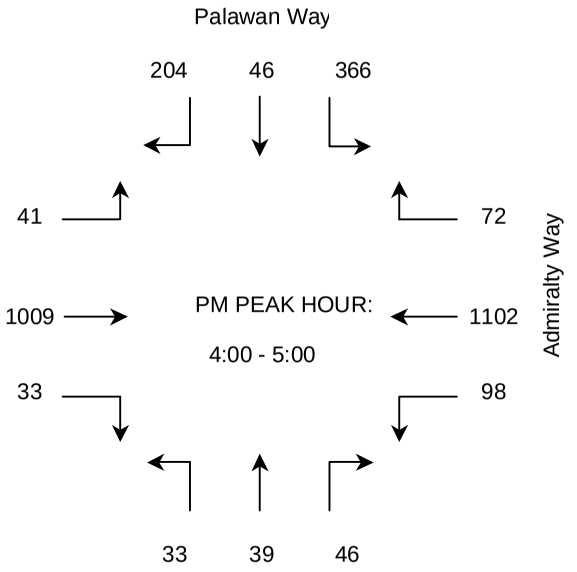
1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 8:00	32	767	62	39	652	6	28	41	49	121	20	37	1,854
7:15 - 8:15	33	812	77	54	771	4	30	52	60	141	25	48	2,107
7:30 - 8:30	36	835	85	72	865	5	34	57	69	156	25	57	2,296
7:45 - 8:45	42	823	86	90	895	6	39	69	63	157	24	67	2,361
8:00 - 9:00	41	814	80	99	906	6	41	78	59	152	27	78	2,381 *
8:15 - 9:15	40	784	73	88	886	8	38	80	57	147	27	86	2,314
8:30 - 9:30	37	749	66	74	860	9	38	78	50	139	27	86	2,213
8:45 - 9:45	32	672	66	64	842	10	32	69	42	135	34	88	2,086
9:00 - 10:00	33	632	65	60	796	14	38	51	37	125	37	86	1,974



PERIOD: PM Peak Hour **DATE:** Wednesday January 31, 2007

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 3:15	17	227	26	8	256	4	8	13	14	63	11	38	685
3:15 - 3:30	14	244	17	11	233	10	10	8	8	91	18	30	694
3:30 - 3:45	25	292	17	7	238	3	10	9	17	78	16	31	743
3:45 - 4:00	30	281	20	6	222	10	11	11	14	76	18	36	735
4:00 - 4:15	31	280	19	11	262	12	9	12	10	84	15	51	796
4:15 - 4:30	22	304	24	12	244	8	12	11	14	90	12	57	810
4:30 - 4:45	21	261	17	8	239	7	7	7	9	101	11	49	737
4:45 - 5:00	24	257	12	10	264	6	5	9	13	91	8	47	746
5:00 - 5:15	18	266	10	14	228	7	6	6	12	90	14	44	715
5:15 - 5:30	23	262	8	6	269	4	6	12	6	89	15	55	755
5:30 - 5:45	29	249	12	14	249	7	6	9	11	62	12	45	705
5:45 - 6:00	31	241	9	9	221	8	7	10	10	60	15	41	662

1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 4:00	86	1,044	80	32	949	27	39	41	53	308	63	135	2,857
3:15 - 4:15	100	1,097	73	35	955	35	40	40	49	329	67	148	2,968
3:30 - 4:30	108	1,157	80	36	966	33	42	43	55	328	61	175	3,084
3:45 - 4:45	104	1,126	80	37	967	37	39	41	47	351	56	193	3,078
4:00 - 5:00	98	1,102	72	41	1,009	33	33	39	46	366	46	204	3,089 *
4:15 - 5:15	85	1,088	63	44	975	28	30	33	48	372	45	197	3,008
4:30 - 5:30	86	1,046	47	38	1,000	24	24	34	40	371	48	195	2,953
4:45 - 5:45	94	1,034	42	44	1,010	24	23	36	42	332	49	191	2,921
5:00 - 6:00	101	1,018	39	43	967	26	25	37	39	301	56	185	2,837



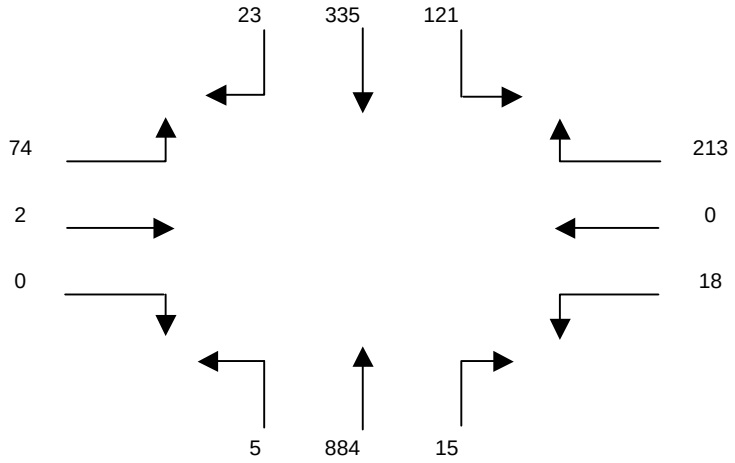
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: CRAIN & ASSOCIATES
PROJECT: MARINA DEL REY PROJECT
DATE: WEDNESDAY, MARCH 01, 2006
PERIOD: 07:00 AM TO 09:00 AM
INTERSECTION: N/S VIA MARINA
E/W PANAY WAY
FILE NUMBER: 3-AM

15 MINUTE TOTALS	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT
700-715	7	67	16	44	2	2	4	201	2	2	1	10
715-730	6	85	27	42	0	0	2	215	1	1	2	15
730-745	7	80	22	32	0	0	3	209	0	0	0	11
745-800	2	99	35	51	0	3	7	236	0	0	0	19
800-815	6	82	29	45	0	3	3	227	1	0	2	15
815-830	8	83	24	58	0	5	2	218	3	0	0	23
830-845	7	71	33	59	0	7	3	203	1	0	0	17
845-900	10	86	25	47	0	4	1	202	1	3	1	15

1 HOUR TOTALS	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTALS
700-800	22	331	100	169	2	5	16	861	3	3	3	55	1570
715-815	21	346	113	170	0	6	15	887	2	1	4	60	1625
730-830	23	344	110	186	0	11	15	890	4	0	2	68	1653
745-845	23	335	121	213	0	18	15	884	5	0	2	74	1690
800-900	31	322	111	209	0	19	9	850	6	3	3	70	1633

A.M. PEAK HOUR
745-845



THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91006
626.446.7978

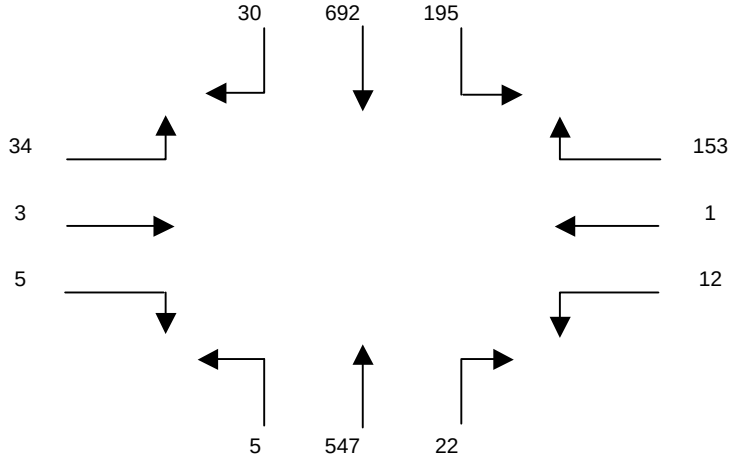
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: CRAIN & ASSOCIATES
PROJECT: MARINA DEL REY PROJECT
DATE: WEDNESDAY, MARCH 01, 2006
PERIOD: 04:00 PM TO 06:00 PM
INTERSECTION: N/S VIA MARINA
E/W PANAY WAY
FILE NUMBER: 3-PM

15 MINUTE	1	2	3	4	5	6	7	8	9	10	11	12
TOTALS	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT
400-415	7	142	33	36	0	2	5	133	2	0	0	11
415-430	8	156	36	50	0	1	4	125	1	1	0	10
430-445	10	152	50	51	0	2	8	123	0	0	0	10
445-500	8	173	48	34	0	2	5	120	1	1	1	7
500-515	7	173	41	48	0	3	7	159	0	1	0	10
515-530	6	186	47	28	1	4	5	143	2	3	0	8
530-545	9	160	59	43	0	3	5	125	2	0	2	9
545-600	8	173	47	37	1	3	6	97	0	1	0	7

1 HOUR	1	2	3	4	5	6	7	8	9	10	11	12	
TOTALS	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTALS
400-500	33	623	167	171	0	7	22	501	4	2	1	38	1569
415-515	33	654	175	183	0	8	24	527	2	3	1	37	1647
430-530	31	684	186	161	1	11	25	545	3	5	1	35	1688
445-545	30	692	195	153	1	12	22	547	5	5	3	34	1699
500-600	30	692	194	156	2	13	23	524	4	5	2	34	1679

P.M. PEAK HOUR
445-545



THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91006
626.446.7978

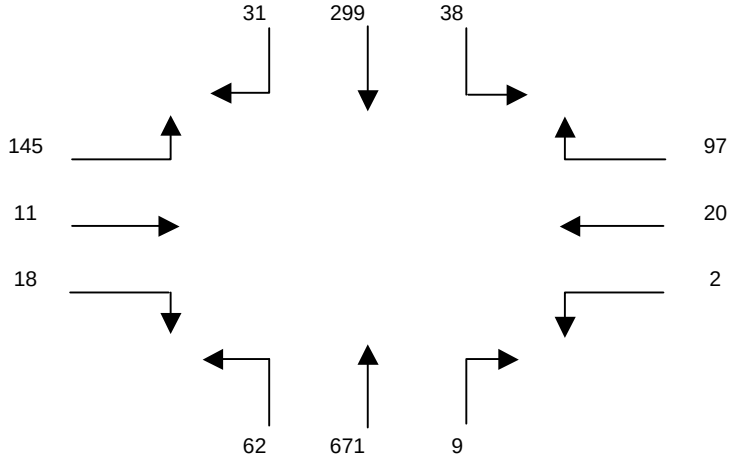
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: CRAIN & ASSOCIATES
PROJECT: MARINA DEL REY PROJECT
DATE: WEDNESDAY, MARCH 01, 2006
PERIOD: 07:00 AM TO 09:00 AM
INTERSECTION: N/S VIA MARINA
E/W MARQUESAS WAY
FILE NUMBER: 2-AM

15 MINUTE TOTALS	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT
700-715	5	46	12	10	1	0	0	157	5	1	2	21
715-730	10	57	8	17	2	0	1	165	7	2	1	29
730-745	5	67	12	24	5	0	0	170	8	1	2	30
745-800	8	73	9	25	7	0	2	186	15	3	4	26
800-815	11	79	12	26	5	0	2	161	19	3	3	42
815-830	7	69	11	26	5	0	3	162	16	6	3	41
830-845	5	78	6	20	3	2	2	162	12	6	1	36
845-900	6	69	9	22	1	0	3	177	7	3	2	38

1 HOUR TOTALS	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTALS
700-800	28	243	41	76	15	0	3	678	35	7	9	106	1241
715-815	34	276	41	92	19	0	5	682	49	9	10	127	1344
730-830	31	288	44	101	22	0	7	679	58	13	12	139	1394
745-845	31	299	38	97	20	2	9	671	62	18	11	145	1403
800-900	29	295	38	94	14	2	10	662	54	18	9	157	1382

A.M. PEAK HOUR
745-845



THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91006
626.446.7978

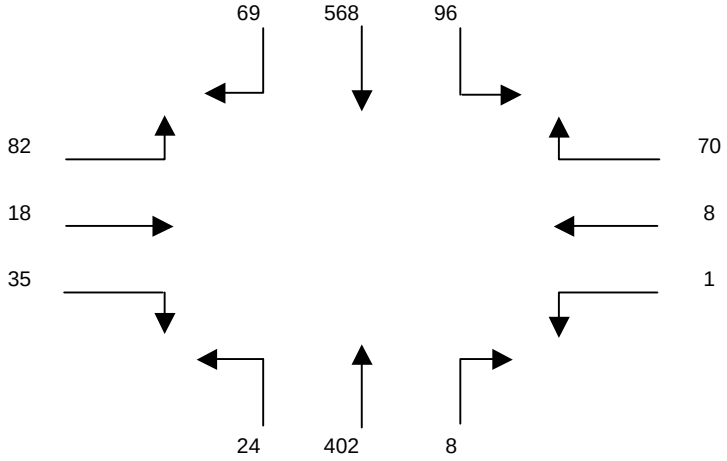
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: CRAIN & ASSOCIATES
PROJECT: MARINA DEL REY PROJECT
DATE: WEDNESDAY, MARCH 01, 2006
PERIOD: 04:00 PM TO 06:00 PM
INTERSECTION: N/S VIA MARINA
E/W MARQUESAS WAY
FILE NUMBER: 2-PM

15 MINUTE TOTALS	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT
400-415	13	109	16	14	3	0	4	59	2	5	4	23
415-430	19	121	23	19	2	0	3	90	3	10	8	30
430-445	15	101	18	19	2	0	4	94	6	6	5	29
445-500	15	120	23	14	2	0	1	98	4	4	3	24
500-515	21	151	23	17	1	0	3	111	5	6	4	19
515-530	15	141	24	24	3	1	2	97	8	10	5	24
530-545	18	156	26	15	2	0	2	96	7	15	6	15
545-600	14	125	23	10	3	0	1	85	12	11	4	11

1 HOUR TOTALS	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTALS
400-500	62	451	80	66	9	0	12	341	15	25	20	106	1187
415-515	70	493	87	69	7	0	11	393	18	26	20	102	1296
430-530	66	513	88	74	8	1	10	400	23	26	17	96	1322
445-545	69	568	96	70	8	1	8	402	24	35	18	82	1381
500-600	68	573	96	66	9	1	8	389	32	42	19	69	1372

P.M. PEAK HOUR
445-545



THE TRAFFIC SOLUTION
329 DIAMOND STREET
ARCADIA, CALIFORNIA 91006
626.446.7978

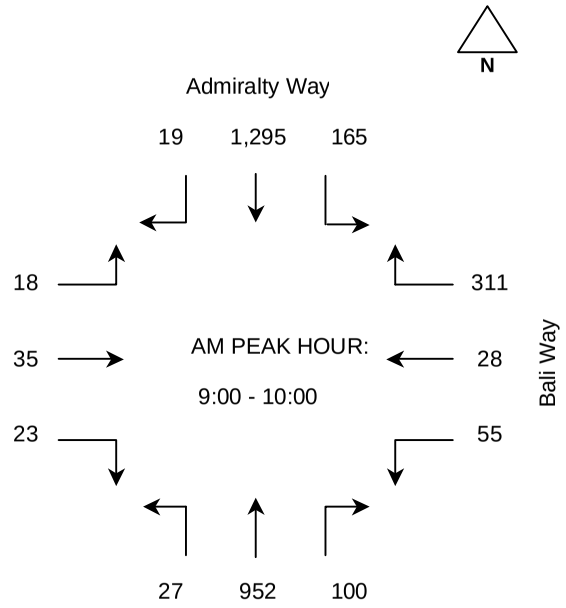
Crain & Associates
2007 Sawtelle Blvd., Suite 4
Los Angeles, CA 90025
Tel: (310) 473-6508

VEHICLE TURNING MOVEMENT COUNT SUMMARY

N/S STREET: Admiralty Way **E/W STREET:** Bali Way
PERIOD: AM Peak Hour **DATE:** Tuesday January 30, 2007

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 7:15	0	0	45	0	0	0	1	123	8	15	125	0	317
7:15 - 7:30	3	12	24	1	9	2	2	210	5	22	177	1	468
7:30 - 7:45	2	8	32	1	4	0	2	212	7	21	186	1	476
7:45 - 8:00	0	1	52	1	2	1	0	207	10	16	195	0	485
8:00 - 8:15	8	7	51	4	10	2	4	233	4	35	240	0	598
8:15 - 8:30	4	6	46	8	7	1	5	256	5	39	229	1	607
8:30 - 8:45	6	5	39	2	4	1	6	246	5	40	248	1	603
8:45 - 9:00	4	5	42	1	4	1	4	251	7	36	239	0	594
9:00 - 9:15	8	9	54	1	8	3	3	180	14	27	252	2	561
9:15 - 9:30	5	6	111	2	6	6	5	190	15	37	249	5	637
9:30 - 9:45	16	7	83	6	9	6	8	226	29	51	346	5	792
9:45 - 10:00	26	6	63	9	12	8	11	356	42	50	448	7	1,038

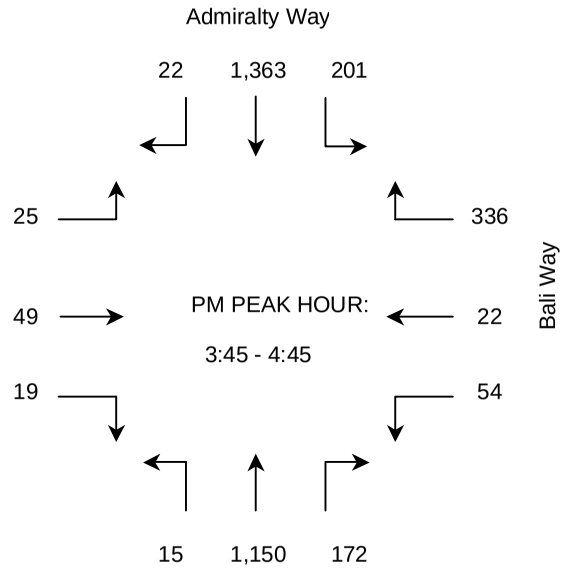
1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 8:00	5	21	153	3	15	3	5	752	30	74	683	2	1,746
7:15 - 8:15	13	28	159	7	25	5	8	862	26	94	798	2	2,027
7:30 - 8:30	14	22	181	14	23	4	11	908	26	111	850	2	2,166
7:45 - 8:45	18	19	188	15	23	5	15	942	24	130	912	2	2,293
8:00 - 9:00	22	23	178	15	25	5	19	986	21	150	956	2	2,402
8:15 - 9:15	22	25	181	12	23	6	18	933	31	142	968	4	2,365
8:30 - 9:30	23	25	246	6	22	11	18	867	41	140	988	8	2,395
8:45 - 9:45	33	27	290	10	27	16	20	847	65	151	1,086	12	2,584
9:00 - 10:00	55	28	311	18	35	23	27	952	100	165	1,295	19	3,028 *



PERIOD: PM Peak Hour **DATE:** Tuesday January 30, 2007

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 3:15	12	12	73	17	10	2	6	242	30	51	310	7	772
3:15 - 3:30	10	6	97	15	12	1	0	271	38	53	330	10	843
3:30 - 3:45	10	7	73	5	6	3	5	284	30	29	326	6	784
3:45 - 4:00	3	10	93	4	5	3	3	261	22	54	359	5	822
4:00 - 4:15	12	6	82	6	10	4	3	286	43	57	353	7	869
4:15 - 4:30	24	3	66	6	14	3	3	319	60	51	342	8	899
4:30 - 4:45	15	3	95	9	20	9	6	284	47	39	309	2	838
4:45 - 5:00	13	5	86	7	16	6	5	272	51	34	312	2	809
5:00 - 5:15	33	7	85	5	7	0	0	264	31	33	338	1	804
5:15 - 5:30	28	5	76	2	6	2	2	311	32	42	355	4	865
5:30 - 5:45	22	7	62	3	6	8	4	306	36	51	362	7	874
5:45 - 6:00	27	1	75	1	5	3	0	282	31	39	284	3	751

1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 4:00	35	35	336	41	33	9	14	1,058	120	187	1,325	28	3,221
3:15 - 4:15	35	29	345	30	33	11	11	1,102	133	193	1,368	28	3,318
3:30 - 4:30	49	26	314	21	35	13	14	1,150	155	191	1,380	26	3,374
3:45 - 4:45	54	22	336	25	49	19	15	1,150	172	201	1,363	22	3,428 *
4:00 - 5:00	64	17	329	28	60	22	17	1,161	201	181	1,316	19	3,415
4:15 - 5:15	85	18	332	27	57	18	14	1,139	189	157	1,301	13	3,350
4:30 - 5:30	89	20	342	23	49	17	13	1,131	161	148	1,314	9	3,316
4:45 - 5:45	96	24	309	17	35	16	11	1,153	150	160	1,367	14	3,352
5:00 - 6:00	110	20	298	11	24	13	6	1,163	130	165	1,339	15	3,294



Crain & Associates
2007 Sawtelle Blvd., Suite 4
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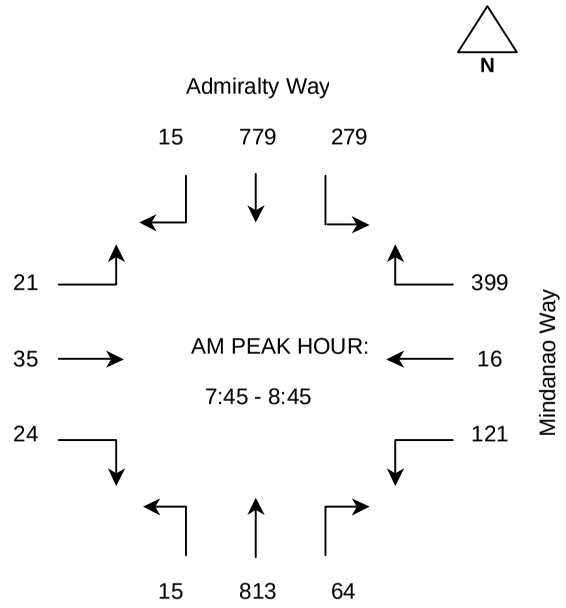
VEHICLE TURNING MOVEMENT COUNT SUMMARY

N/S STREET: Admiralty Way **E/W STREET:** Mindanao Way
PERIOD: AM Peak Hour **DATE:** Wednesday January 24, 2007

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 7:15	18	5	60	0	0	1	5	98	6	62	76	4	335
7:15 - 7:30	16	2	64	2	4	5	2	136	6	82	89	2	410
7:30 - 7:45	18	3	72	3	5	8	1	154	11	100	116	3	494
7:45 - 8:00	18	6	98	10	12	5	1	187	10	65	225	3	640
8:00 - 8:15	27	4	110	2	12	7	5	208	20	69	201	4	669
8:15 - 8:30	34	6	93	6	8	6	3	197	10	71	189	3	626
8:30 - 8:45	42	0	98	3	3	6	6	221	24	74	164	5	646
8:45 - 9:00	24	4	91	6	4	3	2	180	16	92	117	2	541
9:00 - 9:15	28	8	72	2	2	1	5	160	21	64	138	3	504
9:15 - 9:30	42	12	84	2	3	0	2	139	39	67	148	5	543
9:30 - 9:45	33	8	56	0	3	0	10	146	25	59	116	1	457
9:45 - 10:00	29	7	42	1	2	0	5	98	15	62	119	2	382

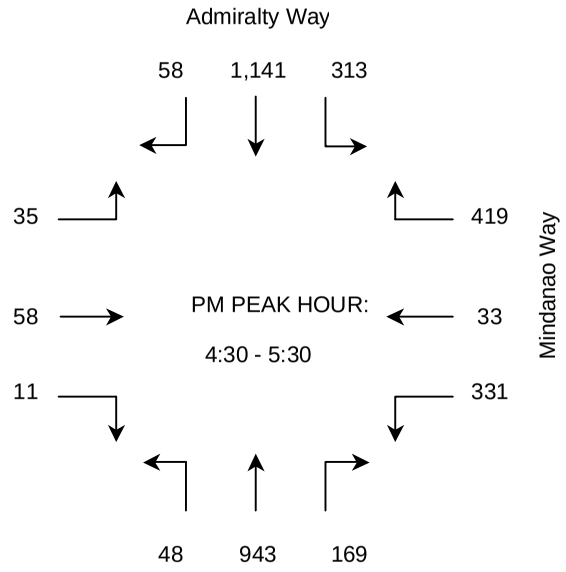
1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 8:00	70	16	294	15	21	19	9	575	33	309	506	12	1,879
7:15 - 8:15	79	15	344	17	33	25	9	685	47	316	631	12	2,213
7:30 - 8:30	97	19	373	21	37	26	10	746	51	305	731	13	2,429
7:45 - 8:45	121	16	399	21	35	24	15	813	64	279	779	15	2,581 *
8:00 - 9:00	127	14	392	17	27	22	16	806	70	306	671	14	2,482
8:15 - 9:15	128	18	354	17	17	16	16	758	71	301	608	13	2,317
8:30 - 9:30	136	24	345	13	12	10	15	700	100	297	567	15	2,234
8:45 - 9:45	127	32	303	10	12	4	19	625	101	282	519	11	2,045
9:00 - 10:00	132	35	254	5	10	1	22	543	100	252	521	11	1,886



PERIOD: PM Peak Hour **DATE:** Wednesday January 24, 2007

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 3:15	60	5	108	5	10	2	3	161	37	59	178	1	629
3:15 - 3:30	61	14	61	0	2	6	3	156	42	98	136	0	579
3:30 - 3:45	79	6	68	2	6	4	2	172	37	82	173	8	639
3:45 - 4:00	95	4	73	0	8	2	0	156	29	63	228	12	670
4:00 - 4:15	69	7	69	6	8	3	7	158	31	82	259	8	707
4:15 - 4:30	45	9	72	6	11	2	7	163	36	104	295	7	757
4:30 - 4:45	114	16	140	11	20	5	14	209	57	80	296	10	972
4:45 - 5:00	59	3	77	3	5	2	5	155	24	73	269	7	682
5:00 - 5:15	73	6	84	5	14	1	8	281	40	76	270	18	876
5:15 - 5:30	85	8	118	16	19	3	21	298	48	84	306	23	1,029
5:30 - 5:45	72	7	110	10	10	2	8	168	36	71	329	12	835
5:45 - 6:00	62	11	106	5	6	3	7	164	47	63	229	8	711

1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 4:00	295	29	310	7	26	14	8	645	145	302	715	21	2,517
3:15 - 4:15	304	31	271	8	24	15	12	642	139	325	796	28	2,595
3:30 - 4:30	288	26	282	14	33	11	16	649	133	331	955	35	2,773
3:45 - 4:45	323	36	354	23	47	12	28	686	153	329	1,078	37	3,106
4:00 - 5:00	287	35	358	26	44	12	33	685	148	339	1,119	32	3,118
4:15 - 5:15	291	34	373	25	50	10	34	808	157	333	1,130	42	3,287
4:30 - 5:30	331	33	419	35	58	11	48	943	169	313	1,141	58	3,559 *
4:45 - 5:45	289	24	389	34	48	8	42	902	148	304	1,174	60	3,422
5:00 - 6:00	292	32	418	36	49	9	44	911	171	294	1,134	61	3,451



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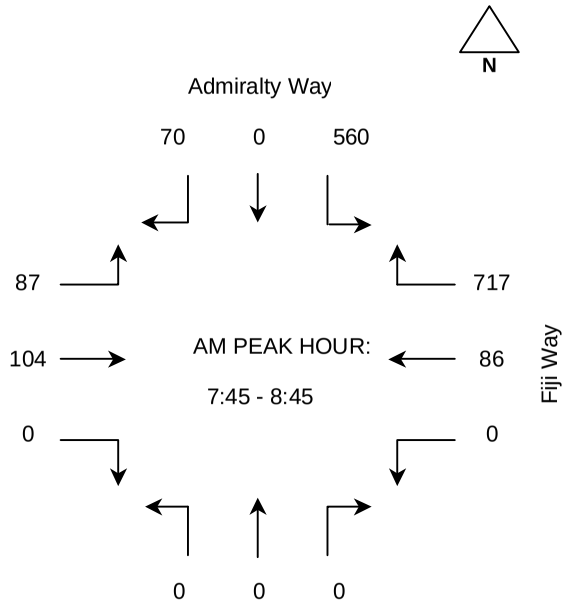
VEHICLE TURNING MOVEMENT COUNT SUMMARY

N/S STREET: Admiralty Way **E/W STREET:** Fiji Way
PERIOD: AM Peak Hour **DATE:** Wednesday January 24, 2007

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 7:15	0	33	86	17	15	0	0	0	0	83	0	19	253
7:15 - 7:30	0	27	122	20	30	0	0	0	0	89	0	16	304
7:30 - 7:45	0	22	162	16	24	0	0	0	0	114	0	13	351
7:45 - 8:00	0	25	177	23	18	0	0	0	0	124	0	21	388
8:00 - 8:15	0	27	204	21	29	0	0	0	0	133	0	24	438
8:15 - 8:30	0	16	191	19	30	0	0	0	0	162	0	17	435
8:30 - 8:45	0	18	145	24	27	0	0	0	0	141	0	8	363
8:45 - 9:00	0	9	159	16	22	0	0	0	0	148	0	12	366
9:00 - 9:15	0	11	144	30	17	0	0	0	0	141	0	14	357
9:15 - 9:30	0	17	140	21	22	0	0	0	0	111	0	10	321
9:30 - 9:45	0	20	113	19	19	0	0	0	0	92	0	16	279
9:45 - 10:00	0	23	84	28	20	0	0	0	0	109	0	26	290

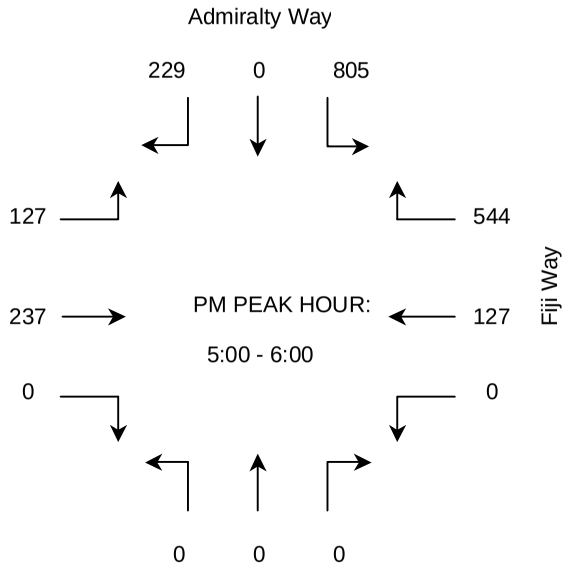
1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 8:00	0	107	547	76	87	0	0	0	0	410	0	69	1,296
7:15 - 8:15	0	101	665	80	101	0	0	0	0	460	0	74	1,481
7:30 - 8:30	0	90	734	79	101	0	0	0	0	533	0	75	1,612
7:45 - 8:45	0	86	717	87	104	0	0	0	0	560	0	70	1,624 *
8:00 - 9:00	0	70	699	80	108	0	0	0	0	584	0	61	1,602
8:15 - 9:15	0	54	639	89	96	0	0	0	0	592	0	51	1,521
8:30 - 9:30	0	55	588	91	88	0	0	0	0	541	0	44	1,407
8:45 - 9:45	0	57	556	86	80	0	0	0	0	492	0	52	1,323
9:00 - 10:00	0	71	481	98	78	0	0	0	0	453	0	66	1,247



PERIOD: PM Peak Hour **DATE:** Wednesday January 24, 2007

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 3:15	0	24	111	24	31	0	0	0	0	181	0	33	404
3:15 - 3:30	0	28	158	19	40	0	0	0	0	222	0	25	492
3:30 - 3:45	0	22	108	26	46	0	0	0	0	180	0	30	412
3:45 - 4:00	0	34	115	16	33	0	0	0	0	213	0	27	438
4:00 - 4:15	0	30	151	23	53	0	0	0	0	222	0	41	520
4:15 - 4:30	0	21	145	11	61	0	0	0	0	201	0	45	484
4:30 - 4:45	0	28	166	18	50	0	0	0	0	209	0	27	498
4:45 - 5:00	0	30	160	22	42	0	0	0	0	194	0	40	488
5:00 - 5:15	0	31	169	30	55	0	0	0	0	217	0	59	561
5:15 - 5:30	0	29	144	29	59	0	0	0	0	197	0	54	512
5:30 - 5:45	0	27	117	35	62	0	0	0	0	201	0	65	507
5:45 - 6:00	0	40	114	33	61	0	0	0	0	190	0	51	489

1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 4:00	0	108	492	85	150	0	0	0	0	796	0	115	1,746
3:15 - 4:15	0	114	532	84	172	0	0	0	0	837	0	123	1,862
3:30 - 4:30	0	107	519	76	193	0	0	0	0	816	0	143	1,854
3:45 - 4:45	0	113	577	68	197	0	0	0	0	845	0	140	1,940
4:00 - 5:00	0	109	622	74	206	0	0	0	0	826	0	153	1,990
4:15 - 5:15	0	110	640	81	208	0	0	0	0	821	0	171	2,031
4:30 - 5:30	0	118	639	99	206	0	0	0	0	817	0	180	2,059
4:45 - 5:45	0	117	590	116	218	0	0	0	0	809	0	218	2,068
5:00 - 6:00	0	127	544	127	237	0	0	0	0	805	0	229	2,069 *



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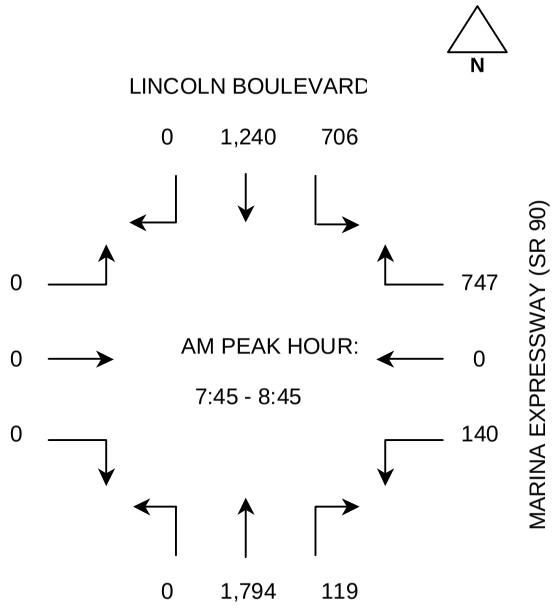
VEHICLE TURNING MOVEMENT COUNT SUMMARY

N/S STREET: LINCOLN BOULEVARD **E/W STREET:** MARINA EXPRESSWAY (SR 90)
PERIOD: AM PEAK HOUR **DATE:** TUESDAY JUNE 13, 2006

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 7:15	23	0	156	0	0	0	0	438	18	96	147	0	878
7:15 - 7:30	19	0	138	0	0	0	0	495	13	148	217	0	1,030
7:30 - 7:45	32	0	168	0	0	0	0	493	21	167	294	0	1,175
7:45 - 8:00	32	0	192	0	0	0	0	493	24	166	275	0	1,182
8:00 - 8:15	42	0	190	0	0	0	0	425	21	178	321	0	1,177
8:15 - 8:30	22	0	174	0	0	0	0	461	34	180	308	0	1,179
8:30 - 8:45	44	0	191	0	0	0	0	415	40	182	336	0	1,208
8:45 - 9:00	39	0	165	0	0	0	0	417	24	151	334	0	1,130
9:00 - 9:15	26	0	151	0	0	0	0	420	26	166	304	0	1,093
9:15 - 9:30	26	0	140	0	0	0	0	407	34	143	324	0	1,074
9:30 - 9:45	45	0	149	0	0	0	0	408	32	127	319	0	1,080
9:45 - 10:00	41	0	157	0	0	0	0	368	34	114	300	0	1,014

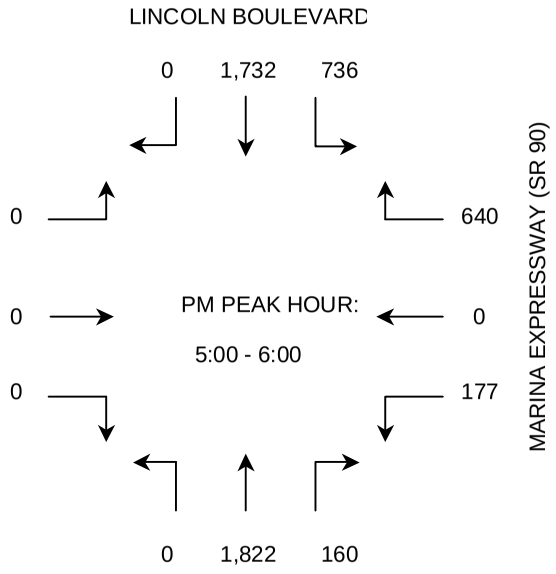
1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 8:00	106	0	654	0	0	0	0	1,919	76	577	933	0	4,265
7:15 - 8:15	125	0	688	0	0	0	0	1,906	79	659	1,107	0	4,564
7:30 - 8:30	128	0	724	0	0	0	0	1,872	100	691	1,198	0	4,713
7:45 - 8:45	140	0	747	0	0	0	0	1,794	119	706	1,240	0	4,746 *
8:00 - 9:00	147	0	720	0	0	0	0	1,718	119	691	1,299	0	4,694
8:15 - 9:15	131	0	681	0	0	0	0	1,713	124	679	1,282	0	4,610
8:30 - 9:30	135	0	647	0	0	0	0	1,659	124	642	1,298	0	4,505
8:45 - 9:45	136	0	605	0	0	0	0	1,652	116	587	1,281	0	4,377
9:00 - 10:00	138	0	597	0	0	0	0	1,603	126	550	1,247	0	4,261



PERIOD: PM PEAK HOUR **DATE:** TUESDAY JUNE 13, 2006

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 3:15	32	0	142	0	0	0	0	393	35	162	401	0	1,165
3:15 - 3:30	38	0	132	0	0	0	0	384	50	157	371	0	1,132
3:30 - 3:45	35	0	118	0	0	0	0	404	62	175	410	0	1,204
3:45 - 4:00	41	0	159	0	0	0	0	400	64	155	379	0	1,198
4:00 - 4:15	41	0	113	0	0	0	0	425	59	198	434	0	1,270
4:15 - 4:30	40	0	134	0	0	0	0	385	37	166	344	0	1,106
4:30 - 4:45	39	0	153	0	0	0	0	391	56	146	390	0	1,175
4:45 - 5:00	36	0	153	0	0	0	0	429	38	196	409	0	1,261
5:00 - 5:15	48	0	153	0	0	0	0	447	30	176	453	0	1,307
5:15 - 5:30	39	0	160	0	0	0	0	450	50	197	443	0	1,339
5:30 - 5:45	50	0	174	0	0	0	0	429	40	181	427	0	1,301
5:45 - 6:00	40	0	153	0	0	0	0	496	40	182	409	0	1,320

1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 4:00	146	0	551	0	0	0	0	1,581	211	649	1,561	0	4,699
3:15 - 4:15	155	0	522	0	0	0	0	1,613	235	685	1,594	0	4,804
3:30 - 4:30	157	0	524	0	0	0	0	1,614	222	694	1,567	0	4,778
3:45 - 4:45	161	0	559	0	0	0	0	1,601	216	665	1,547	0	4,749
4:00 - 5:00	156	0	553	0	0	0	0	1,630	190	706	1,577	0	4,812
4:15 - 5:15	163	0	593	0	0	0	0	1,652	161	684	1,596	0	4,849
4:30 - 5:30	162	0	619	0	0	0	0	1,717	174	715	1,695	0	5,082
4:45 - 5:45	173	0	640	0	0	0	0	1,755	158	750	1,732	0	5,208
5:00 - 6:00	177	0	640	0	0	0	0	1,822	160	736	1,732	0	5,267 *



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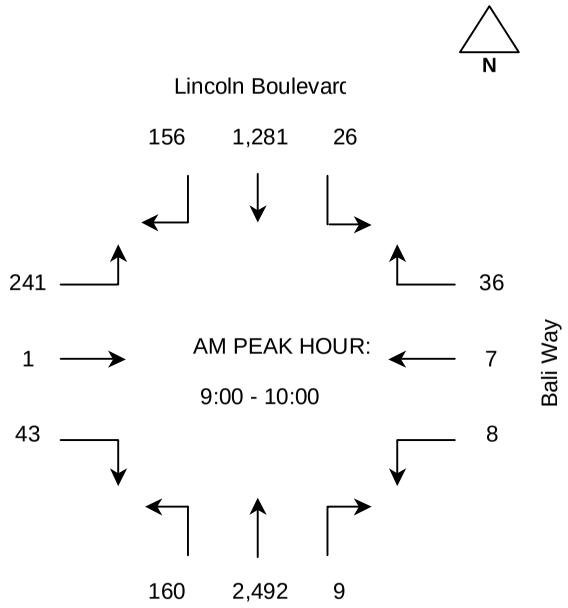
VEHICLE TURNING MOVEMENT COUNT SUMMARY

N/S STREET: Lincoln Boulevard **E/W STREET:** Bali Way

PERIOD: AM Peak Hour **DATE:** Wednesday January 31, 2007

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 7:15	1	0	0	24	0	3	17	464	7	3	227	38	784
7:15 - 7:30	0	0	5	24	2	7	19	368	3	3	225	27	683
7:30 - 7:45	0	1	0	26	3	6	17	409	5	1	252	31	751
7:45 - 8:00	0	0	0	18	0	9	16	444	5	0	286	34	812
8:00 - 8:15	0	0	3	46	0	4	26	378	6	1	295	30	789
8:15 - 8:30	1	0	1	44	1	7	24	386	5	3	316	29	817
8:30 - 8:45	0	1	2	45	0	4	25	411	7	5	337	33	870
8:45 - 9:00	2	0	0	43	1	9	29	422	7	6	342	34	895
9:00 - 9:15	1	2	8	38	1	10	52	592	3	5	329	38	1,079
9:15 - 9:30	5	2	9	47	0	9	74	675	1	5	336	33	1,196
9:30 - 9:45	0	0	12	70	0	13	18	617	3	8	303	40	1,084
9:45 - 10:00	2	3	7	86	0	11	16	608	2	8	313	45	1,101

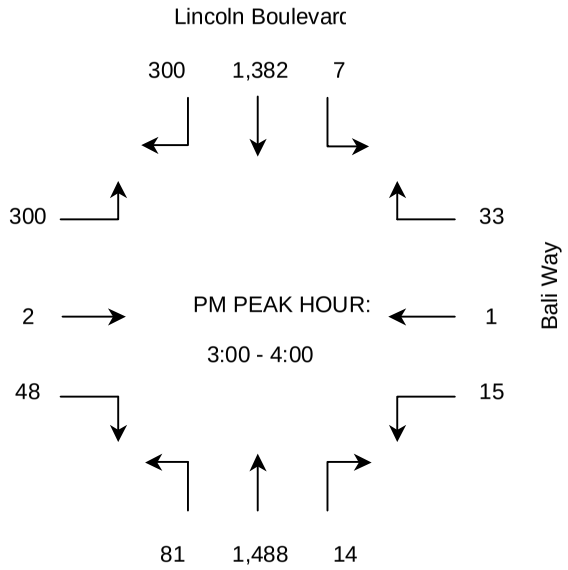
1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 8:00	1	1	5	92	5	25	69	1,685	20	7	990	130	3,030
7:15 - 8:15	0	1	8	114	5	26	78	1,599	19	5	1,058	122	3,035
7:30 - 8:30	1	1	4	134	4	26	83	1,617	21	5	1,149	124	3,169
7:45 - 8:45	1	1	6	153	1	24	91	1,619	23	9	1,234	126	3,288
8:00 - 9:00	3	1	6	178	2	24	104	1,597	25	15	1,290	126	3,371
8:15 - 9:15	4	3	11	170	3	30	130	1,811	22	19	1,324	134	3,661
8:30 - 9:30	8	5	19	173	2	32	180	2,100	18	21	1,344	138	4,040
8:45 - 9:45	8	4	29	198	2	41	173	2,306	14	24	1,310	145	4,254
9:00 - 10:00	8	7	36	241	1	43	160	2,492	9	26	1,281	156	4,460 *



PERIOD: PM Peak Hour **DATE:** Wednesday January 31, 2007

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 3:15	7	0	10	76	0	12	25	334	5	3	304	81	857
3:15 - 3:30	6	0	11	62	0	15	12	399	5	1	408	75	994
3:30 - 3:45	2	1	6	78	2	12	20	382	2	1	361	69	936
3:45 - 4:00	0	0	6	84	0	9	24	373	2	2	309	75	884
4:00 - 4:15	2	1	12	102	0	2	24	321	1	1	271	83	820
4:15 - 4:30	6	1	13	62	2	5	14	383	1	2	344	68	901
4:30 - 4:45	1	0	8	71	1	4	26	367	6	1	299	73	857
4:45 - 5:00	1	2	5	78	0	5	42	358	5	3	288	90	877
5:00 - 5:15	0	1	7	75	1	4	19	321	2	2	344	72	848
5:15 - 5:30	0	0	12	68	0	2	18	310	3	6	336	69	824
5:30 - 5:45	0	0	3	55	0	6	21	357	0	5	319	55	821
5:45 - 6:00	1	1	3	58	0	6	17	348	2	2	289	51	778

1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 4:00	15	1	33	300	2	48	81	1,488	14	7	1,382	300	3,671 *
3:15 - 4:15	10	2	35	326	2	38	80	1,475	10	5	1,349	302	3,634
3:30 - 4:30	10	3	37	326	4	28	82	1,459	6	6	1,285	295	3,541
3:45 - 4:45	9	2	39	319	3	20	88	1,444	10	6	1,223	299	3,462
4:00 - 5:00	10	4	38	313	3	16	106	1,429	13	7	1,202	314	3,455
4:15 - 5:15	8	4	33	286	4	18	101	1,429	14	8	1,275	303	3,483
4:30 - 5:30	2	3	32	292	2	15	105	1,356	16	12	1,267	304	3,406
4:45 - 5:45	1	3	27	276	1	17	100	1,346	10	16	1,287	286	3,370
5:00 - 6:00	1	2	25	256	1	18	75	1,336	7	15	1,288	247	3,271



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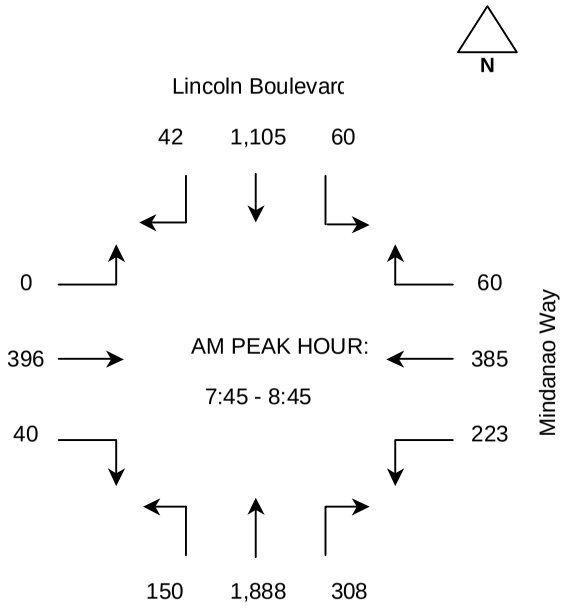
VEHICLE TURNING MOVEMENT COUNT SUMMARY

N/S STREET: Lincoln Boulevard **E/W STREET:** Mindanao Way

PERIOD: AM Peak Hour **DATE:** Thursday January 25, 2007

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 7:15	31	63	12	0	66	4	17	425	77	14	151	7	867
7:15 - 7:30	30	31	19	0	111	6	18	448	66	19	159	5	912
7:30 - 7:45	48	51	14	0	114	5	29	461	64	9	251	11	1,057
7:45 - 8:00	54	84	12	0	51	12	41	489	70	10	298	9	1,130
8:00 - 8:15	63	112	19	0	111	3	51	454	84	19	243	15	1,174
8:15 - 8:30	45	88	13	0	132	14	27	492	81	17	253	8	1,170
8:30 - 8:45	61	101	16	0	102	11	31	453	73	14	311	10	1,183
8:45 - 9:00	40	92	19	0	98	13	20	411	69	19	270	11	1,062
9:00 - 9:15	66	108	21	0	122	16	24	385	63	16	319	16	1,156
9:15 - 9:30	54	95	11	0	102	14	16	410	66	21	348	15	1,152
9:30 - 9:45	50	80	18	0	95	11	14	392	54	20	301	20	1,055
9:45 - 10:00	61	98	22	0	137	15	12	362	61	23	236	25	1,052

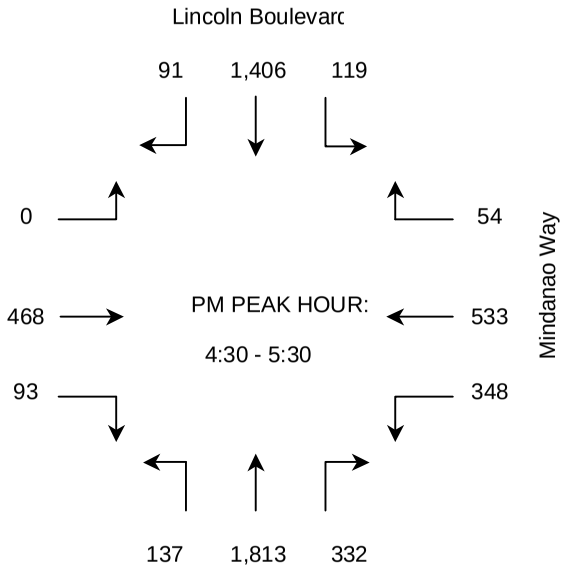
1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 8:00	163	229	57	0	342	27	105	1,823	277	52	859	32	3,966
7:15 - 8:15	195	278	64	0	387	26	139	1,852	284	57	951	40	4,273
7:30 - 8:30	210	335	58	0	408	34	148	1,896	299	55	1,045	43	4,531
7:45 - 8:45	223	385	60	0	396	40	150	1,888	308	60	1,105	42	4,657 *
8:00 - 9:00	209	393	67	0	443	41	129	1,810	307	69	1,077	44	4,589
8:15 - 9:15	212	389	69	0	454	54	102	1,741	286	66	1,153	45	4,571
8:30 - 9:30	221	396	67	0	424	54	91	1,659	271	70	1,248	52	4,553
8:45 - 9:45	210	375	69	0	417	54	74	1,598	252	76	1,238	62	4,425
9:00 - 10:00	231	381	72	0	456	56	66	1,549	244	80	1,204	76	4,415



PERIOD: PM Peak Hour **DATE:** Thursday January 25, 2007

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 3:15	98	138	20	0	104	29	25	336	43	28	334	18	1,173
3:15 - 3:30	101	77	18	0	132	31	28	393	82	31	390	12	1,295
3:30 - 3:45	106	138	24	0	142	27	31	315	54	29	318	39	1,223
3:45 - 4:00	97	122	19	0	80	20	33	357	67	30	384	19	1,228
4:00 - 4:15	70	88	11	0	143	25	35	387	72	29	410	33	1,303
4:15 - 4:30	72	99	10	0	132	22	30	431	70	28	342	18	1,254
4:30 - 4:45	74	133	12	0	145	35	30	418	78	28	362	19	1,334
4:45 - 5:00	81	102	14	0	85	18	35	427	80	31	342	22	1,237
5:00 - 5:15	96	148	16	0	135	19	35	537	83	28	377	26	1,500
5:15 - 5:30	97	150	12	0	103	21	37	431	91	32	325	24	1,323
5:30 - 5:45	90	152	18	0	109	17	44	365	100	38	309	31	1,273
5:45 - 6:00	111	141	14	0	101	24	39	369	104	27	271	21	1,222

1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 4:00	402	475	81	0	458	107	117	1,401	246	118	1,426	88	4,919
3:15 - 4:15	374	425	72	0	497	103	127	1,452	275	119	1,502	103	5,049
3:30 - 4:30	345	447	64	0	497	94	129	1,490	263	116	1,454	109	5,008
3:45 - 4:45	313	442	52	0	500	102	128	1,593	287	115	1,498	89	5,119
4:00 - 5:00	297	422	47	0	505	100	130	1,663	300	116	1,456	92	5,128
4:15 - 5:15	323	482	52	0	497	94	130	1,813	311	115	1,423	85	5,325
4:30 - 5:30	348	533	54	0	468	93	137	1,813	332	119	1,406	91	5,394 *
4:45 - 5:45	364	552	60	0	432	75	151	1,760	354	129	1,353	103	5,333
5:00 - 6:00	394	591	60	0	448	81	155	1,702	378	125	1,282	102	5,318



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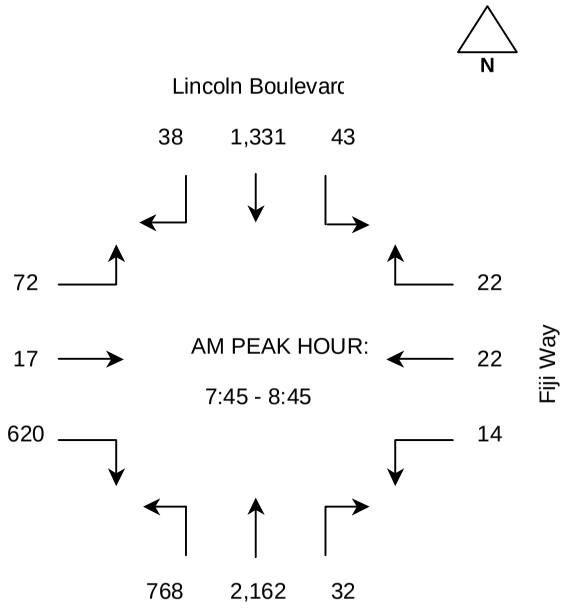
VEHICLE TURNING MOVEMENT COUNT SUMMARY

N/S STREET: Lincoln Boulevard **E/W STREET:** Fiji Way

PERIOD: AM Peak Hour **DATE:** Thursday January 25, 2007

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 7:15	9	2	5	12	4	88	136	515	5	4	168	15	963
7:15 - 7:30	3	4	3	13	2	91	139	509	4	7	190	12	977
7:30 - 7:45	3	3	3	15	5	109	174	511	9	5	299	11	1,147
7:45 - 8:00	2	5	4	15	3	136	185	536	7	9	345	7	1,254
8:00 - 8:15	2	4	6	24	4	147	203	530	10	10	291	14	1,245
8:15 - 8:30	4	4	3	17	3	163	211	572	8	9	333	8	1,335
8:30 - 8:45	6	9	9	16	7	174	169	524	7	15	362	9	1,307
8:45 - 9:00	7	10	7	19	7	160	159	480	11	17	327	10	1,214
9:00 - 9:15	4	6	8	18	8	154	141	455	6	14	384	12	1,210
9:15 - 9:30	6	0	3	5	3	109	133	485	7	10	381	15	1,157
9:30 - 9:45	7	5	10	10	5	117	145	431	10	9	346	11	1,106
9:45 - 10:00	4	4	4	15	7	104	96	435	5	10	292	10	986

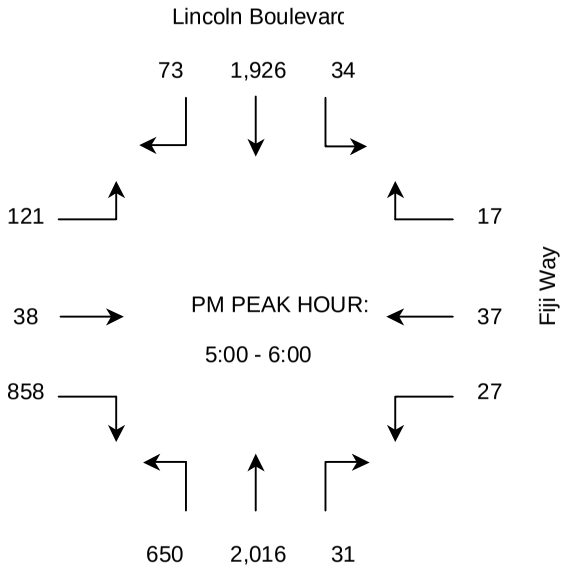
1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
7:00 - 8:00	17	14	15	55	14	424	634	2,071	25	25	1,002	45	4,341
7:15 - 8:15	10	16	16	67	14	483	701	2,086	30	31	1,125	44	4,623
7:30 - 8:30	11	16	16	71	15	555	773	2,149	34	33	1,268	40	4,981
7:45 - 8:45	14	22	22	72	17	620	768	2,162	32	43	1,331	38	5,141 *
8:00 - 9:00	19	27	25	76	21	644	742	2,106	36	51	1,313	41	5,101
8:15 - 9:15	21	29	27	70	25	651	680	2,031	32	55	1,406	39	5,066
8:30 - 9:30	23	25	27	58	25	597	602	1,944	31	56	1,454	46	4,888
8:45 - 9:45	24	21	28	52	23	540	578	1,851	34	50	1,438	48	4,687
9:00 - 10:00	21	15	25	48	23	484	515	1,806	28	43	1,403	48	4,459



PERIOD: PM Peak Hour **DATE:** Thursday January 25, 2007

15-MINUTE	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 3:15	8	7	5	25	2	179	126	342	9	8	395	21	1,127
3:15 - 3:30	6	4	8	15	4	216	168	443	8	11	478	20	1,381
3:30 - 3:45	4	7	10	17	4	203	151	377	5	9	427	18	1,232
3:45 - 4:00	8	6	9	21	5	191	160	411	10	7	461	24	1,313
4:00 - 4:15	9	7	9	28	7	208	169	534	11	3	375	17	1,377
4:15 - 4:30	10	6	10	31	6	211	149	503	10	6	404	18	1,364
4:30 - 4:45	7	9	13	24	10	201	171	488	4	5	422	21	1,375
4:45 - 5:00	7	9	9	25	5	187	188	512	8	7	417	11	1,385
5:00 - 5:15	9	9	5	26	9	236	210	493	3	12	439	16	1,467
5:15 - 5:30	7	10	5	36	10	204	179	489	15	10	492	22	1,479
5:30 - 5:45	6	11	3	30	11	207	122	523	4	9	507	20	1,453
5:45 - 6:00	5	7	4	29	8	211	139	511	9	3	488	15	1,429

1-HOUR	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND			
TOTALS	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
3:00 - 4:00	26	24	32	78	15	789	605	1,573	32	35	1,761	83	5,053
3:15 - 4:15	27	24	36	81	20	818	648	1,765	34	30	1,741	79	5,303
3:30 - 4:30	31	26	38	97	22	813	629	1,825	36	25	1,667	77	5,286
3:45 - 4:45	34	28	41	104	28	811	649	1,936	35	21	1,662	80	5,429
4:00 - 5:00	33	31	41	108	28	807	677	2,037	33	21	1,618	67	5,501
4:15 - 5:15	33	33	37	106	30	835	718	1,996	25	30	1,682	66	5,591
4:30 - 5:30	30	37	32	111	34	828	748	1,982	30	34	1,770	70	5,706
4:45 - 5:45	29	39	22	117	35	834	699	2,017	30	38	1,855	69	5,784
5:00 - 6:00	27	37	17	121	38	858	650	2,016	31	34	1,926	73	5,828 *

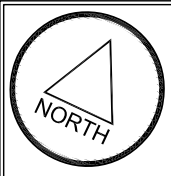


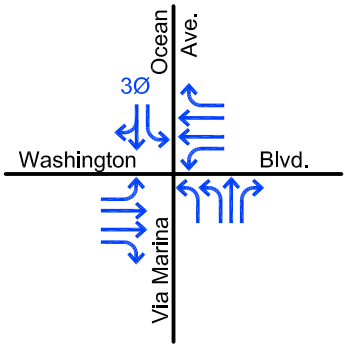
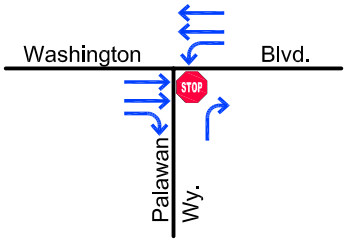
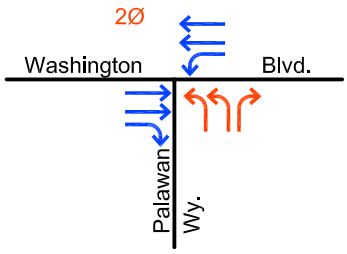
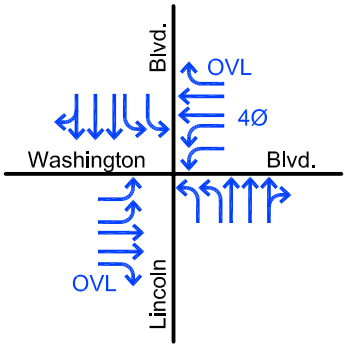
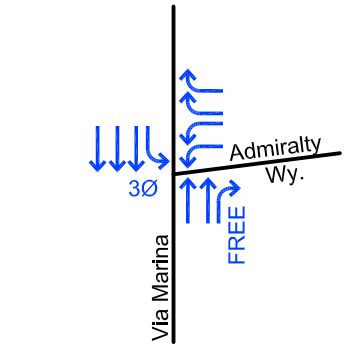
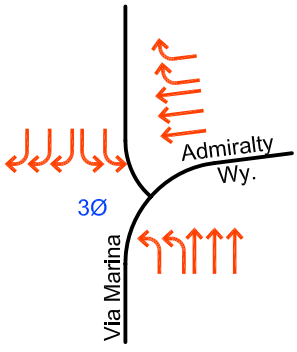
Driveway Count at Parcel OT Parking Lot
July 1, 2005

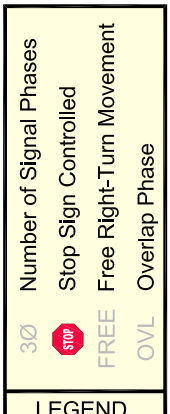
Start Time	Parking Lot Driveway I/B	O/B	Total
07:00 AM	0	0	0
07:15 AM	0	0	0
07:30 AM	0	0	0
07:45 AM	0	0	0
08:00 AM	2	1	3
08:15 AM	0	0	0
08:30 AM	0	0	0
08:45 AM	0	0	0
04:00 PM	3	0	3
04:15 PM	0	0	0
04:30 PM	0	0	0
04:45 PM	0	0	0
05:00 PM	0	0	0
05:15 PM	0	0	0
05:30 PM	6	0	6
05:45 PM	3	0	3

APPENDIX B

EXISTING AND FUTURE LANE CONFIGURATIONS



	Existing (2007) & Future (2014)	With Project Mitigation	With Cumulative Mitigation
1 Washington Blvd. & Via Marina / Ocean Ave.		NONE NEEDED	NO CHANGE
2 Washington Blvd. & Palawan Wy.		NONE NEEDED	
3 Washington Blvd. & Lincoln Blvd.		NONE NEEDED	NOT DETERMINED
4 Admiralty Wy. & Via Marina		NONE NEEDED	



APPENDIX B

6/17/2008

FN: MARINA DEL REY PARCEL OT GOLDRICH & KEST\PARCEL OT AND 21\2008-6\LANE-CONFIGS

EXISTING AND FUTURE LANE CONFIGURATIONS

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Traffic Engineering
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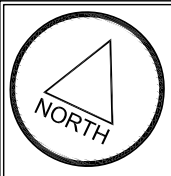
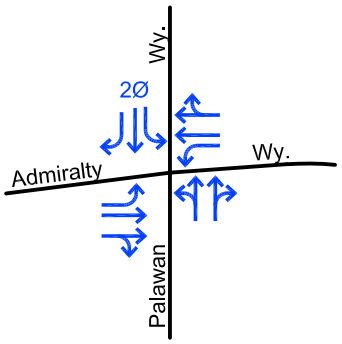
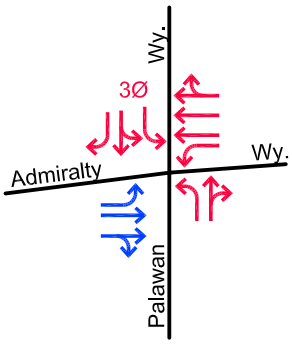
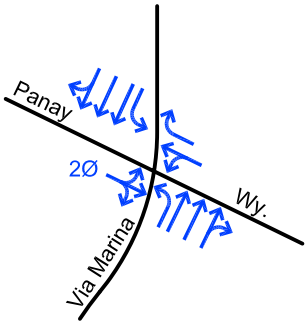
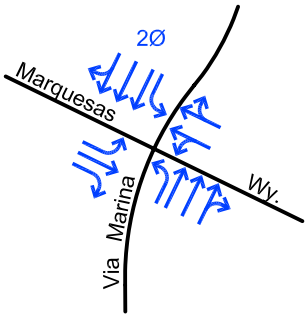
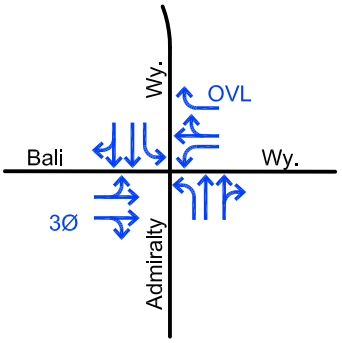
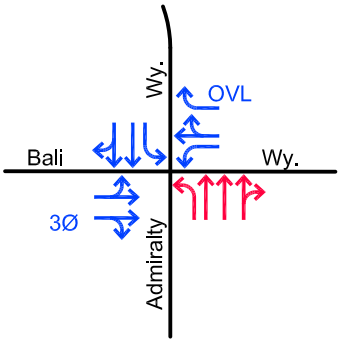
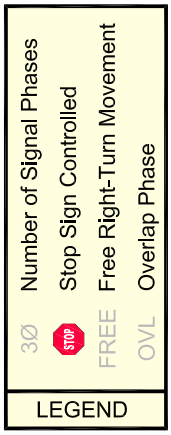
PH (310) 473 6508 F (310) 444 9771
www.crainandassociates.com



	Existing (2007) & Future (2014)	With Project Mitigation	With Cumulative Mitigation
5 Admiralty Wy. & Palawan Wy.		NONE NEEDED	
6 Panay Wy. & Via Marina		NONE NEEDED	NONE NEEDED
7 Marquesas Wy. & Via Marina		NONE NEEDED	NONE NEEDED
8 Bali Wy. & Admiralty Wy.		NONE NEEDED	



APPENDIX B

6/17/2008

FN: MARINA DEL REY PARCEL OT GOLDRICH & KEST\PARCEL OT AND 21\\2008-6\LANE-CONFIGS

EXISTING AND FUTURE
LANE CONFIGURATIONS

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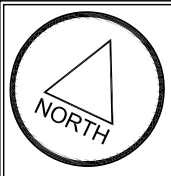
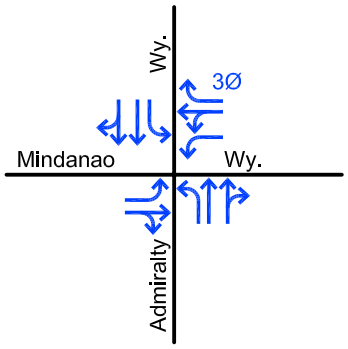
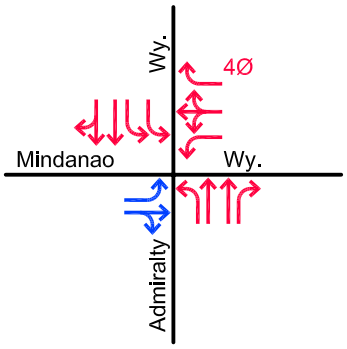
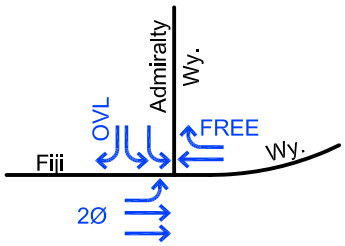
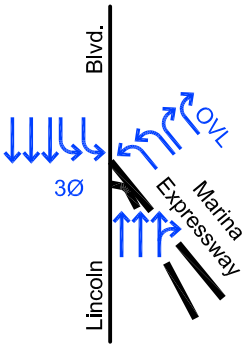
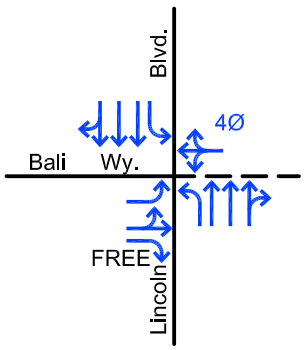


	Existing (2007) & Future (2014)	With Project Mitigation	With Cumulative Mitigation
9 Mindanao Wy. & Admiralty Wy.		NONE NEEDED	
10 Fiji Wy. & Admiralty Wy.		NONE NEEDED	NONE NEEDED
11 Marina Expressway & Lincoln Blvd.		NONE NEEDED	NOT DETERMINED
12 Bali Wy. & Lincoln Blvd.		NONE NEEDED	NOT DETERMINED

LEGEND

3Ø Number of Signal Phases

STOP Stop Sign Controlled

FREE Free Right-Turn Movement

OVL Overlap Phase

APPENDIX B

6/17/2008

FN: MARINA DEL REY PARCEL OT GOLDRICH & KEST\PARCEL OT AND 21\2008-6\LANE-CONFIGS

EXISTING AND FUTURE
LANE CONFIGURATIONS

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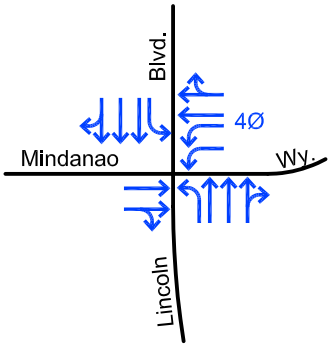
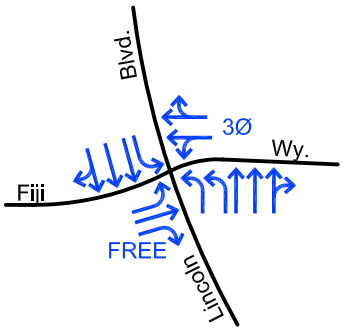
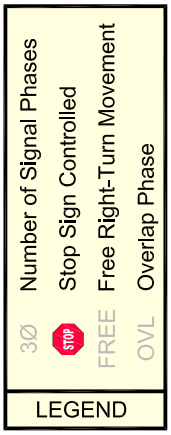
	Existing (2007) & Future (2014)	With Project Mitigation	With Cumulative Mitigation
13 Mindanao Wy. & Lincoln Blvd.		NONE NEEDED	NOT DETERMINED
14 Fiji Wy. & Llincoln Blvd.		NONE NEEDED	NOT DETERMINED



APPENDIX B

6/17/2008

FN: MARINA DEL REY PARCEL OT GOLDRICH & KEST\PARCEL OT AND 21\2008-6\LANE-CONFIGS

EXISTING AND FUTURE
LANE CONFIGURATIONS

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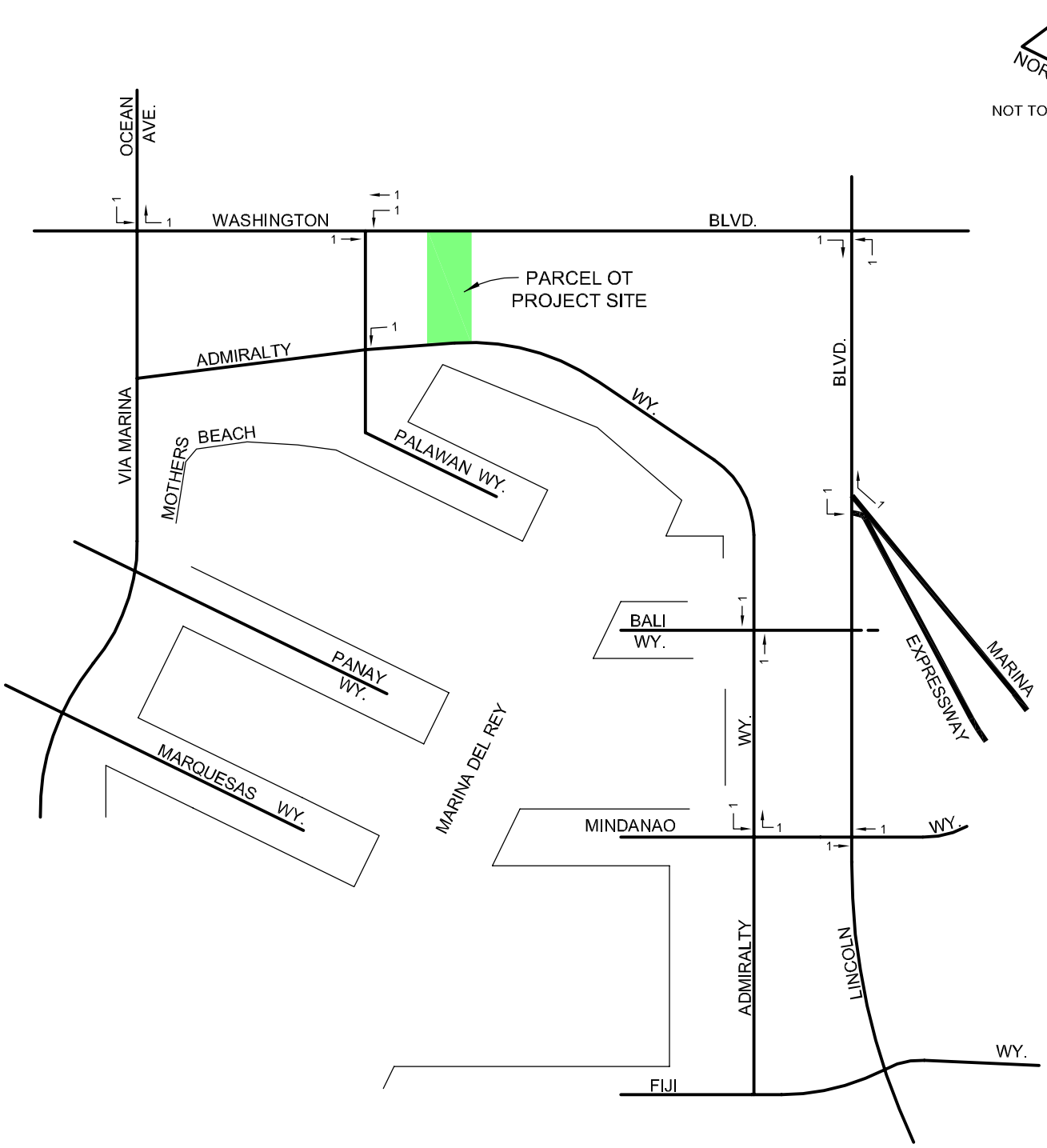
APPENDIX C

PROJECT TRAFFIC VOLUMES FOR CONGREGATE-CARE RETIREMENT FACILITY AND RETAIL USES ON PARCEL OT AND NET PROJECT TRAFFIC VOLUMES ON PARCEL 21



APPENDIX C

1/25/2007

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\AMPRJVOL(RETIREMENT FACILITY)

PROJECT TRAFFIC VOLUMES
(RETIREMENT FACILITY ON PARCEL OT)
AM PEAK HOUR

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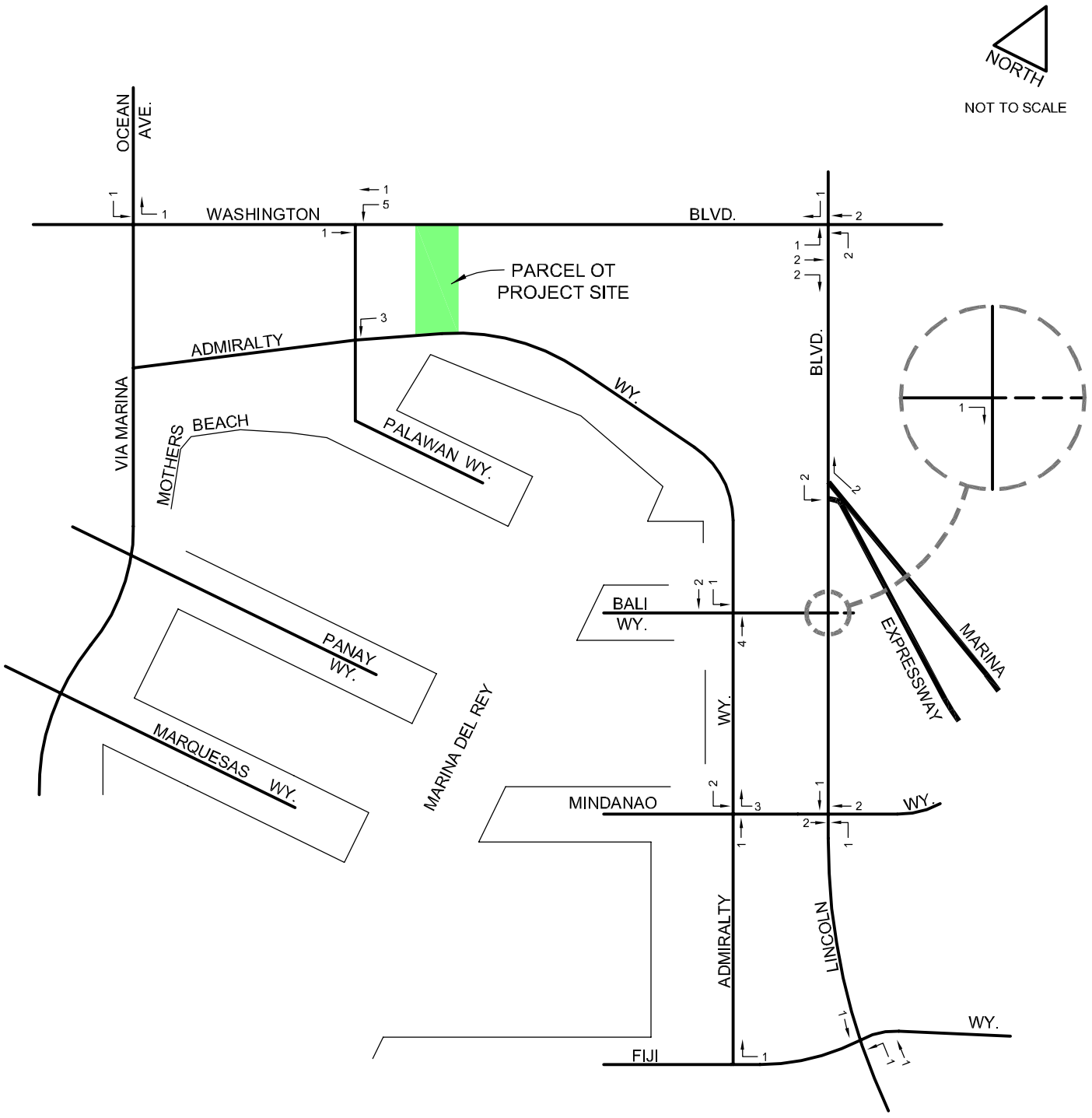

APPENDIX C

1/25/2007

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\PMPRJVOL(RETIREMENT FACILITY)

PROJECT TRAFFIC VOLUMES
(RETIREMENT FACILITY ON PARCEL OT)
PM PEAK HOUR

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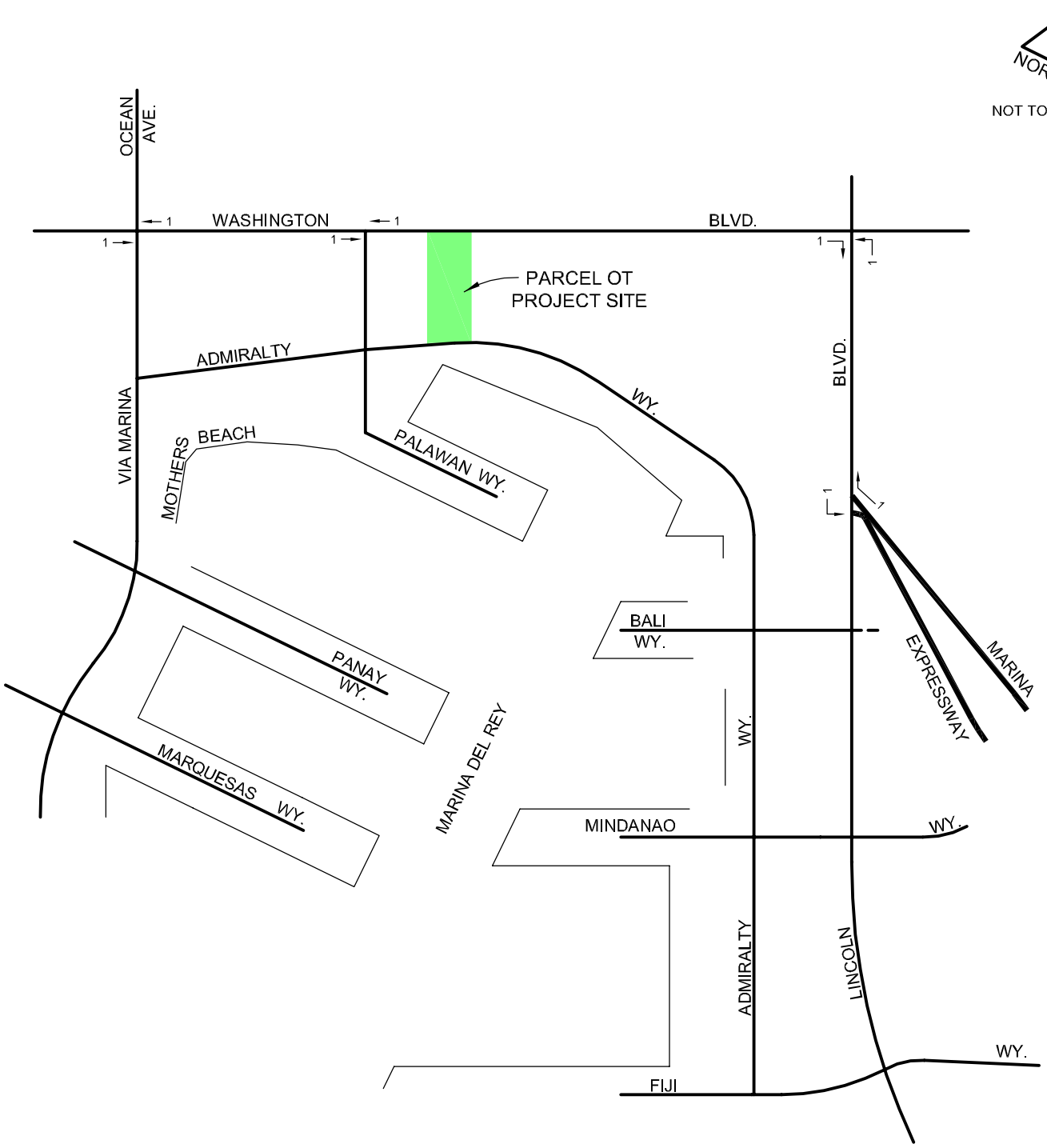

APPENDIX C

1/25/2007

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\AMPRJVOL(RETAIL)

PROJECT TRAFFIC VOLUMES
(RETAIL COMPONENT ON PARCEL OT)
AM PEAK HOUR

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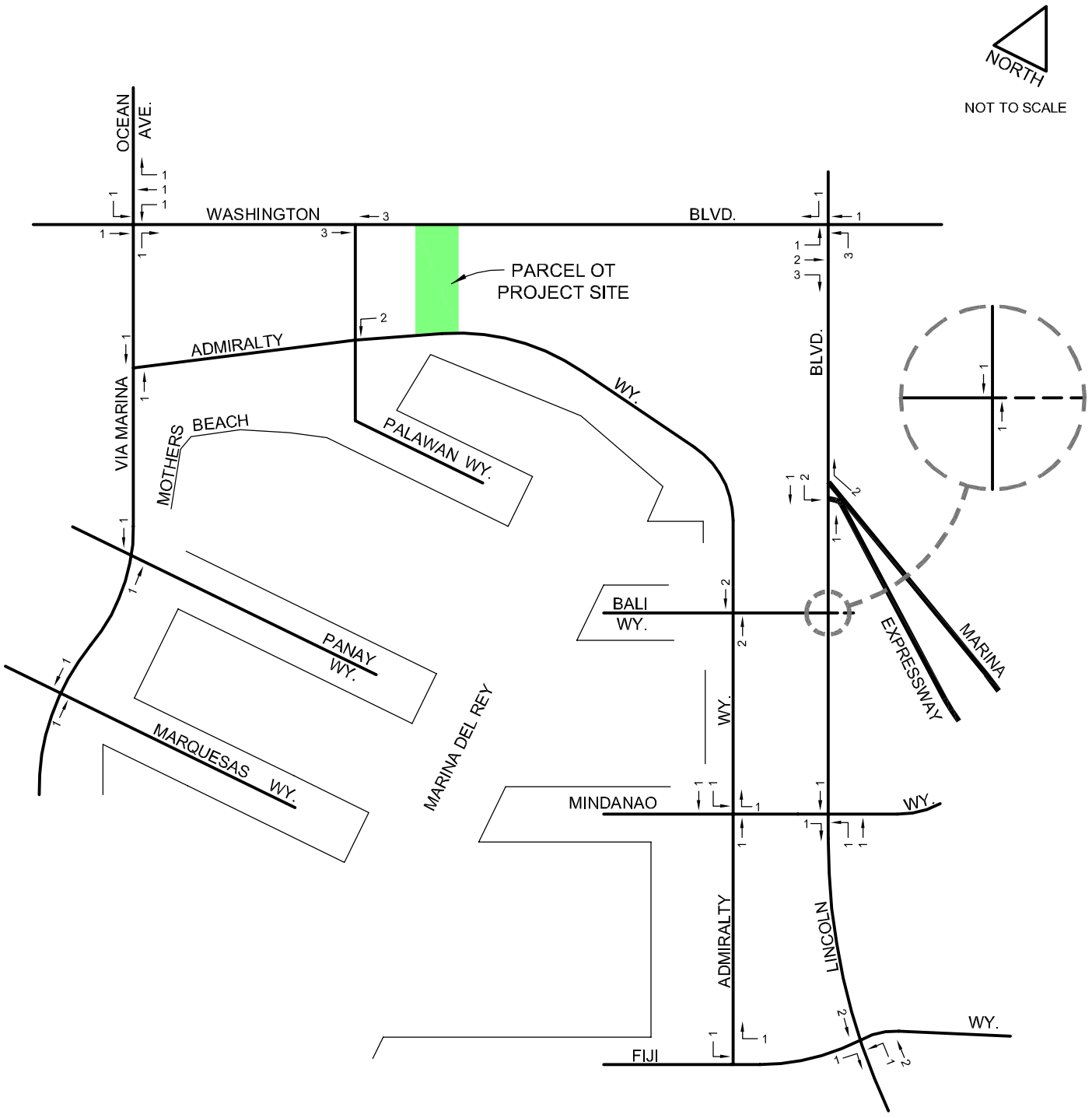

APPENDIX C

1/25/2007

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\PMPRJVOL(RETAIL)

PROJECT TRAFFIC VOLUMES
(RETAIL COMPONENT ON PARCEL OT)
PM PEAK HOUR

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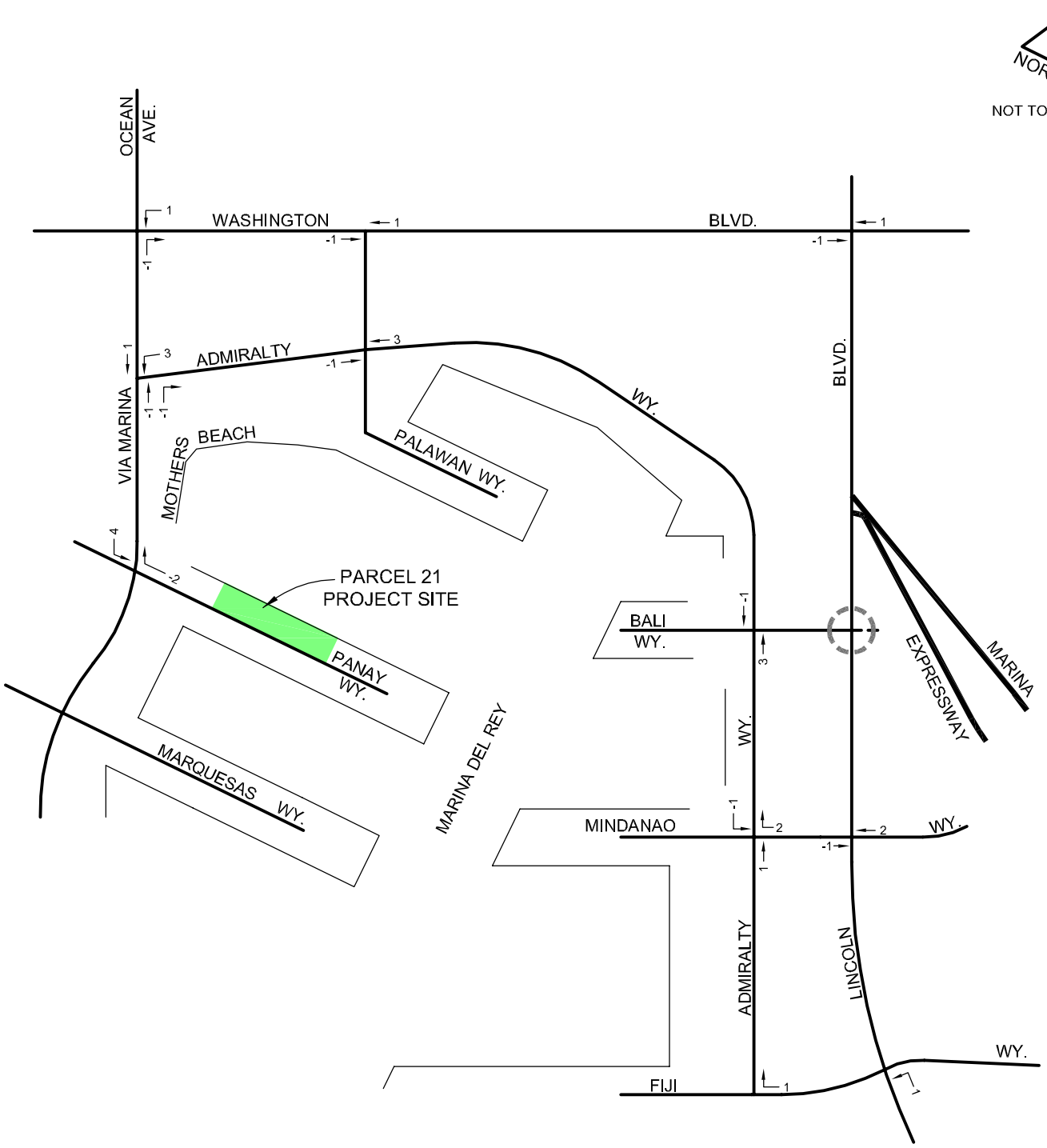

APPENDIX C

1/25/2007

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\AMPRJVOL(PARCEL 21)

PROJECT TRAFFIC VOLUMES
(PARCEL 21)
AM PEAK HOUR

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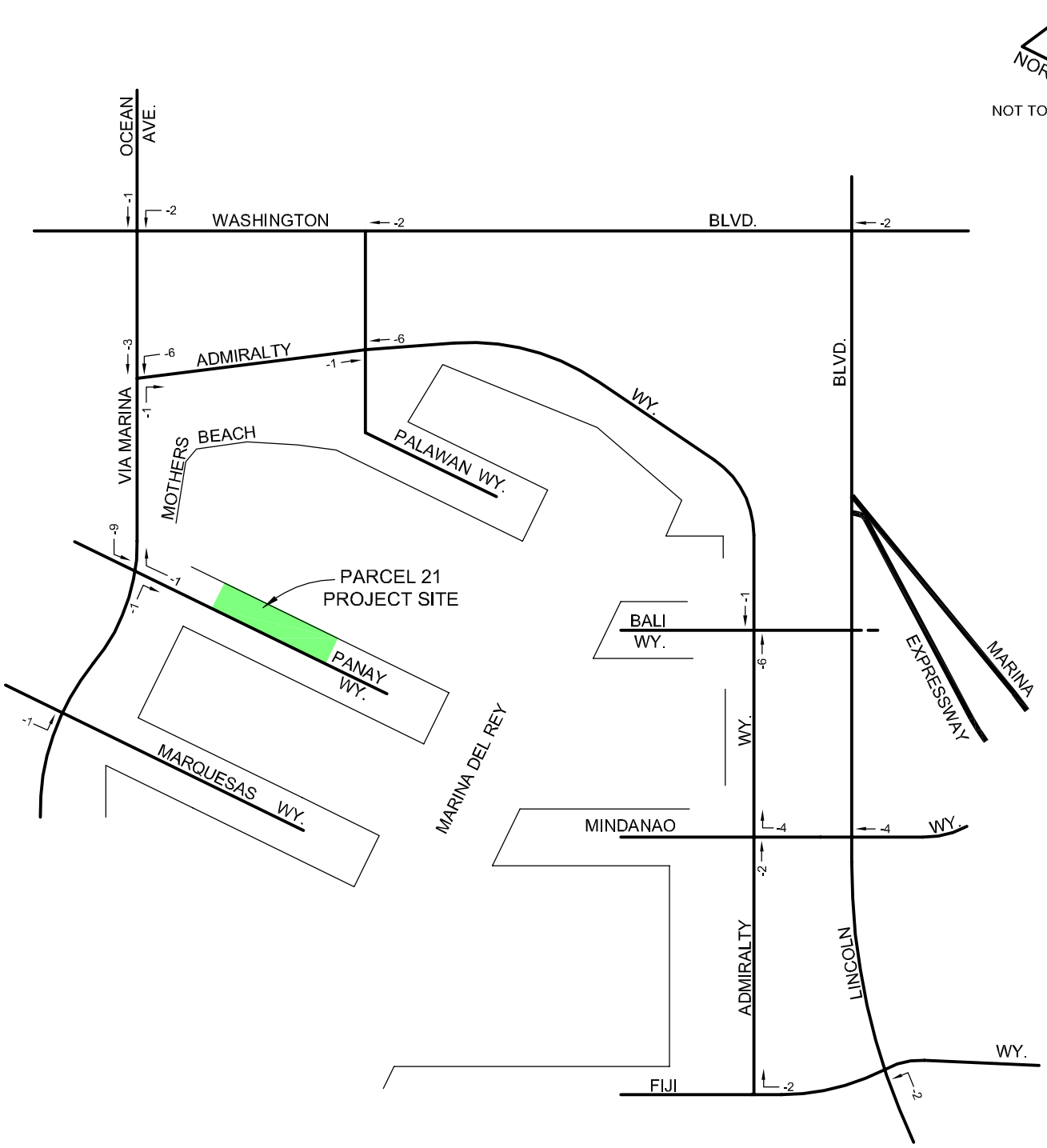

APPENDIX C

1/25/2007

Marina del Rey Parcel OT Goldrich & Kest\Parcel OT and 21\PMPRJVOL(PARCEL 21)

PROJECT TRAFFIC VOLUMES
(PARCEL 21)
PM PEAK HOUR

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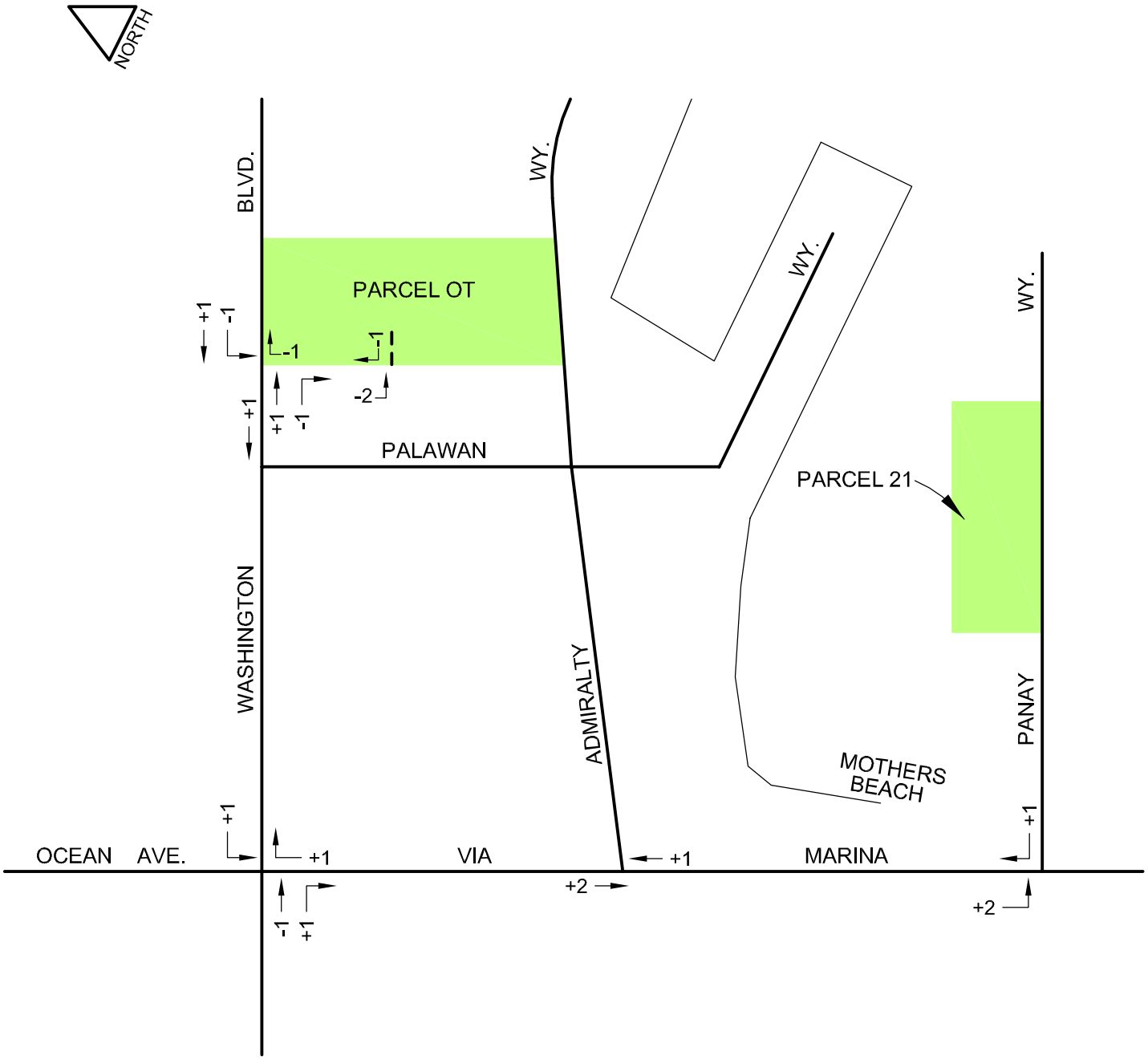
APPENDIX D

TRAFFIC SHIFT DUE TO RELOCATION OF EXISTING PARKING SPACES FROM PARCEL OT TO PARCEL 21



APPENDIX D

1/25/2007

FN: MARINA DEL REY PARCEL OT GOLDRICH & KEST\ PARCEL OT AND 21\AM-TRAFFIC SHIFT

TRAFFIC SHIFT DUE TO RELOCATION OF
94 EXISTING PARKING SPACES FROM
PARCEL OT TO PARCEL 21
AM PEAK HOUR

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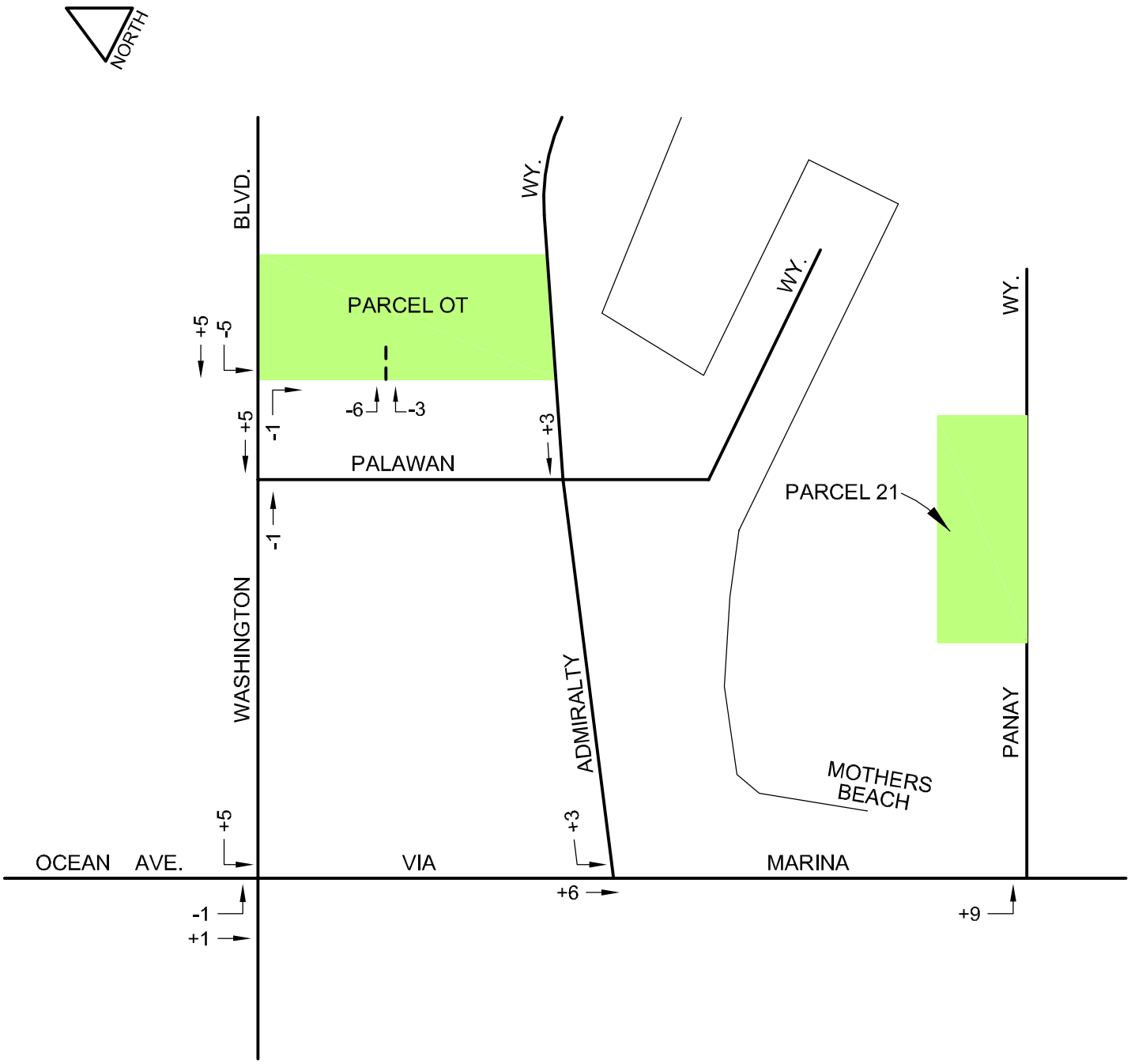

APPENDIX D

1/25/2007

FN: MARINA DEL REY PARCEL OT GOLDRICH & KEST\PARCEL OT AND 21\PM-TRAFFIC SHIFT

TRAFFIC SHIFT DUE TO RELOCATION OF
94 EXISTING PARKING SPACES FROM
PARCEL OT TO PARCEL 21
PM PEAK HOUR

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APPENDIX E

CRITICAL MOVEMENT ANALYSIS CALCULATION WORKSHEETS

Existing (2007)

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:1, WASHINGTON BOULEVARD AND VIA MARINA/OCEAN AVENUE
DATE: 2/21/2007 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	119	394	0	32
EASTBOUND	63	558	0	261
NORTHBOUND	500	527	280	60
SOUTHBOUND	56	226	9	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	2	0	1	0	1	0	4
SOUTHBOUND	1	0	0	1	0	0	2

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	119	N/A	197	N/A	0	N/A
EASTBOUND	63	N/A	279	N/A	0	N/A
NORTHBOUND	275	N/A	527	N/A	280	N/A
SOUTHBOUND	56	N/A	N/A	235	N/A	N/A

EAST-WEST CRITICAL VOLUMES 398
NORTH-SOUTH CRITICAL VOLUMES 762

THE SUM OF CRITICAL VOLUMES 1160

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.714

LEVEL OF SERVICE C

---

* Includes CMA value decreased due to ATCS Implementation.

Northbound and Southbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:2, WASHINGTON BOULEVARD AND PALAWAN WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	124	908	0	0
EASTBOUND	0	948	0	79
NORTHBOUND	0	0	174	62
SOUTHBOUND	0	0	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	0	0	3
EASTBOUND	0	0	2	0	1	0	3
NORTHBOUND	0	0	0	0	1	0	1
SOUTHBOUND	0	0	0	0	0	0	0

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	124	N/A	454	N/A	N/A	N/A
EASTBOUND	N/A	N/A	474	N/A	0	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	174	N/A
SOUTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 598
NORTH-SOUTH CRITICAL VOLUMES 174

THE SUM OF CRITICAL VOLUMES 772

NUMBER OF CRITICAL CLEARANCE INTERVALS 2

CMA VALUE 0.643

LEVEL OF SERVICE ..... B

Capacity used = 1200.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:3, WASHINGTON BOULEVARD AND LINCOLN BOULEVARD
DATE: 2/21/2007 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	174	524	51	140
EASTBOUND	164	725	201	228
NORTHBOUND	414	1440	235	0
SOUTHBOUND	255	1383	167	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	2	0	1	0	5
EASTBOUND	2	0	2	0	1	0	5
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	2	0	2	1	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	96	N/A	262	N/A	51	N/A
EASTBOUND	90	N/A	362	N/A	201	N/A
NORTHBOUND	228	N/A	558	558	N/A	N/A
SOUTHBOUND	140	N/A	517	517	N/A	N/A

EAST-WEST CRITICAL VOLUMES 458
NORTH-SOUTH CRITICAL VOLUMES 745
THE SUM OF CRITICAL VOLUMES 1203

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.775

LEVEL OF SERVICE C

---
* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:4, ADMIRALTY WAY AND VIA MARINA
DATE: 2/21/2007 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	347	0	836	0
EASTBOUND	0	0	0	0
NORTHBOUND	0	564	0	636
SOUTHBOUND	441	158	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	0	1	0	3
SOUTHBOUND	1	0	3	0	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	191	N/A	N/A	N/A	418	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	282	N/A	0	N/A
SOUTHBOUND	441	N/A	53	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 418
NORTH-SOUTH CRITICAL VOLUMES 723
THE SUM OF CRITICAL VOLUMES 1141

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.701

LEVEL OF SERVICE C

---
* Includes CMA value decreased due to ATCS Implementation.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:5, ADMIRALTY WAY AND PALAWAN WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	41	814	80	0
EASTBOUND	99	906	6	0
NORTHBOUND	41	78	59	0
SOUTHBOUND	151	27	28	50

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	1	1	0	0	3
EASTBOUND	1	0	1	1	0	0	3
NORTHBOUND	0	1	0	1	0	0	2
SOUTHBOUND	1	0	1	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	41	N/A	447	447	N/A	N/A
EASTBOUND	99	N/A	456	456	N/A	N/A
NORTHBOUND	N/A	89	N/A	89	N/A	N/A
SOUTHBOUND	151	N/A	27	N/A	28	N/A

EAST-WEST CRITICAL VOLUMES 546
NORTH-SOUTH CRITICAL VOLUMES 240

THE SUM OF CRITICAL VOLUMES 786

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.424

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:6, PANAY WAY AND VIA MARINA
DATE: 2/21/2007 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	18	0	153	61
EASTBOUND	74	2	0	0
NORTHBOUND	5	889	15	0
SOUTHBOUND	122	337	23	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	0	1	0	2
EASTBOUND	0	0	0	0	0	1	1
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	18	N/A	N/A	153	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	76
NORTHBOUND	5	N/A	301	301	N/A	N/A
SOUTHBOUND	122	N/A	120	120	N/A	N/A

EAST-WEST CRITICAL VOLUMES 227
NORTH-SOUTH CRITICAL VOLUMES 423
THE SUM OF CRITICAL VOLUMES 650

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.347

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:7, MARQUESAS WAY AND VIA MARINA
DATE: 2/21/2007 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	2	20	79	19
EASTBOUND	146	11	0	18
NORTHBOUND	62	675	9	0
SOUTHBOUND	38	301	31	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	22	N/A	N/A	79	N/A
EASTBOUND	146	N/A	11	N/A	0	N/A
NORTHBOUND	62	N/A	228	228	N/A	N/A
SOUTHBOUND	38	N/A	111	111	N/A	N/A

EAST-WEST CRITICAL VOLUMES 225
NORTH-SOUTH CRITICAL VOLUMES 266

THE SUM OF CRITICAL VOLUMES 491

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.262

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:8, ADMIRALTY WAY AND BALI WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	55	28	146	165
EASTBOUND	18	35	23	0
NORTHBOUND	27	952	100	0
SOUTHBOUND	165	1295	19	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	0	1	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	55	N/A	N/A	87	87	N/A
EASTBOUND	N/A	38	N/A	38	N/A	N/A
NORTHBOUND	27	N/A	526	526	N/A	N/A
SOUTHBOUND	165	N/A	657	657	N/A	N/A

EAST-WEST CRITICAL VOLUMES	105
NORTH-SOUTH CRITICAL VOLUMES	691
THE SUM OF CRITICAL VOLUMES	796
NUMBER OF CRITICAL CLEARANCE INTERVALS	3*
CMA VALUE	0.459
LEVEL OF SERVICE	A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:9, ADMIRALTY WAY AND MINDANAO WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	121	16	259	140
EASTBOUND	21	35	24	0
NORTHBOUND	15	813	64	0
SOUTHBOUND	279	779	15	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	1	0	0	1	0	3
EASTBOUND	1	0	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	68	68	N/A	N/A	259	N/A
EASTBOUND	21	N/A	N/A	59	N/A	N/A
NORTHBOUND	15	N/A	438	438	N/A	N/A
SOUTHBOUND	279	N/A	397	397	N/A	N/A

EAST-WEST CRITICAL VOLUMES 318
NORTH-SOUTH CRITICAL VOLUMES 717

THE SUM OF CRITICAL VOLUMES 1035

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.626

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:10, ADMIRALTY WAY AND FIJI WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	0	86	0	717
EASTBOUND	87	104	0	0
NORTHBOUND	0	0	0	0
SOUTHBOUND	560	0	0	70

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	1	0	1	0	2
EASTBOUND	1	0	2	0	0	0	3
NORTHBOUND	0	0	0	0	0	0	0
SOUTHBOUND	2	0	0	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	86	N/A	0	N/A
EASTBOUND	87	N/A	52	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A
SOUTHBOUND	308	N/A	N/A	N/A	0	N/A

EAST-WEST CRITICAL VOLUMES 173
NORTH-SOUTH CRITICAL VOLUMES 308
THE SUM OF CRITICAL VOLUMES 481

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.257

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:11, LINCOLN BOULEVARD AND MARINA EXPRESSWAY
DATE: 2/21/2007 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	141	0	0	751
EASTBOUND	0	0	0	0
NORTHBOUND	0	1805	120	0
SOUTHBOUND	710	1247	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	1	0	0	3
SOUTHBOUND	2	0	3	0	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	78	N/A	N/A	N/A	0	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	642	642	N/A	N/A
SOUTHBOUND	390	N/A	416	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 78
NORTH-SOUTH CRITICAL VOLUMES 1032
THE SUM OF CRITICAL VOLUMES 1110

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.679

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:12, LINCOLN BOULEVARD AND BALI WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	8	7	36	0
EASTBOUND	241	1	0	43
NORTHBOUND	160	2492	9	0
SOUTHBOUND	26	1281	156	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	0	0	0	1	1
EASTBOUND	1	1	0	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	N/A	N/A	N/A	51
EASTBOUND	121	121	N/A	N/A	0	N/A
NORTHBOUND	160	N/A	834	834	N/A	N/A
SOUTHBOUND	26	N/A	479	479	N/A	N/A

EAST-WEST CRITICAL VOLUMES 172
NORTH-SOUTH CRITICAL VOLUMES 860

THE SUM OF CRITICAL VOLUMES 1032

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.651

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:13, LINCOLN BOULEVARD AND MINDANAO WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	223	385	60	0
EASTBOUND	0	396	40	0
NORTHBOUND	150	1888	308	0
SOUTHBOUND	60	1105	42	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	1	1	0	0	4
EASTBOUND	0	0	1	1	0	0	2
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	123	N/A	222	222	N/A	N/A
EASTBOUND	N/A	N/A	218	218	N/A	N/A
NORTHBOUND	150	N/A	732	732	N/A	N/A
SOUTHBOUND	60	N/A	382	382	N/A	N/A

EAST-WEST CRITICAL VOLUMES 341
NORTH-SOUTH CRITICAL VOLUMES 792

THE SUM OF CRITICAL VOLUMES 1133

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.724

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:14, LINCOLN BOULEVARD AND FIJI WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	14	22	22	0
EASTBOUND	72	17	0	620
NORTHBOUND	768	2162	32	0
SOUTHBOUND	43	1331	38	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	29	N/A	29	N/A	N/A
EASTBOUND	72	N/A	17	N/A	0	N/A
NORTHBOUND	422	N/A	731	731	N/A	N/A
SOUTHBOUND	43	N/A	456	456	N/A	N/A

EAST-WEST CRITICAL VOLUMES 101
NORTH-SOUTH CRITICAL VOLUMES 878

THE SUM OF CRITICAL VOLUMES 979

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.587

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:1, WASHINGTON BOULEVARD AND VIA MARINA/OCEAN AVENUE
DATE: 2/21/2007 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	175	576	0	36
EASTBOUND	33	487	313	116
NORTHBOUND	322	232	116	88
SOUTHBOUND	147	488	29	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	2	0	1	0	1	0	4
SOUTHBOUND	1	0	0	1	0	0	2

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	175	N/A	288	N/A	0	N/A
EASTBOUND	33	N/A	244	N/A	313	N/A
NORTHBOUND	177	N/A	232	N/A	116	N/A
SOUTHBOUND	147	N/A	N/A	517	N/A	N/A

EAST-WEST CRITICAL VOLUMES 488
NORTH-SOUTH CRITICAL VOLUMES 749

THE SUM OF CRITICAL VOLUMES 1237

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.768

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

Northbound and Southbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:2, WASHINGTON BOULEVARD AND PALAWAN WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	361	993	0	0
EASTBOUND	0	1005	130	0
NORTHBOUND	0	0	0	172
SOUTHBOUND	0	0	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	0	0	3
EASTBOUND	0	0	2	0	1	0	3
NORTHBOUND	0	0	0	0	1	0	1
SOUTHBOUND	0	0	0	0	0	0	0

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	361	N/A	496	N/A	N/A	N/A
EASTBOUND	N/A	N/A	502	N/A	130	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	0	N/A
SOUTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 863
NORTH-SOUTH CRITICAL VOLUMES 0

THE SUM OF CRITICAL VOLUMES 863

NUMBER OF CRITICAL CLEARANCE INTERVALS 2

CMA VALUE 0.719

LEVEL OF SERVICE C

Capacity used = 1200.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:3, WASHINGTON BOULEVARD AND LINCOLN BOULEVARD
DATE: 2/21/2007 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	486	945	139	255
EASTBOUND	295	1076	303	364
NORTHBOUND	662	1522	332	0
SOUTHBOUND	463	2230	191	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	2	0	1	0	5
EASTBOUND	2	0	2	0	1	0	5
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	2	0	2	1	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	267	N/A	472	N/A	139	N/A
EASTBOUND	162	N/A	538	N/A	303	N/A
NORTHBOUND	364	N/A	618	618	N/A	N/A
SOUTHBOUND	255	N/A	807	807	N/A	N/A

EAST-WEST CRITICAL VOLUMES	805
NORTH-SOUTH CRITICAL VOLUMES	1171
THE SUM OF CRITICAL VOLUMES	1976
NUMBER OF CRITICAL CLEARANCE INTERVALS	4*
CMA VALUE	1.337
LEVEL OF SERVICE	F

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:4, ADMIRALTY WAY AND VIA MARINA
DATE: 2/21/2007 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	568	0	373	0
EASTBOUND	0	0	0	0
NORTHBOUND	0	355	0	422
SOUTHBOUND	723	352	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	0	1	0	3
SOUTHBOUND	1	0	3	0	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	312	N/A	N/A	N/A	186	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	178	N/A	0	N/A
SOUTHBOUND	723	N/A	117	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 312
NORTH-SOUTH CRITICAL VOLUMES 901

THE SUM OF CRITICAL VOLUMES 1213

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.751

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:5, ADMIRALTY WAY AND PALAWAN WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	98	1102	72	0
EASTBOUND	41	1009	33	0
NORTHBOUND	33	39	46	0
SOUTHBOUND	366	46	184	20

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	1	1	0	0	3
EASTBOUND	1	0	1	1	0	0	3
NORTHBOUND	0	1	0	1	0	0	2
SOUTHBOUND	1	0	1	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	98	N/A	587	587	N/A	N/A
EASTBOUND	41	N/A	521	521	N/A	N/A
NORTHBOUND	N/A	57	N/A	62	N/A	N/A
SOUTHBOUND	366	N/A	46	N/A	184	N/A

EAST-WEST CRITICAL VOLUMES 628
NORTH-SOUTH CRITICAL VOLUMES 428

THE SUM OF CRITICAL VOLUMES 1056

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.604

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:6, PANAY WAY AND VIA MARINA
DATE: 2/21/2007 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	12	1	56	98
EASTBOUND	34	3	5	0
NORTHBOUND	5	550	22	0
SOUTHBOUND	196	696	30	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	0	1	0	2
EASTBOUND	0	0	0	0	0	1	1
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	13	N/A	N/A	56	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	42
NORTHBOUND	5	N/A	191	191	N/A	N/A
SOUTHBOUND	196	N/A	242	242	N/A	N/A

EAST-WEST CRITICAL VOLUMES 90
NORTH-SOUTH CRITICAL VOLUMES 387
THE SUM OF CRITICAL VOLUMES 477

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.254

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:7, MARQUESAS WAY AND VIA MARINA
DATE: 2/21/2007 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	1	8	20	50
EASTBOUND	82	18	23	12
NORTHBOUND	24	404	8	0
SOUTHBOUND	97	571	69	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	9	N/A	N/A	20	N/A
EASTBOUND	82	N/A	18	N/A	23	N/A
NORTHBOUND	24	N/A	137	137	N/A	N/A
SOUTHBOUND	97	N/A	213	213	N/A	N/A

EAST-WEST CRITICAL VOLUMES 102
NORTH-SOUTH CRITICAL VOLUMES 237

THE SUM OF CRITICAL VOLUMES 339

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.181

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:8, ADMIRALTY WAY AND BALI WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	54	22	135	201
EASTBOUND	25	49	19	0
NORTHBOUND	15	1150	172	0
SOUTHBOUND	201	1363	22	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	0	1	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	54	N/A	N/A	78	78	N/A
EASTBOUND	N/A	46	N/A	46	N/A	N/A
NORTHBOUND	15	N/A	661	661	N/A	N/A
SOUTHBOUND	201	N/A	692	692	N/A	N/A

EAST-WEST CRITICAL VOLUMES 103
NORTH-SOUTH CRITICAL VOLUMES 862

THE SUM OF CRITICAL VOLUMES 965

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.577

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:9, ADMIRALTY WAY AND MINDANAO WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	331	33	263	156
EASTBOUND	35	58	11	0
NORTHBOUND	48	943	169	0
SOUTHBOUND	313	1141	58	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	1	0	0	1	0	3
EASTBOUND	1	0	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	182	182	N/A	N/A	263	N/A
EASTBOUND	35	N/A	N/A	69	N/A	N/A
NORTHBOUND	48	N/A	556	556	N/A	N/A
SOUTHBOUND	313	N/A	600	600	N/A	N/A

EAST-WEST CRITICAL VOLUMES 332
NORTH-SOUTH CRITICAL VOLUMES 869

THE SUM OF CRITICAL VOLUMES 1201

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.743

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:10, ADMIRALTY WAY AND FIJI WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	0	127	0	544
EASTBOUND	127	237	0	0
NORTHBOUND	0	0	0	0
SOUTHBOUND	805	0	102	127

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	1	0	1	0	2
EASTBOUND	1	0	2	0	0	0	3
NORTHBOUND	0	0	0	0	0	0	0
SOUTHBOUND	2	0	0	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	127	N/A	0	N/A
EASTBOUND	127	N/A	118	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A
SOUTHBOUND	443	N/A	N/A	N/A	102	N/A

EAST-WEST CRITICAL VOLUMES 254
NORTH-SOUTH CRITICAL VOLUMES 443

THE SUM OF CRITICAL VOLUMES 697

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.372

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:11, LINCOLN BOULEVARD AND MARINA EXPRESSWAY
DATE: 2/21/2007 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	178	0	0	644
EASTBOUND	0	0	0	0
NORTHBOUND	0	1833	161	0
SOUTHBOUND	740	1742	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	1	0	0	3
SOUTHBOUND	2	0	3	0	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	98	N/A	N/A	N/A	0	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	665	665	N/A	N/A
SOUTHBOUND	407	N/A	581	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 98
NORTH-SOUTH CRITICAL VOLUMES 1072
THE SUM OF CRITICAL VOLUMES 1170

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.721

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:12, LINCOLN BOULEVARD AND BALI WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	15	1	33	0
EASTBOUND	300	2	0	48
NORTHBOUND	81	1488	14	0
SOUTHBOUND	7	1382	300	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	0	0	0	1	1
EASTBOUND	1	1	0	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	N/A	N/A	N/A	49
EASTBOUND	151	151	N/A	N/A	0	N/A
NORTHBOUND	81	N/A	501	501	N/A	N/A
SOUTHBOUND	7	N/A	561	561	N/A	N/A

EAST-WEST CRITICAL VOLUMES 200
NORTH-SOUTH CRITICAL VOLUMES 642

THE SUM OF CRITICAL VOLUMES 842

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.512

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:13, LINCOLN BOULEVARD AND MINDANAO WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	348	533	54	0
EASTBOUND	0	468	93	0
NORTHBOUND	137	1813	332	0
SOUTHBOUND	119	1406	91	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	1	1	0	0	4
EASTBOUND	0	0	1	1	0	0	2
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	191	N/A	294	294	N/A	N/A
EASTBOUND	N/A	N/A	280	280	N/A	N/A
NORTHBOUND	137	N/A	715	715	N/A	N/A
SOUTHBOUND	119	N/A	499	499	N/A	N/A

EAST-WEST CRITICAL VOLUMES 471
NORTH-SOUTH CRITICAL VOLUMES 834

THE SUM OF CRITICAL VOLUMES 1305

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.849

LEVEL OF SERVICE ..... D

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:14, LINCOLN BOULEVARD AND FIJI WAY
DATE: 2/21/2007 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: EXISTING (2007)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	27	37	17	0
EASTBOUND	121	38	0	858
NORTHBOUND	650	2016	31	0
SOUTHBOUND	34	1926	73	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	40	N/A	40	N/A	N/A
EASTBOUND	121	N/A	38	N/A	0	N/A
NORTHBOUND	358	N/A	682	682	N/A	N/A
SOUTHBOUND	34	N/A	666	666	N/A	N/A

EAST-WEST CRITICAL VOLUMES 161
NORTH-SOUTH CRITICAL VOLUMES 1024

THE SUM OF CRITICAL VOLUMES 1185

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.732

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

Future (2014) With Ambient Growth Only

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:1, WASHINGTON BOULEVARD AND VIA MARINA/OCEAN AVENUE
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	124	411	0	34
EASTBOUND	66	582	0	272
NORTHBOUND	521	550	293	62
SOUTHBOUND	59	236	9	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	2	0	1	0	1	0	4
SOUTHBOUND	1	0	0	1	0	0	2

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	124	N/A	206	N/A	0	N/A
EASTBOUND	66	N/A	291	N/A	0	N/A
NORTHBOUND	287	N/A	550	N/A	293	N/A
SOUTHBOUND	59	N/A	N/A	245	N/A	N/A

EAST-WEST CRITICAL VOLUMES 414
NORTH-SOUTH CRITICAL VOLUMES 795

THE SUM OF CRITICAL VOLUMES 1209

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.748

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

Northbound and Southbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:2, WASHINGTON BOULEVARD AND PALAWAN WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	130	947	0	0
EASTBOUND	0	989	0	82
NORTHBOUND	0	0	181	65
SOUTHBOUND	0	0	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	0	0	3
EASTBOUND	0	0	2	0	1	0	3
NORTHBOUND	0	0	0	0	1	0	1
SOUTHBOUND	0	0	0	0	0	0	0

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	130	N/A	474	N/A	N/A	N/A
EASTBOUND	N/A	N/A	494	N/A	0	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	181	N/A
SOUTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 624
NORTH-SOUTH CRITICAL VOLUMES 181

THE SUM OF CRITICAL VOLUMES 805

NUMBER OF CRITICAL CLEARANCE INTERVALS 2

CMA VALUE 0.671

LEVEL OF SERVICE ..... B

Capacity used = 1200.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:3, WASHINGTON BOULEVARD AND LINCOLN BOULEVARD
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	181	547	53	146
EASTBOUND	171	756	209	238
NORTHBOUND	432	1501	245	0
SOUTHBOUND	265	1442	174	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	2	0	1	0	5
EASTBOUND	2	0	2	0	1	0	5
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	2	0	2	1	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	100	N/A	274	N/A	53	N/A
EASTBOUND	94	N/A	378	N/A	209	N/A
NORTHBOUND	238	N/A	582	582	N/A	N/A
SOUTHBOUND	146	N/A	539	539	N/A	N/A

EAST-WEST CRITICAL VOLUMES	478
NORTH-SOUTH CRITICAL VOLUMES	777
THE SUM OF CRITICAL VOLUMES	1255
NUMBER OF CRITICAL CLEARANCE INTERVALS	4*
CMA VALUE	0.813
LEVEL OF SERVICE	D

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:4, ADMIRALTY WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	362	0	872	0
EASTBOUND	0	0	0	0
NORTHBOUND	0	589	0	663
SOUTHBOUND	459	165	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	0	1	0	3
SOUTHBOUND	1	0	3	0	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	199	N/A	N/A	N/A	436	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	294	N/A	0	N/A
SOUTHBOUND	459	N/A	55	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 436
NORTH-SOUTH CRITICAL VOLUMES 753

THE SUM OF CRITICAL VOLUMES 1189

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.734

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:5, ADMIRALTY WAY AND PALAWAN WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	43	849	83	0
EASTBOUND	103	945	6	0
NORTHBOUND	43	81	62	0
SOUTHBOUND	157	28	29	52

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	1	1	0	0	3
EASTBOUND	1	0	1	1	0	0	3
NORTHBOUND	0	1	0	1	0	0	2
SOUTHBOUND	1	0	1	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	43	N/A	466	466	N/A	N/A
EASTBOUND	103	N/A	476	476	N/A	N/A
NORTHBOUND	N/A	93	N/A	93	N/A	N/A
SOUTHBOUND	157	N/A	28	N/A	29	N/A

EAST-WEST CRITICAL VOLUMES 569
NORTH-SOUTH CRITICAL VOLUMES 250

THE SUM OF CRITICAL VOLUMES 819

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.446

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:6, PANAY WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	19	0	159	64
EASTBOUND	78	2	0	0
NORTHBOUND	5	927	16	0
SOUTHBOUND	127	351	24	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	0	1	0	2
EASTBOUND	0	0	0	0	0	1	1
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	19	N/A	N/A	159	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	80
NORTHBOUND	5	N/A	314	314	N/A	N/A
SOUTHBOUND	127	N/A	125	125	N/A	N/A

EAST-WEST CRITICAL VOLUMES 237
NORTH-SOUTH CRITICAL VOLUMES 441

THE SUM OF CRITICAL VOLUMES 678

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.362

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:7, MARQUESAS WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	2	21	82	20
EASTBOUND	152	12	0	19
NORTHBOUND	65	704	9	0
SOUTHBOUND	40	314	33	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	23	N/A	N/A	82	N/A
EASTBOUND	152	N/A	12	N/A	0	N/A
NORTHBOUND	65	N/A	238	238	N/A	N/A
SOUTHBOUND	40	N/A	116	116	N/A	N/A

EAST-WEST CRITICAL VOLUMES 234
NORTH-SOUTH CRITICAL VOLUMES 278

THE SUM OF CRITICAL VOLUMES 512

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.273

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:8, ADMIRALTY WAY AND BALI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	57	29	152	172
EASTBOUND	19	36	24	0
NORTHBOUND	28	993	104	0
SOUTHBOUND	172	1350	20	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	0	1	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	57	N/A	N/A	90	90	N/A
EASTBOUND	N/A	40	N/A	40	N/A	N/A
NORTHBOUND	28	N/A	548	548	N/A	N/A
SOUTHBOUND	172	N/A	685	685	N/A	N/A

EAST-WEST CRITICAL VOLUMES	109
NORTH-SOUTH CRITICAL VOLUMES	720
THE SUM OF CRITICAL VOLUMES	829
NUMBER OF CRITICAL CLEARANCE INTERVALS	3*
CMA VALUE	0.482
LEVEL OF SERVICE	A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:9, ADMIRALTY WAY AND MINDANAO WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	126	17	270	146
EASTBOUND	22	36	25	0
NORTHBOUND	16	848	67	0
SOUTHBOUND	291	812	16	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	1	0	0	1	0	3
EASTBOUND	1	0	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	72	72	N/A	N/A	270	N/A
EASTBOUND	22	N/A	N/A	61	N/A	N/A
NORTHBOUND	16	N/A	458	458	N/A	N/A
SOUTHBOUND	291	N/A	414	414	N/A	N/A

EAST-WEST CRITICAL VOLUMES 331
NORTH-SOUTH CRITICAL VOLUMES 749

THE SUM OF CRITICAL VOLUMES 1080

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.658

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:10, ADMIRALTY WAY AND FIJI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	0	90	0	748
EASTBOUND	91	108	0	0
NORTHBOUND	0	0	0	0
SOUTHBOUND	584	0	0	73

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	1	0	1	0	2
EASTBOUND	1	0	2	0	0	0	3
NORTHBOUND	0	0	0	0	0	0	0
SOUTHBOUND	2	0	0	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	90	N/A	0	N/A
EASTBOUND	91	N/A	54	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A
SOUTHBOUND	321	N/A	N/A	N/A	0	N/A

EAST-WEST CRITICAL VOLUMES 181
NORTH-SOUTH CRITICAL VOLUMES 321

THE SUM OF CRITICAL VOLUMES 502

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.268

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:11, LINCOLN BOULEVARD AND MARINA EXPRESSWAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	147	0	0	784
EASTBOUND	0	0	0	0
NORTHBOUND	0	1882	125	0
SOUTHBOUND	741	1301	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	1	0	0	3
SOUTHBOUND	2	0	3	0	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	81	N/A	N/A	N/A	0	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	669	669	N/A	N/A
SOUTHBOUND	408	N/A	434	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 81
NORTH-SOUTH CRITICAL VOLUMES 1077
THE SUM OF CRITICAL VOLUMES 1158

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.713

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:12, LINCOLN BOULEVARD AND BALI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	8	7	38	0
EASTBOUND	251	1	0	45
NORTHBOUND	167	2599	9	0
SOUTHBOUND	27	1336	163	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	0	0	0	1	1
EASTBOUND	1	1	0	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	N/A	N/A	N/A	53
EASTBOUND	126	126	N/A	N/A	0	N/A
NORTHBOUND	167	N/A	869	869	N/A	N/A
SOUTHBOUND	27	N/A	500	500	N/A	N/A

EAST-WEST CRITICAL VOLUMES 179
NORTH-SOUTH CRITICAL VOLUMES 896

THE SUM OF CRITICAL VOLUMES 1075

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.682

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:13, LINCOLN BOULEVARD AND MINDANAO WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	233	401	63	0
EASTBOUND	0	413	42	0
NORTHBOUND	156	1969	321	0
SOUTHBOUND	63	1152	44	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	1	1	0	0	4
EASTBOUND	0	0	1	1	0	0	2
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	128	N/A	232	232	N/A	N/A
EASTBOUND	N/A	N/A	228	228	N/A	N/A
NORTHBOUND	156	N/A	763	763	N/A	N/A
SOUTHBOUND	63	N/A	399	399	N/A	N/A

EAST-WEST CRITICAL VOLUMES 356
NORTH-SOUTH CRITICAL VOLUMES 826

THE SUM OF CRITICAL VOLUMES 1182

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.760

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:14, LINCOLN BOULEVARD AND FIJI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	15	23	23	0
EASTBOUND	75	18	0	647
NORTHBOUND	801	2254	33	0
SOUTHBOUND	45	1388	40	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	30	N/A	30	N/A	N/A
EASTBOUND	75	N/A	18	N/A	0	N/A
NORTHBOUND	441	N/A	762	762	N/A	N/A
SOUTHBOUND	45	N/A	476	476	N/A	N/A

EAST-WEST CRITICAL VOLUMES 105
NORTH-SOUTH CRITICAL VOLUMES 917

THE SUM OF CRITICAL VOLUMES 1022

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.617

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:1, WASHINGTON BOULEVARD AND VIA MARINA/OCEAN AVENUE
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	183	601	0	38
EASTBOUND	35	508	326	121
NORTHBOUND	336	242	122	91
SOUTHBOUND	153	509	30	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	2	0	1	0	1	0	4
SOUTHBOUND	1	0	0	1	0	0	2

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	183	N/A	300	N/A	0	N/A
EASTBOUND	35	N/A	254	N/A	326	N/A
NORTHBOUND	185	N/A	242	N/A	122	N/A
SOUTHBOUND	153	N/A	N/A	539	N/A	N/A

EAST-WEST CRITICAL VOLUMES 508
NORTH-SOUTH CRITICAL VOLUMES 781

THE SUM OF CRITICAL VOLUMES 1289

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.805

LEVEL OF SERVICE ..... D

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* Includes CMA value decreased due to ATCS Implementation.

Northbound and Southbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:2, WASHINGTON BOULEVARD AND PALAWAN WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	377	1035	0	0
EASTBOUND	0	1048	135	0
NORTHBOUND	0	0	0	179
SOUTHBOUND	0	0	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	0	0	3
EASTBOUND	0	0	2	0	1	0	3
NORTHBOUND	0	0	0	0	1	0	1
SOUTHBOUND	0	0	0	0	0	0	0

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	377	N/A	518	N/A	N/A	N/A
EASTBOUND	N/A	N/A	524	N/A	135	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	0	N/A
SOUTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 901
NORTH-SOUTH CRITICAL VOLUMES 0

THE SUM OF CRITICAL VOLUMES 901

NUMBER OF CRITICAL CLEARANCE INTERVALS 2

CMA VALUE 0.751

LEVEL OF SERVICE C

Capacity used = 1200.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:3, WASHINGTON BOULEVARD AND LINCOLN BOULEVARD
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	507	985	145	266
EASTBOUND	307	1122	316	380
NORTHBOUND	690	1587	346	0
SOUTHBOUND	483	2326	199	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	2	0	1	0	5
EASTBOUND	2	0	2	0	1	0	5
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	2	0	2	1	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	279	N/A	492	N/A	145	N/A
EASTBOUND	169	N/A	561	N/A	316	N/A
NORTHBOUND	380	N/A	644	644	N/A	N/A
SOUTHBOUND	266	N/A	842	842	N/A	N/A

EAST-WEST CRITICAL VOLUMES 840
NORTH-SOUTH CRITICAL VOLUMES 1222

THE SUM OF CRITICAL VOLUMES 2062

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 1.400

LEVEL OF SERVICE ..... F

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:4, ADMIRALTY WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	593	0	389	0
EASTBOUND	0	0	0	0
NORTHBOUND	0	370	0	440
SOUTHBOUND	754	367	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	0	1	0	3
SOUTHBOUND	1	0	3	0	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	326	N/A	N/A	N/A	194	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	185	N/A	0	N/A
SOUTHBOUND	754	N/A	122	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 326
NORTH-SOUTH CRITICAL VOLUMES 939

THE SUM OF CRITICAL VOLUMES 1265

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.788

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:5, ADMIRALTY WAY AND PALAWAN WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	102	1149	75	0
EASTBOUND	43	1052	34	0
NORTHBOUND	34	41	48	0
SOUTHBOUND	382	48	191	22

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	1	1	0	0	3
EASTBOUND	1	0	1	1	0	0	3
NORTHBOUND	0	1	0	1	0	0	2
SOUTHBOUND	1	0	1	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	102	N/A	612	612	N/A	N/A
EASTBOUND	43	N/A	543	543	N/A	N/A
NORTHBOUND	N/A	58	N/A	65	N/A	N/A
SOUTHBOUND	382	N/A	48	N/A	191	N/A

EAST-WEST CRITICAL VOLUMES 655
NORTH-SOUTH CRITICAL VOLUMES 447

THE SUM OF CRITICAL VOLUMES 1102

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.635

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:6, PANAY WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	13	1	59	102
EASTBOUND	36	3	5	0
NORTHBOUND	5	574	23	0
SOUTHBOUND	205	726	31	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	0	1	0	2
EASTBOUND	0	0	0	0	0	1	1
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	14	N/A	N/A	59	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	44
NORTHBOUND	5	N/A	199	199	N/A	N/A
SOUTHBOUND	205	N/A	252	252	N/A	N/A

EAST-WEST CRITICAL VOLUMES 95
NORTH-SOUTH CRITICAL VOLUMES 404
THE SUM OF CRITICAL VOLUMES 499

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.266

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:7, MARQUESAS WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	1	8	21	52
EASTBOUND	86	19	25	12
NORTHBOUND	25	422	8	0
SOUTHBOUND	101	596	72	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	9	N/A	N/A	21	N/A
EASTBOUND	86	N/A	19	N/A	25	N/A
NORTHBOUND	25	N/A	143	143	N/A	N/A
SOUTHBOUND	101	N/A	223	223	N/A	N/A

EAST-WEST CRITICAL VOLUMES 107
NORTH-SOUTH CRITICAL VOLUMES 248

THE SUM OF CRITICAL VOLUMES 355

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.189

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:8, ADMIRALTY WAY AND BALI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	56	23	140	210
EASTBOUND	26	51	20	0
NORTHBOUND	16	1199	179	0
SOUTHBOUND	210	1421	23	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	0	1	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	56	N/A	N/A	82	82	N/A
EASTBOUND	N/A	48	N/A	48	N/A	N/A
NORTHBOUND	16	N/A	689	689	N/A	N/A
SOUTHBOUND	210	N/A	722	722	N/A	N/A

EAST-WEST CRITICAL VOLUMES	108
NORTH-SOUTH CRITICAL VOLUMES	899
THE SUM OF CRITICAL VOLUMES	1007
NUMBER OF CRITICAL CLEARANCE INTERVALS	3*
CMA VALUE	0.607
LEVEL OF SERVICE	B

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:9, ADMIRALTY WAY AND MINDANAO WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	345	34	274	163
EASTBOUND	36	60	11	0
NORTHBOUND	50	983	176	0
SOUTHBOUND	326	1190	60	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	1	0	0	1	0	3
EASTBOUND	1	0	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	190	190	N/A	N/A	274	N/A
EASTBOUND	36	N/A	N/A	71	N/A	N/A
NORTHBOUND	50	N/A	580	580	N/A	N/A
SOUTHBOUND	326	N/A	625	625	N/A	N/A

EAST-WEST CRITICAL VOLUMES 345
NORTH-SOUTH CRITICAL VOLUMES 906

THE SUM OF CRITICAL VOLUMES 1251

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.778

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:10, ADMIRALTY WAY AND FIJI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	0	132	0	567
EASTBOUND	132	247	0	0
NORTHBOUND	0	0	0	0
SOUTHBOUND	839	0	107	132

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	1	0	1	0	2
EASTBOUND	1	0	2	0	0	0	3
NORTHBOUND	0	0	0	0	0	0	0
SOUTHBOUND	2	0	0	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	132	N/A	0	N/A
EASTBOUND	132	N/A	124	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A
SOUTHBOUND	461	N/A	N/A	N/A	107	N/A

EAST-WEST CRITICAL VOLUMES 264
NORTH-SOUTH CRITICAL VOLUMES 461

THE SUM OF CRITICAL VOLUMES 725

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.387

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:11, LINCOLN BOULEVARD AND MARINA EXPRESSWAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	186	0	0	671
EASTBOUND	0	0	0	0
NORTHBOUND	0	1911	168	0
SOUTHBOUND	772	1817	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	1	0	0	3
SOUTHBOUND	2	0	3	0	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	102	N/A	N/A	N/A	0	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	693	693	N/A	N/A
SOUTHBOUND	425	N/A	606	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 102
NORTH-SOUTH CRITICAL VOLUMES 1118
THE SUM OF CRITICAL VOLUMES 1220

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.756

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:12, LINCOLN BOULEVARD AND BALI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	16	1	34	0
EASTBOUND	313	2	0	50
NORTHBOUND	84	1552	15	0
SOUTHBOUND	7	1441	313	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	0	0	0	1	1
EASTBOUND	1	1	0	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	N/A	N/A	N/A	51
EASTBOUND	158	158	N/A	N/A	0	N/A
NORTHBOUND	84	N/A	522	522	N/A	N/A
SOUTHBOUND	7	N/A	585	585	N/A	N/A

EAST-WEST CRITICAL VOLUMES 209
NORTH-SOUTH CRITICAL VOLUMES 669

THE SUM OF CRITICAL VOLUMES 878

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.539

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:13, LINCOLN BOULEVARD AND MINDANAO WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	363	556	56	0
EASTBOUND	0	488	97	0
NORTHBOUND	143	1891	346	0
SOUTHBOUND	124	1466	95	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	1	1	0	0	4
EASTBOUND	0	0	1	1	0	0	2
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	200	N/A	306	306	N/A	N/A
EASTBOUND	N/A	N/A	292	292	N/A	N/A
NORTHBOUND	143	N/A	746	746	N/A	N/A
SOUTHBOUND	124	N/A	520	520	N/A	N/A

EAST-WEST CRITICAL VOLUMES 492
NORTH-SOUTH CRITICAL VOLUMES 870

THE SUM OF CRITICAL VOLUMES 1362

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.891

LEVEL OF SERVICE ..... D

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:14, LINCOLN BOULEVARD AND FIJI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITHOUT PROJECT (AMBIENT GROWTH ONLY)

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	28	39	18	0
EASTBOUND	126	40	0	895
NORTHBOUND	678	2102	32	0
SOUTHBOUND	35	2008	76	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	42	N/A	42	N/A	N/A
EASTBOUND	126	N/A	40	N/A	0	N/A
NORTHBOUND	373	N/A	711	711	N/A	N/A
SOUTHBOUND	35	N/A	695	695	N/A	N/A

EAST-WEST CRITICAL VOLUMES 168
NORTH-SOUTH CRITICAL VOLUMES 1068

THE SUM OF CRITICAL VOLUMES 1236

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.767

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

Future (2014) With Ambient Growth Plus Project

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:1, WASHINGTON BOULEVARD AND VIA MARINA/OCEAN AVENUE
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	126	412	0	35
EASTBOUND	66	582	0	273
NORTHBOUND	521	550	293	62
SOUTHBOUND	60	236	9	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	2	0	1	0	1	0	4
SOUTHBOUND	1	0	0	1	0	0	2

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	126	N/A	206	N/A	0	N/A
EASTBOUND	66	N/A	291	N/A	0	N/A
NORTHBOUND	287	N/A	550	N/A	293	N/A
SOUTHBOUND	60	N/A	N/A	245	N/A	N/A

EAST-WEST CRITICAL VOLUMES 416
NORTH-SOUTH CRITICAL VOLUMES 795

THE SUM OF CRITICAL VOLUMES 1211

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.750

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

Northbound and Southbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:2, WASHINGTON BOULEVARD AND PALAWAN WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	131	951	0	0
EASTBOUND	0	990	0	82
NORTHBOUND	0	0	180	66
SOUTHBOUND	0	0	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	0	0	3
EASTBOUND	0	0	2	0	1	0	3
NORTHBOUND	0	0	0	0	1	0	1
SOUTHBOUND	0	0	0	0	0	0	0

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	131	N/A	476	N/A	N/A	N/A
EASTBOUND	N/A	N/A	495	N/A	0	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	180	N/A
SOUTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 626
NORTH-SOUTH CRITICAL VOLUMES 180

THE SUM OF CRITICAL VOLUMES 806

NUMBER OF CRITICAL CLEARANCE INTERVALS 2

CMA VALUE 0.672

LEVEL OF SERVICE ..... B

Capacity used = 1200.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:3, WASHINGTON BOULEVARD AND LINCOLN BOULEVARD
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	181	548	53	146
EASTBOUND	171	755	210	239
NORTHBOUND	434	1501	245	0
SOUTHBOUND	265	1442	174	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	2	0	1	0	5
EASTBOUND	2	0	2	0	1	0	5
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	2	0	2	1	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	100	N/A	274	N/A	53	N/A
EASTBOUND	94	N/A	378	N/A	210	N/A
NORTHBOUND	239	N/A	582	582	N/A	N/A
SOUTHBOUND	146	N/A	539	539	N/A	N/A

EAST-WEST CRITICAL VOLUMES	478
NORTH-SOUTH CRITICAL VOLUMES	778
THE SUM OF CRITICAL VOLUMES	1256
NUMBER OF CRITICAL CLEARANCE INTERVALS	4*
CMA VALUE	0.813
LEVEL OF SERVICE	D

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:4, ADMIRALTY WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	365	0	872	0
EASTBOUND	0	0	0	0
NORTHBOUND	0	589	0	662
SOUTHBOUND	459	168	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	0	1	0	3
SOUTHBOUND	1	0	3	0	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	201	N/A	N/A	N/A	436	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	294	N/A	0	N/A
SOUTHBOUND	459	N/A	56	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 436
NORTH-SOUTH CRITICAL VOLUMES 753

THE SUM OF CRITICAL VOLUMES 1189

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.734

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:5, ADMIRALTY WAY AND PALAWAN WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	44	852	83	0
EASTBOUND	103	944	6	0
NORTHBOUND	43	81	62	0
SOUTHBOUND	157	28	29	52

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	1	1	0	0	3
EASTBOUND	1	0	1	1	0	0	3
NORTHBOUND	0	1	0	1	0	0	2
SOUTHBOUND	1	0	1	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	44	N/A	468	468	N/A	N/A
EASTBOUND	103	N/A	475	475	N/A	N/A
NORTHBOUND	N/A	93	N/A	93	N/A	N/A
SOUTHBOUND	157	N/A	28	N/A	29	N/A

EAST-WEST CRITICAL VOLUMES 571
NORTH-SOUTH CRITICAL VOLUMES 250

THE SUM OF CRITICAL VOLUMES 821

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.447

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:6, PANAY WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	19	0	156	66
EASTBOUND	78	2	0	0
NORTHBOUND	5	927	16	0
SOUTHBOUND	133	351	24	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	0	1	0	2
EASTBOUND	0	0	0	0	0	1	1
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	19	N/A	N/A	156	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	80
NORTHBOUND	5	N/A	314	314	N/A	N/A
SOUTHBOUND	133	N/A	125	125	N/A	N/A

EAST-WEST CRITICAL VOLUMES 234
NORTH-SOUTH CRITICAL VOLUMES 447
THE SUM OF CRITICAL VOLUMES 681

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.363

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:7, MARQUESAS WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	2	21	82	20
EASTBOUND	152	12	0	19
NORTHBOUND	65	704	9	0
SOUTHBOUND	40	314	33	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	23	N/A	N/A	82	N/A
EASTBOUND	152	N/A	12	N/A	0	N/A
NORTHBOUND	65	N/A	238	238	N/A	N/A
SOUTHBOUND	40	N/A	116	116	N/A	N/A

EAST-WEST CRITICAL VOLUMES 234
NORTH-SOUTH CRITICAL VOLUMES 278

THE SUM OF CRITICAL VOLUMES 512

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.273

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:8, ADMIRALTY WAY AND BALI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	57	29	152	172
EASTBOUND	19	36	24	0
NORTHBOUND	28	997	104	0
SOUTHBOUND	172	1350	20	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	0	1	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	57	N/A	N/A	90	90	N/A
EASTBOUND	N/A	40	N/A	40	N/A	N/A
NORTHBOUND	28	N/A	550	550	N/A	N/A
SOUTHBOUND	172	N/A	685	685	N/A	N/A

EAST-WEST CRITICAL VOLUMES 109
NORTH-SOUTH CRITICAL VOLUMES 722

THE SUM OF CRITICAL VOLUMES 831

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.483

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:9, ADMIRALTY WAY AND MINDANAO WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	126	17	273	146
EASTBOUND	22	36	25	0
NORTHBOUND	16	849	67	0
SOUTHBOUND	291	812	16	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	1	0	0	1	0	3
EASTBOUND	1	0	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	72	72	N/A	N/A	273	N/A
EASTBOUND	22	N/A	N/A	61	N/A	N/A
NORTHBOUND	16	N/A	458	458	N/A	N/A
SOUTHBOUND	291	N/A	414	414	N/A	N/A

EAST-WEST CRITICAL VOLUMES 334
NORTH-SOUTH CRITICAL VOLUMES 749

THE SUM OF CRITICAL VOLUMES 1083

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.660

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:10, ADMIRALTY WAY AND FIJI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	0	90	0	749
EASTBOUND	91	108	0	0
NORTHBOUND	0	0	0	0
SOUTHBOUND	584	0	0	73

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	1	0	1	0	2
EASTBOUND	1	0	2	0	0	0	3
NORTHBOUND	0	0	0	0	0	0	0
SOUTHBOUND	2	0	0	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	90	N/A	0	N/A
EASTBOUND	91	N/A	54	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A
SOUTHBOUND	321	N/A	N/A	N/A	0	N/A

EAST-WEST CRITICAL VOLUMES 181
NORTH-SOUTH CRITICAL VOLUMES 321

THE SUM OF CRITICAL VOLUMES 502

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.268

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:11, LINCOLN BOULEVARD AND MARINA EXPRESSWAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	147	0	0	786
EASTBOUND	0	0	0	0
NORTHBOUND	0	1882	125	0
SOUTHBOUND	743	1301	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	1	0	0	3
SOUTHBOUND	2	0	3	0	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	81	N/A	N/A	N/A	0	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	669	669	N/A	N/A
SOUTHBOUND	409	N/A	434	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 81
NORTH-SOUTH CRITICAL VOLUMES 1078
THE SUM OF CRITICAL VOLUMES 1159

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.713

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:12, LINCOLN BOULEVARD AND BALI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	8	7	38	0
EASTBOUND	251	1	0	45
NORTHBOUND	167	2599	9	0
SOUTHBOUND	27	1336	163	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	0	0	0	1	1
EASTBOUND	1	1	0	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	N/A	N/A	N/A	53
EASTBOUND	126	126	N/A	N/A	0	N/A
NORTHBOUND	167	N/A	869	869	N/A	N/A
SOUTHBOUND	27	N/A	500	500	N/A	N/A

EAST-WEST CRITICAL VOLUMES 179
NORTH-SOUTH CRITICAL VOLUMES 896

THE SUM OF CRITICAL VOLUMES 1075

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.682

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:13, LINCOLN BOULEVARD AND MINDANAO WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	233	404	63	0
EASTBOUND	0	413	42	0
NORTHBOUND	156	1969	321	0
SOUTHBOUND	63	1152	44	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	1	1	0	0	4
EASTBOUND	0	0	1	1	0	0	2
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	128	N/A	234	234	N/A	N/A
EASTBOUND	N/A	N/A	228	228	N/A	N/A
NORTHBOUND	156	N/A	763	763	N/A	N/A
SOUTHBOUND	63	N/A	399	399	N/A	N/A

EAST-WEST CRITICAL VOLUMES 356
NORTH-SOUTH CRITICAL VOLUMES 826

THE SUM OF CRITICAL VOLUMES 1182

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.760

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:14, LINCOLN BOULEVARD AND FIJI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	15	23	23	0
EASTBOUND	75	18	0	647
NORTHBOUND	802	2254	33	0
SOUTHBOUND	45	1388	40	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	30	N/A	30	N/A	N/A
EASTBOUND	75	N/A	18	N/A	0	N/A
NORTHBOUND	441	N/A	762	762	N/A	N/A
SOUTHBOUND	45	N/A	476	476	N/A	N/A

EAST-WEST CRITICAL VOLUMES 105
NORTH-SOUTH CRITICAL VOLUMES 917

THE SUM OF CRITICAL VOLUMES 1022

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.617

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:1, WASHINGTON BOULEVARD AND VIA MARINA/OCEAN AVENUE
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	187	602	0	40
EASTBOUND	35	509	326	121
NORTHBOUND	336	242	121	93
SOUTHBOUND	154	509	30	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	2	0	1	0	1	0	4
SOUTHBOUND	1	0	0	1	0	0	2

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	187	N/A	301	N/A	0	N/A
EASTBOUND	35	N/A	254	N/A	326	N/A
NORTHBOUND	185	N/A	242	N/A	121	N/A
SOUTHBOUND	154	N/A	N/A	539	N/A	N/A

EAST-WEST CRITICAL VOLUMES 512
NORTH-SOUTH CRITICAL VOLUMES 781

THE SUM OF CRITICAL VOLUMES 1293

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.807

LEVEL OF SERVICE ..... D

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* Includes CMA value decreased due to ATCS Implementation.

Northbound and Southbound approaches have opposed signal phases.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:2, WASHINGTON BOULEVARD AND PALAWAN WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	382	1042	0	0
EASTBOUND	0	1051	135	0
NORTHBOUND	0	0	0	179
SOUTHBOUND	0	0	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	0	0	3
EASTBOUND	0	0	2	0	1	0	3
NORTHBOUND	0	0	0	0	1	0	1
SOUTHBOUND	0	0	0	0	0	0	0

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	382	N/A	521	N/A	N/A	N/A
EASTBOUND	N/A	N/A	526	N/A	135	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	0	N/A
SOUTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 908
NORTH-SOUTH CRITICAL VOLUMES 0

THE SUM OF CRITICAL VOLUMES 908

NUMBER OF CRITICAL CLEARANCE INTERVALS 2

CMA VALUE 0.757

LEVEL OF SERVICE C

Capacity used = 1200.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:3, WASHINGTON BOULEVARD AND LINCOLN BOULEVARD
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	507	986	145	266
EASTBOUND	309	1126	319	382
NORTHBOUND	695	1587	346	0
SOUTHBOUND	483	2326	201	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	2	0	1	0	5
EASTBOUND	2	0	2	0	1	0	5
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	2	0	2	1	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	279	N/A	493	N/A	145	N/A
EASTBOUND	170	N/A	563	N/A	319	N/A
NORTHBOUND	382	N/A	644	644	N/A	N/A
SOUTHBOUND	266	N/A	842	842	N/A	N/A

EAST-WEST CRITICAL VOLUMES 842
NORTH-SOUTH CRITICAL VOLUMES 1224
THE SUM OF CRITICAL VOLUMES 2066

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 1.403

LEVEL OF SERVICE ..... F

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:4, ADMIRALTY WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	590	0	389	0
EASTBOUND	0	0	0	0
NORTHBOUND	0	371	0	439
SOUTHBOUND	754	371	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	0	1	0	3
SOUTHBOUND	1	0	3	0	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	324	N/A	N/A	N/A	194	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	186	N/A	0	N/A
SOUTHBOUND	754	N/A	124	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 324
NORTH-SOUTH CRITICAL VOLUMES 940

THE SUM OF CRITICAL VOLUMES 1264

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.787

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:5, ADMIRALTY WAY AND PALAWAN WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	107	1146	75	0
EASTBOUND	43	1051	34	0
NORTHBOUND	34	41	48	0
SOUTHBOUND	382	48	191	22

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	1	1	0	0	3
EASTBOUND	1	0	1	1	0	0	3
NORTHBOUND	0	1	0	1	0	0	2
SOUTHBOUND	1	0	1	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	107	N/A	610	610	N/A	N/A
EASTBOUND	43	N/A	542	542	N/A	N/A
NORTHBOUND	N/A	58	N/A	65	N/A	N/A
SOUTHBOUND	382	N/A	48	N/A	191	N/A

EAST-WEST CRITICAL VOLUMES 653
NORTH-SOUTH CRITICAL VOLUMES 447

THE SUM OF CRITICAL VOLUMES 1100

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.633

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:6, PANAY WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	13	1	58	102
EASTBOUND	36	3	5	0
NORTHBOUND	5	575	22	0
SOUTHBOUND	205	727	31	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	0	1	0	2
EASTBOUND	0	0	0	0	0	1	1
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	14	N/A	N/A	58	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	44
NORTHBOUND	5	N/A	199	199	N/A	N/A
SOUTHBOUND	205	N/A	253	253	N/A	N/A

EAST-WEST CRITICAL VOLUMES 94
NORTH-SOUTH CRITICAL VOLUMES 404

THE SUM OF CRITICAL VOLUMES 498

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.266

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:7, MARQUESAS WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	1	8	21	52
EASTBOUND	85	19	25	12
NORTHBOUND	25	423	8	0
SOUTHBOUND	101	597	72	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	9	N/A	N/A	21	N/A
EASTBOUND	85	N/A	19	N/A	25	N/A
NORTHBOUND	25	N/A	144	144	N/A	N/A
SOUTHBOUND	101	N/A	223	223	N/A	N/A

EAST-WEST CRITICAL VOLUMES 106
NORTH-SOUTH CRITICAL VOLUMES 248

THE SUM OF CRITICAL VOLUMES 354

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.189

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:8, ADMIRALTY WAY AND BALI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	56	23	139	211
EASTBOUND	26	51	20	0
NORTHBOUND	16	1199	179	0
SOUTHBOUND	211	1424	23	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	0	1	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	56	N/A	N/A	81	81	N/A
EASTBOUND	N/A	48	N/A	48	N/A	N/A
NORTHBOUND	16	N/A	689	689	N/A	N/A
SOUTHBOUND	211	N/A	724	724	N/A	N/A

EAST-WEST CRITICAL VOLUMES 107
NORTH-SOUTH CRITICAL VOLUMES 900

THE SUM OF CRITICAL VOLUMES 1007

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.607

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:9, ADMIRALTY WAY AND MINDANAO WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	345	34	273	164
EASTBOUND	36	60	11	0
NORTHBOUND	50	983	176	0
SOUTHBOUND	329	1191	60	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	1	0	0	1	0	3
EASTBOUND	1	0	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	190	190	N/A	N/A	273	N/A
EASTBOUND	36	N/A	N/A	71	N/A	N/A
NORTHBOUND	50	N/A	580	580	N/A	N/A
SOUTHBOUND	329	N/A	626	626	N/A	N/A

EAST-WEST CRITICAL VOLUMES 344
NORTH-SOUTH CRITICAL VOLUMES 909

THE SUM OF CRITICAL VOLUMES 1253

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.779

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:10, ADMIRALTY WAY AND FIJI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	0	132	0	567
EASTBOUND	132	247	0	0
NORTHBOUND	0	0	0	0
SOUTHBOUND	840	0	107	132

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	1	0	1	0	2
EASTBOUND	1	0	2	0	0	0	3
NORTHBOUND	0	0	0	0	0	0	0
SOUTHBOUND	2	0	0	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	132	N/A	0	N/A
EASTBOUND	132	N/A	124	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A
SOUTHBOUND	462	N/A	N/A	N/A	107	N/A

EAST-WEST CRITICAL VOLUMES 264
NORTH-SOUTH CRITICAL VOLUMES 462

THE SUM OF CRITICAL VOLUMES 726

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.387

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:11, LINCOLN BOULEVARD AND MARINA EXPRESSWAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS **	
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	186	0	0	675
EASTBOUND	0	0	0	0
NORTHBOUND	0	1912	168	0
SOUTHBOUND	776	1818	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	1	0	0	3
SOUTHBOUND	2	0	3	0	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	102	N/A	N/A	N/A	0	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	693	693	N/A	N/A
SOUTHBOUND	427	N/A	606	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 102
NORTH-SOUTH CRITICAL VOLUMES 1120
THE SUM OF CRITICAL VOLUMES 1222

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.758

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:12, LINCOLN BOULEVARD AND BALI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	16	1	34	0
EASTBOUND	313	2	0	51
NORTHBOUND	84	1553	15	0
SOUTHBOUND	7	1442	313	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	0	0	0	1	1
EASTBOUND	1	1	0	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	N/A	N/A	N/A	51
EASTBOUND	158	158	N/A	N/A	0	N/A
NORTHBOUND	84	N/A	523	523	N/A	N/A
SOUTHBOUND	7	N/A	585	585	N/A	N/A

EAST-WEST CRITICAL VOLUMES 209
NORTH-SOUTH CRITICAL VOLUMES 669

THE SUM OF CRITICAL VOLUMES 878

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.539

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:13, LINCOLN BOULEVARD AND MINDANAO WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	363	554	56	0
EASTBOUND	0	490	98	0
NORTHBOUND	145	1892	346	0
SOUTHBOUND	124	1468	95	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	1	1	0	0	4
EASTBOUND	0	0	1	1	0	0	2
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	200	N/A	305	305	N/A	N/A
EASTBOUND	N/A	N/A	294	294	N/A	N/A
NORTHBOUND	145	N/A	746	746	N/A	N/A
SOUTHBOUND	124	N/A	521	521	N/A	N/A

EAST-WEST CRITICAL VOLUMES 494
NORTH-SOUTH CRITICAL VOLUMES 870

THE SUM OF CRITICAL VOLUMES 1364

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.892

LEVEL OF SERVICE ..... D

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:14, LINCOLN BOULEVARD AND FIJI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH AMBIENT GROWTH PLUS PROJECT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	28	39	18	0
EASTBOUND	126	40	0	896
NORTHBOUND	678	2105	32	0
SOUTHBOUND	35	2011	76	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	42	N/A	42	N/A	N/A
EASTBOUND	126	N/A	40	N/A	0	N/A
NORTHBOUND	373	N/A	712	712	N/A	N/A
SOUTHBOUND	35	N/A	696	696	N/A	N/A

EAST-WEST CRITICAL VOLUMES 168
NORTH-SOUTH CRITICAL VOLUMES 1069

THE SUM OF CRITICAL VOLUMES 1237

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.768

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

Future (2014) With Cumulative Development

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:1, WASHINGTON BOULEVARD AND VIA MARINA/OCEAN AVENUE
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	172	400	0	35
EASTBOUND	66	595	0	295
NORTHBOUND	565	619	361	86
SOUTHBOUND	61	258	8	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	2	0	1	0	1	0	4
SOUTHBOUND	1	0	0	1	0	0	2

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	172	N/A	200	N/A	0	N/A
EASTBOUND	66	N/A	298	N/A	0	N/A
NORTHBOUND	311	N/A	619	N/A	361	N/A
SOUTHBOUND	61	N/A	N/A	266	N/A	N/A

EAST-WEST CRITICAL VOLUMES 470
NORTH-SOUTH CRITICAL VOLUMES 885

THE SUM OF CRITICAL VOLUMES 1355

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.851

LEVEL OF SERVICE ..... D

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* Includes CMA value decreased due to ATCS Implementation.

Northbound and Southbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:2, WASHINGTON BOULEVARD AND PALAWAN WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	224	986	0	0
EASTBOUND	0	1091	0	90
NORTHBOUND	0	0	340	112
SOUTHBOUND	0	0	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	0	0	3
EASTBOUND	0	0	2	0	1	0	3
NORTHBOUND	0	0	0	0	1	0	1
SOUTHBOUND	0	0	0	0	0	0	0

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	224	N/A	493	N/A	N/A	N/A
EASTBOUND	N/A	N/A	546	N/A	0	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	340	N/A
SOUTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 770
NORTH-SOUTH CRITICAL VOLUMES 340

THE SUM OF CRITICAL VOLUMES 1110

NUMBER OF CRITICAL CLEARANCE INTERVALS 2

CMA VALUE 0.925

LEVEL OF SERVICE ..... E

Capacity used = 1200.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:3, WASHINGTON BOULEVARD AND LINCOLN BOULEVARD
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	197	586	66	151
EASTBOUND	214	931	267	266
NORTHBOUND	484	1736	282	0
SOUTHBOUND	274	1575	167	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	2	0	1	0	5
EASTBOUND	2	0	2	0	1	0	5
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	2	0	2	1	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	108	N/A	293	N/A	66	N/A
EASTBOUND	118	N/A	466	N/A	267	N/A
NORTHBOUND	266	N/A	673	673	N/A	N/A
SOUTHBOUND	151	N/A	581	581	N/A	N/A

EAST-WEST CRITICAL VOLUMES	574
NORTH-SOUTH CRITICAL VOLUMES	847
THE SUM OF CRITICAL VOLUMES	1421
NUMBER OF CRITICAL CLEARANCE INTERVALS	4*
CMA VALUE	0.933
LEVEL OF SERVICE	E

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:4, ADMIRALTY WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	480	0	938	0
EASTBOUND	0	0	0	0
NORTHBOUND	0	728	0	910
SOUTHBOUND	486	231	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	0	1	0	3
SOUTHBOUND	1	0	3	0	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	264	N/A	N/A	N/A	469	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	364	N/A	0	N/A
SOUTHBOUND	486	N/A	77	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 469
NORTH-SOUTH CRITICAL VOLUMES 850

THE SUM OF CRITICAL VOLUMES 1319

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.826

LEVEL OF SERVICE ..... D

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:5, ADMIRALTY WAY AND PALAWAN WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	62	1030	194	0
EASTBOUND	127	1231	10	0
NORTHBOUND	53	152	62	0
SOUTHBOUND	211	42	77	64

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	1	1	0	0	3
EASTBOUND	1	0	1	1	0	0	3
NORTHBOUND	0	1	0	1	0	0	2
SOUTHBOUND	1	0	1	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	62	N/A	612	612	N/A	N/A
EASTBOUND	127	N/A	620	620	N/A	N/A
NORTHBOUND	N/A	134	N/A	134	N/A	N/A
SOUTHBOUND	211	N/A	42	N/A	77	N/A

EAST-WEST CRITICAL VOLUMES 739
NORTH-SOUTH CRITICAL VOLUMES 345

THE SUM OF CRITICAL VOLUMES 1084

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.623

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:6, PANAY WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	19	0	173	88
EASTBOUND	166	2	0	0
NORTHBOUND	5	1188	16	0
SOUTHBOUND	175	475	35	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	0	1	0	2
EASTBOUND	0	0	0	0	0	1	1
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	19	N/A	N/A	173	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	168
NORTHBOUND	5	N/A	401	401	N/A	N/A
SOUTHBOUND	175	N/A	170	170	N/A	N/A

EAST-WEST CRITICAL VOLUMES 339
NORTH-SOUTH CRITICAL VOLUMES 576
THE SUM OF CRITICAL VOLUMES 915

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.510

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:7, MARQUESAS WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	7	30	199	34
EASTBOUND	153	15	0	19
NORTHBOUND	67	785	10	0
SOUTHBOUND	68	397	36	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	37	N/A	N/A	199	N/A
EASTBOUND	153	N/A	15	N/A	0	N/A
NORTHBOUND	67	N/A	265	265	N/A	N/A
SOUTHBOUND	68	N/A	144	144	N/A	N/A

EAST-WEST CRITICAL VOLUMES	352
NORTH-SOUTH CRITICAL VOLUMES	333
THE SUM OF CRITICAL VOLUMES	685
NUMBER OF CRITICAL CLEARANCE INTERVALS	2*
CMA VALUE	0.365
LEVEL OF SERVICE	A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:8, ADMIRALTY WAY AND BALI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	66	29	111	243
EASTBOUND	19	36	24	0
NORTHBOUND	29	1172	119	0
SOUTHBOUND	243	1728	22	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	0	1	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	66	N/A	N/A	70	70	N/A
EASTBOUND	N/A	40	N/A	40	N/A	N/A
NORTHBOUND	29	N/A	646	646	N/A	N/A
SOUTHBOUND	243	N/A	875	875	N/A	N/A

EAST-WEST CRITICAL VOLUMES 106
NORTH-SOUTH CRITICAL VOLUMES 904

THE SUM OF CRITICAL VOLUMES 1010

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.609

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:9, ADMIRALTY WAY AND MINDANAO WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	155	17	250	296
EASTBOUND	22	36	25	0
NORTHBOUND	17	911	118	0
SOUTHBOUND	592	895	18	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	1	0	0	1	0	3
EASTBOUND	1	0	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	86	86	N/A	N/A	250	N/A
EASTBOUND	22	N/A	N/A	61	N/A	N/A
NORTHBOUND	17	N/A	514	514	N/A	N/A
SOUTHBOUND	592	N/A	456	456	N/A	N/A

EAST-WEST CRITICAL VOLUMES 311
NORTH-SOUTH CRITICAL VOLUMES 1106
THE SUM OF CRITICAL VOLUMES 1417

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.894

LEVEL OF SERVICE ..... D

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:10, ADMIRALTY WAY AND FIJI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	0	121	0	772
EASTBOUND	180	186	0	0
NORTHBOUND	0	0	0	0
SOUTHBOUND	640	0	0	128

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	1	0	1	0	2
EASTBOUND	1	0	2	0	0	0	3
NORTHBOUND	0	0	0	0	0	0	0
SOUTHBOUND	2	0	0	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	121	N/A	0	N/A
EASTBOUND	180	N/A	93	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A
SOUTHBOUND	352	N/A	N/A	N/A	0	N/A

EAST-WEST CRITICAL VOLUMES 301
NORTH-SOUTH CRITICAL VOLUMES 352

THE SUM OF CRITICAL VOLUMES 653

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.348

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:11, LINCOLN BOULEVARD AND MARINA EXPRESSWAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	148	0	0	839
EASTBOUND	0	0	0	0
NORTHBOUND	0	2102	125	0
SOUTHBOUND	851	1515	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	1	0	0	3
SOUTHBOUND	2	0	3	0	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	81	N/A	N/A	N/A	0	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	742	742	N/A	N/A
SOUTHBOUND	468	N/A	505	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 81
NORTH-SOUTH CRITICAL VOLUMES 1210
THE SUM OF CRITICAL VOLUMES 1291

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.806

LEVEL OF SERVICE ..... D

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:12, LINCOLN BOULEVARD AND BALI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	8	7	38	0
EASTBOUND	266	1	0	116
NORTHBOUND	195	2792	9	0
SOUTHBOUND	39	1575	174	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	0	0	0	1	1
EASTBOUND	1	1	0	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	N/A	N/A	N/A	53
EASTBOUND	134	134	N/A	N/A	0	N/A
NORTHBOUND	195	N/A	934	934	N/A	N/A
SOUTHBOUND	39	N/A	583	583	N/A	N/A

EAST-WEST CRITICAL VOLUMES	187
NORTH-SOUTH CRITICAL VOLUMES	973
THE SUM OF CRITICAL VOLUMES	1160
NUMBER OF CRITICAL CLEARANCE INTERVALS	4*
CMA VALUE	0.744
LEVEL OF SERVICE	C

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:13, LINCOLN BOULEVARD AND MINDANAO WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	240	537	63	0
EASTBOUND	0	738	69	0
NORTHBOUND	179	2189	333	0
SOUTHBOUND	84	1439	44	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	1	1	0	0	4
EASTBOUND	0	0	1	1	0	0	2
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	132	N/A	300	300	N/A	N/A
EASTBOUND	N/A	N/A	404	404	N/A	N/A
NORTHBOUND	179	N/A	841	841	N/A	N/A
SOUTHBOUND	84	N/A	494	494	N/A	N/A

EAST-WEST CRITICAL VOLUMES 536
NORTH-SOUTH CRITICAL VOLUMES 925
THE SUM OF CRITICAL VOLUMES 1461

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.963

LEVEL OF SERVICE ..... E

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:14, LINCOLN BOULEVARD AND FIJI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	15	23	23	0
EASTBOUND	118	18	0	737
NORTHBOUND	841	2466	33	0
SOUTHBOUND	45	1693	55	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	30	N/A	30	N/A	N/A
EASTBOUND	118	N/A	18	N/A	0	N/A
NORTHBOUND	463	N/A	833	833	N/A	N/A
SOUTHBOUND	45	N/A	583	583	N/A	N/A

EAST-WEST CRITICAL VOLUMES 148
NORTH-SOUTH CRITICAL VOLUMES 1046
THE SUM OF CRITICAL VOLUMES 1194

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.738

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:1, WASHINGTON BOULEVARD AND VIA MARINA/OCEAN AVENUE
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	258	687	0	41
EASTBOUND	36	590	336	137
NORTHBOUND	371	274	149	129
SOUTHBOUND	156	559	32	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	2	0	1	0	1	0	4
SOUTHBOUND	1	0	0	1	0	0	2

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	258	N/A	344	N/A	0	N/A
EASTBOUND	36	N/A	295	N/A	336	N/A
NORTHBOUND	204	N/A	274	N/A	149	N/A
SOUTHBOUND	156	N/A	N/A	591	N/A	N/A

EAST-WEST CRITICAL VOLUMES 594
NORTH-SOUTH CRITICAL VOLUMES 865

THE SUM OF CRITICAL VOLUMES 1459

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.924

LEVEL OF SERVICE ..... E

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* Includes CMA value decreased due to ATCS Implementation.

Northbound and Southbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:2, WASHINGTON BOULEVARD AND PALAWAN WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	483	1201	0	0
EASTBOUND	0	1184	141	9
NORTHBOUND	0	0	18	242
SOUTHBOUND	0	0	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	0	0	3
EASTBOUND	0	0	2	0	1	0	3
NORTHBOUND	0	0	0	0	1	0	1
SOUTHBOUND	0	0	0	0	0	0	0

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	483	N/A	600	N/A	N/A	N/A
EASTBOUND	N/A	N/A	592	N/A	141	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	18	N/A
SOUTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 1075
NORTH-SOUTH CRITICAL VOLUMES 18

THE SUM OF CRITICAL VOLUMES 1093

NUMBER OF CRITICAL CLEARANCE INTERVALS 2

CMA VALUE 0.911

LEVEL OF SERVICE ..... E

Capacity used = 1200.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:3, WASHINGTON BOULEVARD AND LINCOLN BOULEVARD
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	573	1077	154	282
EASTBOUND	291	1159	313	450
NORTHBOUND	819	1833	404	0
SOUTHBOUND	512	2603	210	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	2	0	1	0	5
EASTBOUND	2	0	2	0	1	0	5
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	2	0	2	1	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	315	N/A	538	N/A	154	N/A
EASTBOUND	160	N/A	580	N/A	313	N/A
NORTHBOUND	450	N/A	746	746	N/A	N/A
SOUTHBOUND	282	N/A	938	938	N/A	N/A

EAST-WEST CRITICAL VOLUMES 895
NORTH-SOUTH CRITICAL VOLUMES 1388

THE SUM OF CRITICAL VOLUMES 2283

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 1.560

LEVEL OF SERVICE ..... F

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:4, ADMIRALTY WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	801	0	444	0
EASTBOUND	0	0	0	0
NORTHBOUND	0	449	0	596
SOUTHBOUND	788	485	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	0	1	0	3
SOUTHBOUND	1	0	3	0	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	441	N/A	N/A	N/A	222	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	224	N/A	0	N/A
SOUTHBOUND	788	N/A	162	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 441
NORTH-SOUTH CRITICAL VOLUMES 1012
THE SUM OF CRITICAL VOLUMES 1453

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.920

LEVEL OF SERVICE ..... E

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:5, ADMIRALTY WAY AND PALAWAN WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	104	1405	108	0
EASTBOUND	75	1230	35	0
NORTHBOUND	38	57	52	0
SOUTHBOUND	462	44	208	38

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	1	1	0	0	3
EASTBOUND	1	0	1	1	0	0	3
NORTHBOUND	0	1	0	1	0	0	2
SOUTHBOUND	1	0	1	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	104	N/A	756	756	N/A	N/A
EASTBOUND	75	N/A	632	632	N/A	N/A
NORTHBOUND	N/A	69	N/A	78	N/A	N/A
SOUTHBOUND	462	N/A	44	N/A	208	N/A

EAST-WEST CRITICAL VOLUMES 831
NORTH-SOUTH CRITICAL VOLUMES 540

THE SUM OF CRITICAL VOLUMES 1371

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.814

LEVEL OF SERVICE ..... D

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:6, PANAY WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	13	1	98	120
EASTBOUND	68	3	5	0
NORTHBOUND	5	721	22	0
SOUTHBOUND	240	976	72	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	0	1	0	2
EASTBOUND	0	0	0	0	0	1	1
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	14	N/A	N/A	98	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	76
NORTHBOUND	5	N/A	248	248	N/A	N/A
SOUTHBOUND	240	N/A	349	349	N/A	N/A

EAST-WEST CRITICAL VOLUMES 166
NORTH-SOUTH CRITICAL VOLUMES 488
THE SUM OF CRITICAL VOLUMES 654

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.349

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

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CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:7, MARQUESAS WAY AND VIA MARINA
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	2	11	18	100
EASTBOUND	87	25	0	38
NORTHBOUND	26	508	12	0
SOUTHBOUND	201	682	84	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	13	N/A	N/A	18	N/A
EASTBOUND	87	N/A	25	N/A	0	N/A
NORTHBOUND	26	N/A	173	173	N/A	N/A
SOUTHBOUND	201	N/A	255	255	N/A	N/A

EAST-WEST CRITICAL VOLUMES 105
NORTH-SOUTH CRITICAL VOLUMES 374

THE SUM OF CRITICAL VOLUMES 479

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.255

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:8, ADMIRALTY WAY AND BALI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	77	26	142	241
EASTBOUND	28	53	24	0
NORTHBOUND	16	1470	202	0
SOUTHBOUND	241	1634	23	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	0	1	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	77	N/A	N/A	84	84	N/A
EASTBOUND	N/A	52	N/A	52	N/A	N/A
NORTHBOUND	16	N/A	836	836	N/A	N/A
SOUTHBOUND	241	N/A	828	828	N/A	N/A

EAST-WEST CRITICAL VOLUMES 129
NORTH-SOUTH CRITICAL VOLUMES 1077

THE SUM OF CRITICAL VOLUMES 1206

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.746

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:9, ADMIRALTY WAY AND MINDANAO WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	419	34	394	234
EASTBOUND	38	60	17	0
NORTHBOUND	50	1085	233	0
SOUTHBOUND	468	1287	60	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	1	0	0	1	0	3
EASTBOUND	1	0	0	1	0	0	2
NORTHBOUND	1	0	1	1	0	0	3
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	226	226	N/A	N/A	394	N/A
EASTBOUND	38	N/A	N/A	77	N/A	N/A
NORTHBOUND	50	N/A	659	659	N/A	N/A
SOUTHBOUND	468	N/A	674	674	N/A	N/A

EAST-WEST CRITICAL VOLUMES 471
NORTH-SOUTH CRITICAL VOLUMES 1127

THE SUM OF CRITICAL VOLUMES 1598

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 1.021

LEVEL OF SERVICE ..... F

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:10, ADMIRALTY WAY AND FIJI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	0	213	0	624
EASTBOUND	225	325	0	0
NORTHBOUND	0	0	0	0
SOUTHBOUND	899	0	127	225

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	1	0	1	0	2
EASTBOUND	1	0	2	0	0	0	3
NORTHBOUND	0	0	0	0	0	0	0
SOUTHBOUND	2	0	0	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	213	N/A	0	N/A
EASTBOUND	225	N/A	162	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A
SOUTHBOUND	494	N/A	N/A	N/A	127	N/A

EAST-WEST CRITICAL VOLUMES 438
NORTH-SOUTH CRITICAL VOLUMES 494

THE SUM OF CRITICAL VOLUMES 932

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.521

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:11, LINCOLN BOULEVARD AND MARINA EXPRESSWAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	220	0	0	849
EASTBOUND	0	0	0	0
NORTHBOUND	0	2225	168	0
SOUTHBOUND	913	2108	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	0	0	2	0	4
EASTBOUND	0	0	0	0	0	0	0
NORTHBOUND	0	0	2	1	0	0	3
SOUTHBOUND	2	0	3	0	0	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	121	N/A	N/A	N/A	0	N/A
EASTBOUND	N/A	N/A	N/A	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	798	798	N/A	N/A
SOUTHBOUND	502	N/A	703	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 121
NORTH-SOUTH CRITICAL VOLUMES 1300
THE SUM OF CRITICAL VOLUMES 1421

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.897

LEVEL OF SERVICE ..... D

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:12, LINCOLN BOULEVARD AND BALI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	22	1	34	0
EASTBOUND	336	2	0	83
NORTHBOUND	119	1837	19	0
SOUTHBOUND	13	1705	335	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	0	0	0	1	1
EASTBOUND	1	1	0	0	1	0	3
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	N/A	N/A	N/A	57
EASTBOUND	169	169	N/A	N/A	0	N/A
NORTHBOUND	119	N/A	619	619	N/A	N/A
SOUTHBOUND	13	N/A	680	680	N/A	N/A

EAST-WEST CRITICAL VOLUMES 226
NORTH-SOUTH CRITICAL VOLUMES 799

THE SUM OF CRITICAL VOLUMES 1025

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.645

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:13, LINCOLN BOULEVARD AND MINDANAO WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	371	790	56	0
EASTBOUND	0	669	115	0
NORTHBOUND	172	2217	371	0
SOUTHBOUND	132	1756	95	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	2	0	1	1	0	0	4
EASTBOUND	0	0	1	1	0	0	2
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	204	N/A	423	423	N/A	N/A
EASTBOUND	N/A	N/A	392	392	N/A	N/A
NORTHBOUND	172	N/A	863	863	N/A	N/A
SOUTHBOUND	132	N/A	617	617	N/A	N/A

EAST-WEST CRITICAL VOLUMES 596
NORTH-SOUTH CRITICAL VOLUMES 995

THE SUM OF CRITICAL VOLUMES 1591

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 1.057

LEVEL OF SERVICE ..... F

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:14, LINCOLN BOULEVARD AND FIJI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	28	39	18	0
EASTBOUND	163	40	0	997
NORTHBOUND	778	2444	32	0
SOUTHBOUND	35	2287	116	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	1	0	1	0	0	2
EASTBOUND	1	0	1	0	1	0	3
NORTHBOUND	2	0	2	1	0	0	5
SOUTHBOUND	1	0	2	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	42	N/A	42	N/A	N/A
EASTBOUND	163	N/A	40	N/A	0	N/A
NORTHBOUND	428	N/A	825	825	N/A	N/A
SOUTHBOUND	35	N/A	801	801	N/A	N/A

EAST-WEST CRITICAL VOLUMES 205
NORTH-SOUTH CRITICAL VOLUMES 1229

THE SUM OF CRITICAL VOLUMES 1434

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.906

LEVEL OF SERVICE ..... E

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* Includes CMA value decreased due to ATCS Implementation.

Future (2014) With Cumulative Development Plus Mitigation

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:1, OCEAN AVE./VIA MARINA & WASHINGTON BLVD.
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT PLUS MITIGATION

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	172	600	22	133
EASTBOUND	66	595	45	250
NORTHBOUND	365	499	291	86
SOUTHBOUND	61	258	8	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	2	0	1	0	1	0	4
SOUTHBOUND	1	0	0	1	0	0	2

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	172	N/A	300	N/A	22	N/A
EASTBOUND	66	N/A	298	N/A	45	N/A
NORTHBOUND	201	N/A	499	N/A	291	N/A
SOUTHBOUND	61	N/A	N/A	266	N/A	N/A

EAST-WEST CRITICAL VOLUMES 470
NORTH-SOUTH CRITICAL VOLUMES 765

THE SUM OF CRITICAL VOLUMES 1235

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.767

LEVEL OF SERVICE C

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* Includes CMA value decreased due to ATCS Implementation.

Northbound and Southbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:2, PALAWAN WAY & WASHINGTON BLVD.
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT PLUS MITIGATION

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	224	986	0	0
EASTBOUND	0	1021	0	90
NORTHBOUND	320	0	410	112
SOUTHBOUND	0	0	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	0	0	3
EASTBOUND	0	0	2	0	1	0	3
NORTHBOUND	2	0	0	0	1	0	3
SOUTHBOUND	0	0	0	0	0	0	0

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	224	N/A	493	N/A	N/A	N/A
EASTBOUND	N/A	N/A	510	N/A	0	N/A
NORTHBOUND	176	N/A	N/A	N/A	410	N/A
SOUTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 734
NORTH-SOUTH CRITICAL VOLUMES 410
THE SUM OF CRITICAL VOLUMES 1144

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.663

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:4, VIA MARINA & ADMIRALTY WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT PLUS MITIGATION

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	0	480	484	134
EASTBOUND	658	980	0	0
NORTHBOUND	0	0	0	0
SOUTHBOUND	486	0	50	181

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	3	0	2	0	5
EASTBOUND	2	0	3	0	0	0	5
NORTHBOUND	0	0	0	0	0	0	0
SOUTHBOUND	2	0	0	0	3	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	160	N/A	242	N/A
EASTBOUND	362	N/A	327	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A
SOUTHBOUND	267	N/A	N/A	N/A	17	N/A

EAST-WEST CRITICAL VOLUMES 604
NORTH-SOUTH CRITICAL VOLUMES 267

THE SUM OF CRITICAL VOLUMES 871

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.511

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:5, ADMIRALTY WAY AND PALAWAN WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT PLUS MITIGATION

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	62	710	451	63
EASTBOUND	197	1231	10	0
NORTHBOUND	53	152	62	0
SOUTHBOUND	211	42	25	116

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	1	0	0	4
EASTBOUND	1	0	1	1	0	0	3
NORTHBOUND	1	0	0	1	0	0	2
SOUTHBOUND	1	1	0	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	62	N/A	355	N/A	451	N/A
EASTBOUND	197	N/A	620	620	N/A	N/A
NORTHBOUND	53	N/A	N/A	214	N/A	N/A
SOUTHBOUND	126	126	N/A	N/A	25	N/A

EAST-WEST CRITICAL VOLUMES 682
NORTH-SOUTH CRITICAL VOLUMES 340

THE SUM OF CRITICAL VOLUMES 1022

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.617

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

Northbound and Southbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:8, ADMIRALTY WAY AND BALI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT PLUS MITIGATION

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	66	29	111	243
EASTBOUND	19	36	24	0
NORTHBOUND	29	1172	119	0
SOUTHBOUND	243	1728	22	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	0	1	0	1	0	0	2
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	66	N/A	N/A	70	70	N/A
EASTBOUND	N/A	40	N/A	40	N/A	N/A
NORTHBOUND	29	N/A	430	430	N/A	N/A
SOUTHBOUND	243	N/A	875	875	N/A	N/A

EAST-WEST CRITICAL VOLUMES 106
NORTH-SOUTH CRITICAL VOLUMES 904

THE SUM OF CRITICAL VOLUMES 1010

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.609

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:9, ADMIRALTY WAY AND MINDANAO WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: AM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT PLUS MITIGATION

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	155	17	383	163
EASTBOUND	22	36	25	0
NORTHBOUND	17	911	18	100
SOUTHBOUND	592	895	18	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	0	1	1	3
EASTBOUND	1	0	0	1	0	0	2
NORTHBOUND	1	0	2	0	1	0	4
SOUTHBOUND	2	0	1	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	155	N/A	N/A	200	200	N/A
EASTBOUND	22	N/A	N/A	61	N/A	N/A
NORTHBOUND	17	N/A	456	N/A	18	N/A
SOUTHBOUND	326	N/A	456	456	N/A	N/A

EAST-WEST CRITICAL VOLUMES 261
NORTH-SOUTH CRITICAL VOLUMES 782

THE SUM OF CRITICAL VOLUMES 1043

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.659

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:1, OCEAN AVE./VIA MARINA & WASHINGTON BLVD.
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT PLUS MITIGATION

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	258	847	0	201
EASTBOUND	36	590	336	137
NORTHBOUND	211	114	109	129
SOUTHBOUND	156	559	32	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	2	0	1	0	1	0	4
SOUTHBOUND	1	0	0	1	0	0	2

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	258	N/A	424	N/A	0	N/A
EASTBOUND	36	N/A	295	N/A	336	N/A
NORTHBOUND	116	N/A	114	N/A	109	N/A
SOUTHBOUND	156	N/A	N/A	591	N/A	N/A

EAST-WEST CRITICAL VOLUMES 594
NORTH-SOUTH CRITICAL VOLUMES 707

THE SUM OF CRITICAL VOLUMES 1301

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.813

LEVEL OF SERVICE ..... D

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* Includes CMA value decreased due to ATCS Implementation.

Northbound and Southbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:2, PALAWAN WAY & WASHINGTON BLVD.
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT PLUS MITIGATION

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	483	1201	0	0
EASTBOUND	0	1144	62	88
NORTHBOUND	320	0	58	242
SOUTHBOUND	0	0	0	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	0	0	3
EASTBOUND	0	0	2	0	1	0	3
NORTHBOUND	2	0	0	0	1	0	3
SOUTHBOUND	0	0	0	0	0	0	0

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	483	N/A	600	N/A	N/A	N/A
EASTBOUND	N/A	N/A	572	N/A	62	N/A
NORTHBOUND	176	N/A	N/A	N/A	58	N/A
SOUTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A

EAST-WEST CRITICAL VOLUMES 1055
NORTH-SOUTH CRITICAL VOLUMES 176

THE SUM OF CRITICAL VOLUMES 1231

NUMBER OF CRITICAL CLEARANCE INTERVALS 2*

CMA VALUE 0.721

LEVEL OF SERVICE C

---

* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:4, VIA MARINA & ADMIRALTY WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT PLUS MITIGATION

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	0	801	0	124
EASTBOUND	409	636	0	0
NORTHBOUND	0	0	0	0
SOUTHBOUND	788	0	373	112

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	0	0	3	0	2	0	5
EASTBOUND	2	0	3	0	0	0	5
NORTHBOUND	0	0	0	0	0	0	0
SOUTHBOUND	2	0	0	0	3	0	5

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	N/A	N/A	267	N/A	0	N/A
EASTBOUND	225	N/A	212	N/A	N/A	N/A
NORTHBOUND	N/A	N/A	N/A	N/A	N/A	N/A
SOUTHBOUND	433	N/A	N/A	N/A	124	N/A

EAST-WEST CRITICAL VOLUMES 492
NORTH-SOUTH CRITICAL VOLUMES 433

THE SUM OF CRITICAL VOLUMES 925

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.549

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:5, ADMIRALTY WAY AND PALAWAN WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT PLUS MITIGATION

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	104	1085	428	0
EASTBOUND	115	1230	35	0
NORTHBOUND	38	57	52	0
SOUTHBOUND	462	44	130	116

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	1	0	0	4
EASTBOUND	1	0	1	1	0	0	3
NORTHBOUND	1	0	0	1	0	0	2
SOUTHBOUND	1	1	0	0	1	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	104	N/A	504	504	N/A	N/A
EASTBOUND	115	N/A	632	632	N/A	N/A
NORTHBOUND	38	N/A	N/A	109	N/A	N/A
SOUTHBOUND	253	253	N/A	N/A	130	N/A

EAST-WEST CRITICAL VOLUMES 736
NORTH-SOUTH CRITICAL VOLUMES 362

THE SUM OF CRITICAL VOLUMES 1098

NUMBER OF CRITICAL CLEARANCE INTERVALS 3*

CMA VALUE 0.671

LEVEL OF SERVICE ..... B

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* Includes CMA value decreased due to ATCS Implementation.

Northbound and Southbound approaches have opposed signal phases.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:8, ADMIRALTY WAY AND BALI WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT PLUS MITIGATION

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	77	26	142	241
EASTBOUND	28	53	24	0
NORTHBOUND	16	1470	202	0
SOUTHBOUND	241	1634	23	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	0	1	0	1	0	0	2
NORTHBOUND	1	0	2	1	0	0	4
SOUTHBOUND	1	0	1	1	0	0	3

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	77	N/A	N/A	84	84	N/A
EASTBOUND	N/A	52	N/A	52	N/A	N/A
NORTHBOUND	16	N/A	557	557	N/A	N/A
SOUTHBOUND	241	N/A	828	828	N/A	N/A

EAST-WEST CRITICAL VOLUMES	129
NORTH-SOUTH CRITICAL VOLUMES	844
THE SUM OF CRITICAL VOLUMES	973
NUMBER OF CRITICAL CLEARANCE INTERVALS	3*
CMA VALUE	0.583
LEVEL OF SERVICE	A

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* Includes CMA value decreased due to ATCS Implementation.

CRAIN & ASSOCIATES
CMA CALCULATIONS

INTERSECTION:9, ADMIRALTY WAY AND MINDANAO WAY
DATE: 6/16/2008 INITIALS: JL PERIOD: PM PEAK HOUR
CASE: FUTURE (2014) WITH CUMULATIVE DEVELOPMENT PLUS MITIGATION

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	419	34	500	128
EASTBOUND	38	60	17	0
NORTHBOUND	50	1085	74	159
SOUTHBOUND	468	1287	60	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	0	1	1	3
EASTBOUND	1	0	0	1	0	0	2
NORTHBOUND	1	0	2	0	1	0	4
SOUTHBOUND	2	0	1	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	318	N/A	N/A	N/A	318	318
EASTBOUND	38	N/A	N/A	77	N/A	N/A
NORTHBOUND	50	N/A	542	N/A	74	N/A
SOUTHBOUND	257	N/A	674	674	N/A	N/A

EAST-WEST CRITICAL VOLUMES 395
NORTH-SOUTH CRITICAL VOLUMES 799

THE SUM OF CRITICAL VOLUMES 1194

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.768

LEVEL OF SERVICE C

---

* Includes CMA value decreased due to ATCS Implementation.

Eastbound and Westbound approaches have opposed signal phases.

CITY OF LOS ANGELES
CALIFORNIA

Gloria J. Jeff
GENERAL MANAGER

DEPARTMENT OF
TRANSPORTATION
100 S. MAIN ST
LOS ANGELES, CA 90012
(213) 972-8470
FAX (213) 972-84

ANTONIO R. VILLARAIGOSA
MAYOR

LADOT Traffic Control Report:
11 - Western #2579
Los Angeles County File: T-4

March 15, 2007

Mr. Donald L. Wolfe
Director
Los Angeles County, Department of Public Works
P.O. Box 1460
Alhambra, CA 91802-1460

LADOT CONCURRENCE AND APPROVAL OF PROPOSED TRAFFIC SIGNAL INSTALLATION AT PALAWAN WAY & WASHINGTON BOULEVARD

The City of Los Angeles Department of Transportation (LADOT) has completed the review of the traffic engineering analysis regarding the proposal to install a traffic signal at the intersection of Palawan Way and Washington Boulevard. We have determined that the study adequately describes the projected traffic conditions for this location and therefore, the installation of a new traffic signal is acceptable.

Attached is a Traffic Control Report, dated March 8, 2007, which officially authorizes the installation of a new traffic signal at Palawan Way and Washington Boulevard. Please refer to this document for installation requirements and procedures.

If you have any questions or require further assistance regarding this matter, please feel free to contact Eddie Guerrero of my staff at (310) 642-1625.

Sincerely,

JAY W. KIM, Acting Principal Transportation Engineer
Bureau of Planning and Land Use
Los Angeles Department of Transportation

JWK:ejg
J:\Kim\Palawan Washington Signal\palawan_washington_ltr_billwhiter_mar07.wpd

Attachment

cc: William J. Winter, Los Angeles County Department of Public Works
John Fisher, Glenn Ogura, Pauline Chan, Mohammad Blorfroshan, LADOT
Mike Patonai, DPW Bureau of Engineering

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

MAR 1 2 2007

March 8, 2007

TRAFFIC
CONTROL
REPORT

11 - Western #2579
Palawan Way &
Washington Boulevard

TRAFFIC SIGNAL

DETERMINATION

1. That a traffic signal along with appropriate signs, red curb, and pavement markings, be authorized for installation at the intersection of Palawan Way and Washington Boulevard. (Sections 80.07 (d), 80.08, 80.08.2, 80.37 and 80.55 L.A.M.C.)

2. That the authority for the stop sign controlling northbound right-turn traffic on Palawan Way at Washington Boulevard be rescinded at the time the traffic signal is activated. (Section 80.07.1 L.A.M.C.)

3. That the traffic signal be installed under the B-permit process of the Bureau of Engineering with all the costs of design and construction to be borne by the County of Los Angeles.

DISCUSSION

A request was received from Mr. Donald L. Wolfe, Director of Public Works, and Mr. William J. Winter, Assistant Deputy Director for Traffic and Lighting Division for the County of Los Angeles for the installation of a traffic signal at the intersection of Palawan Way and Washington Boulevard.

In March of 2002, Crain and Associates conducted a traffic engineering study for the Esprit Marina Del Rey residential development project located in the Marina Del Rey area, under the jurisdiction of the County of Los Angeles. Because the study proposed dual left-turn lanes for westbound Washington Boulevard at the signalized intersection of Via Marina Avenue/Ocean Avenue, the removal of a significant number of on-street parking spaces on Washington Boulevard would be required.

Recently, the Los Angeles County Department of Public Works has proposed the installation of a new traffic signal and dual left-turn lanes for northbound traffic at the intersection of Palawan Way and Washington Boulevard, as a substitute mitigation measure for the previously proposed dual left-turn lanes at the intersection of Ocean Avenue, Via Marina, and Washington Boulevard. Their recent traffic engineering study considered current traffic studies from other recent developments in the Marina, and compared projected 2009 cumulative level of service with or without mitigation at each of the two intersections. Based on findings from an August, 2002 study conducted by Kaku Associates, the new study assumed that 40 percent of the existing northbound left-turn traffic and 20 percent of the existing northbound through traffic on Via Marina

Avenue at Washington Boulevard would be diverted to Palawan Way. The new study indicated that the new traffic signal would offer comparable mitigation of the project's traffic impact and reduce northbound left-turn and through traffic volumes on Via Marina Avenue at Washington Boulevard, which the study pointed out are a source of concern for the Venice Community.

The Department of Transportation has reviewed the traffic engineering analysis and has determined that the study adequately describes the projected traffic conditions for this location, and the installation of a new traffic signal is acceptable. The anticipated traffic volumes at this intersection indicate that the "Peak Hour Volume" warrant for the installation of a traffic signal would be satisfied. The installation of the traffic signal, as described in the Determination, will provide a more restrictive right-of-way assignment and will promote the safe and orderly flow of traffic at this location, and is therefore, recommended.

The traffic signal shall be installed under the B-permit process of the Bureau of Engineering with all costs of design and construction to be paid for by the County of Los Angeles.

Recommended By:

M. H. Blorfroshan

Mohammad H. Blorfroshan
Transportation Engineer
Western District

Approved By:

Glenn Ogura

Glenn Ogura
Principal Transportation Engineer
Bureau of Metro Operations

MHB/tcr-sig-plwn-wash

c: Councilmember Bill Rosendahl, 11th Council District
LADOT, City Wide Investigations (4030-S)
LADOT, Steps
LADOT, Signal Design
LADOT, Geometric Design
LADOT, West L.A. Land Use Development
Donald L. Wolfe, Los Angeles County Department of Public Works
William J. Winter, Los Angeles County Department of Public Works

CRAIN & ASSOCIATES

VIA EMAIL

March 26, 2008

Ms. Johanna Falzarano
Envicom Corporation
28328 Agoura Road
Agoura Hills, California 91301

RE: Revised Boat Slip Parking on Parcel 21

Dear Johanna,

As we discussed, the parking analysis in the traffic study for the proposed 114-unit congregate-care retirement facility and 5,000 square feet retail on parcel OT and the Holiday Harbor Courts Project on Parcel 21 in Marina del Rey assumed that the Project would provide the required 71 replacement spaces on Parcel 21 based on 94 boat slips. However, the applicant has received approval from the Los Angeles County Small Craft Harbor Commission for 92 rather than 94 boat slips on Parcel 21. Although the project is approved for 92 boat slips on Parcel 21, the project will provide 71 spaces rather than the 69 required spaces based on 92 boat slips. This minor change will not measurably change project trip generation (i.e. any change will be less than one trip per hour).

Please contact me if you have any questions.

Sincerely,

Jonathan Louie
Senior Transportation Planner

JL:
C18861

Cc: Frank Hickman

2007 Sawtelle Blvd., Suite #4
Los Angeles, CA 90025
310 473 6508 (main)
310 444 9771 (fax)

www.crainandassociates.com

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

DEAN D. EFSTATHIOU, Acting Director

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
http://dpw.lacounty.gov

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

IN REPLY PLEASE
REFER TO FILE: T-4

November 24, 2008

Mr. Jonathan Louie
Crain & Associates
2007 Sawtelle Boulevard, Suite No. 4
Los Angeles, CA 90025-6238

Dear Mr. Louie:

OCEANA RETIREMENT FACILITY AND HOLIDAY HARBOR COURTS PROJECTS
MARINA DEL REY PARCEL NOS. OT AND 21
CONDITIONAL USE PERMITS 06115 AND 06223
TRAFFIC IMPACT ANALYSIS (JUNE 25, 2008)
MARINA DEL REY AREA

As requested, we have reviewed the revised Traffic Impact Analysis (TIA) for the proposed Oceana Retirement Facility project located on the County-owned Parcel No. OT in the Oxford Development Zone (DZ) 6 at 4445 Admiralty Way east of Palawan Way and the proposed Holiday Harbor Courts project located on the County-owned Parcel No. 21 in the Panay DZ 4 at 14025 Panay Way east of Via Marina with a builtout year of 2014 instead of 2010. Both projects are located in the unincorporated County of Los Angeles area of Marina del Rey. This memo supersedes our previous memo dated February 27, 2008.

The Oceana Retirement Facility project proposes to develop a six-floor, 114-unit retirement facility, which would house an estimated population of 145 residents. The facility will include retail space, a lobby, two lounges, two card rooms, a chapel, administration and reception offices, a dining room, a library, arts and crafts room, laundry facilities, a trash and mailroom, a kitchen, a beauty salon, and on-site parking. The Oceana Retirement Facility project is estimated to generate a net increase of approximately 387 vehicle trips daily, with 10 and 41 vehicle trips during the a.m. and p.m. peak hours, respectively.

GFL

The Holiday Harbor Courts project proposes to replace the existing on-site marine commercial office, health club, and retail uses with a new five-floor structure housing marine commercial office, health club, yacht club, and retail uses, as well as, a public park plaza, promenade, and on-site parking. The Holiday Harbor Courts project is estimated to generate a net decrease of approximately 19 vehicle trips daily, with a net increase of 2 and a net decrease of 11 vehicle trips during the a.m. and p.m. peak hours, respectively. Both projects combined are estimated to generate a net increase of approximately 278 vehicle trips daily, with 12 and 30 vehicle trips during the a.m. and p.m. peak hours, respectively.

The traffic generated cumulatively by both projects and with other related projects will exceed the significance threshold as defined in our TIA Report Guidelines at the three intersections listed below. We agree with the TIA that mitigation measures which are identified in the Marina del Rey Local Implementation Program (MDR LIP) will fully mitigate the direct and cumulative impacts to these three intersections. As required by the MDR Local Coastal Plan (LCP), the project shall pay the LCP traffic mitigation fee of $5,690 per p.m. peak-hour trip for Category 1 and 3 improvements. Based on the 30 estimated project p.m. peak-hour trips, the project's fair share of the LCP Transportation Improvement Program fee is $170,700 of which $47,760 will go toward the Category 1 transportation improvements and the remaining $122,940 will go toward the Category 3 transportation improvements. The project shall submit payment to Public Works, Marina del Rey Traffic Mitigation Fee Account No. TF2 7703, upon approval of the project.

- Admiralty Way at Via Marina

  We agree with the TIA's recommendation to reconstruct the intersection to realign Admiralty Way as a through roadway with the southern leg of Via Marina as proposed under the MDR LIP Category 3 improvements, rather than widen the south side of Admiralty Way to accommodate a triple westbound left-turn movement as proposed under the MDR LIP Category 1 improvements.

- Admiralty Way at Mindanao Way

  The addition of a northbound right-turn lane as proposed under the MDR LIP Category 1 improvements is not feasible due to right of way constraints. We agree with the TIA's recommendation to add a second southbound left-turn lane. We also recommend converting the shared left-turn/through lane to a shared left-/through/right-turn lane on the westbound approach, modifying the traffic signal to provide a westbound

right-turn phase concurrent with the southbound left-turn movement, and optimizing the signal operation at adjacent intersections to mitigate the project's cumulative traffic impact at the intersection.

- Admiralty Way at Bali Way

  Although the TIA's recommendation to widen Admiralty Way from Fiji Way to Via Marina to provide a third westbound/northbound through lane as proposed under the MDR LIP Category 1 improvements will mitigate the project's impact, we recommend instead adding a second southbound left-turn lane.

No feasible physical improvements are currently available to mitigate the potential cumulative impact for the five intersections listed below. The TIA indicates the proposed extension of State Route 90 (SR-90) to connect to Admiralty Way will mitigate the cumulative impact at these intersections. Although the SR-90 extension is not a programmed project, it is one of several potential regional transportation circulation improvements identified under the MDR LIP Category 3 improvements. These five intersections will have significant cumulative impacts until the SR-90 extension or another project of equal effectiveness is constructed. Therefore, please ensure that these unmitigated impacts are properly described in the project's revised TIA and subsequent Environmental Impact Report.

- Lincoln Boulevard at Washington Boulevard
- Lincoln Boulevard at SR-90 (Marina Expressway)
- Lincoln Boulevard at Bali Way
- Lincoln Boulevard at Mindanao Way
- Lincoln Boulevard at Fiji Way

The intersections listed below need to be improved to adequately handle the cumulative traffic generated by the project and other related projects. The project shall contribute its proportionate share of the cost for these improvements. Detailed striping and signal modification plans and cost estimates shall be submitted to Public Works for review and approval.

- Admiralty Way at Palawan Way

  North approach: One left-turn lane, one shared left-turn/through lane, and an exclusive right-turn lane instead of one left-turn lane, one through lane, and an exclusive right-turn lane (convert through lane to shared left-turn/through lane). This alternative appears to be feasible and

provides a better Level of Service (LOS) than the alternative to convert one through lane into a second left-turn lane to Admiralty Way as proposed under the MDR LIP Category 1 improvements.

East approach: One left-turn, two through lanes, and one shared through/right-turn lane instead of one left-turn lane, one through lane, and one shared through/right-turn lane (add second through lane).

South approach: One left-turn and one shared through/right-turn lane instead of one shared left-turn/through lane and one shared through/right-turn lane (convert shared left-turn/through lane to left-turn lane). This alternative appears to be feasible and provides a better LOS than the alternative to provide a separate right-turn lane to Admiralty Way as proposed under the MDR LIP Category 1 improvements.

- Washington Boulevard at Ocean Avenue/Via Marina

  Although no physical improvements are feasible at this intersection, the improvements recommended for the adjacent intersection of Washington Boulevard at Palawan Way will provide adequate mitigation.

- Washington Boulevard at Palawan Way

  South approach: Two northbound left-turn lanes and an exclusive right-turn lane (add two left-turn lanes).

  Install a new traffic signal and, as necessary, modify traffic signal at the intersection of Palawan Way at Admiralty Way. The project's prorata share is 3.8 percent which is $12,635 based on the total improvement cost estimated at $332,500. This improvement was reviewed and approved by the City of Los Angeles Department of Transportation (copy enclosed).

The project shall dedicate the necessary right of way for the future roadway widening along Admiralty Way and widening of sidewalk to 8 feet wide along the project frontage on Admiralty Way.

The project shall submit a 40-foot-scale site plan of the project showing access locations in relationship to adjacent intersections and driveways to our Land Development Division for review and approval.

MDR LCP Compliance

The project is well within the MDR LCP potential development entitlement of 2,750 p.m. peak-hour trips. The project's request to transfer the development potential of 114 hotel rooms and 5,000 square feet of office space from the Admiralty DZ 7 to Oxford DZ 6 will require an amendment to the LCP. We advise the project's representatives to consult with the Department of Regional Planning (DRP) to assess the requirements for obtaining the necessary approvals for this amendment.

Chapter 22.46 of the Los Angeles County Code (also known as the Marina del Rey Specific Plan) states for Parcel No. OT that development of uses other than public parking shall be conditioned to provide replacement public parking on-site or elsewhere in the marina on a one-to-one basis such that there is no net reduction on public parking spaces. The project's proposed relocation of 94 existing parking spaces from Parcel No. OT to Parcel No. 21 may conflict with the Department of Beaches and Harbors (DBH) pursuit for rights to relocate 260 other parking spaces to Parcel No. 21. We advise the project's representatives to consult with DRP and DBH to assess all parking lot redevelopment and parking space relocation for Parcel No. 21.

The Cities of Culver City and Los Angeles and Caltrans shall be consulted to obtain its written concurrence with the California Environmental Quality Act level of significance determination as soon as possible and/or before the public review period.

If you have any questions regarding the traffic analysis, please contact Mr. Suen Fei Lau of our Traffic Studies Section at (626) 300-4820.

Very truly yours,

DEAN D. EFSTATHIOU
Acting Director of Public Works

FH WILLIAM J. WINTER
Assistant Deputy Director
Traffic and Lighting Division

SFL:cn
P:\tlpub\WPFILES\LAND DEVELOPMENT REVIEW\Fei\EIR08178 MDR Pcl OT&Holiday Harbor Courts Pcl 21.doc

Enc.

cc: Caltrans (Elmer Alvarez)
City of Culver City (Charles Herbertson)
City of Los Angeles (Eddie Guerrero)
County Counsel (Thomas Faughnan)
Department of Beaches and Harbors (Barry Kurtz)
Department of Regional Planning (Russell Fricano, Gina Natoli)

bc: Design (Chinn)
Land Development (Narag)
Programs Development (Dingman)
Traffic and Lighting (Quintana)

VIA EMAIL

July 22, 2009

Ms. Johanna Falzarano
Project Manager
Envicom Corporation
28328 Agoura Road
Agoura Hills, California 91301

RE: Development Transfer Amendment on Parcel OT, Marina del Rey

Dear Johanna,

As we discussed, the traffic study for the proposed 114-unit congregate-care retirement facility and 5,000 square feet retail on Parcel OT and the Holiday Harbor Courts Project on Parcel 21 in Marina del Rey referenced a transfer of development allowance from Admiralty Development Zone (DZ) 7 to Oxford DZ 6, which is one of the sites (Parcel OT) of the proposed project. Specifically, the traffic study noted that the project proposes a development allowance transfer of 114 hotel rooms and 5,000 square feet of office space from Admiralty DZ 7 to Oxford DZ 6. However, a development allowance of 5,000 square feet of office space is not available for transfer from Admiralty DZ 7. Instead of 5,000 square feet of office space to be transferred from Admiralty DZ 7, the Los Angeles County Department of Beaches and Harbors has identified that 5,000 square feet of retail space in Palawan/Beach DZ 5 (Parcel 97) is available for transfer to Oxford DZ 6 for the Parcel OT component of the project.

The table below shows the development allowances for Oxford DZ 6 based on the amended development allowance transfer. As shown in this table, the original Phase II development allowances for Oxford DZ 6 would allow no net new PM trips. However, as described previously, the proposed project is requesting the transfer of a total of 114 hotel rooms from Admiralty DZ 7 and 5,000 square feet of retail space from Palawan/Beach DZ 5 to the Oxford DZ 6 in order to comply with the Marina del Rey Land Use Plan (LUP) trip generation allowances. Therefore, this potential transfer would result in a total trip allowance of 424.62 PM

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310 473 6508 (main)
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peak hour trips in Oxford DZ 6. The proposed project would produce a total of 41.58 net new PM peak hour trips for Oxford DZ 6, resulting in a net total of 383.04 trips remaining for other development within the zone. Therefore, the proposed project is compatible with the trip generation limits identified in the LUP for Oxford DZ 6, assuming the potential transfer of hotel development rights from Admiralty DZ 7 and retail development rights from Palawan/Beach DZ 5 to Oxford DZ 6.

PM Peak Hour Trips
Development Zone 6

Allowable Phase II Development		
Fire Station Expansion	=	0.00 trips
A. – Total Allowable Trips		**0.00 trips**
Approved/Constructed Phase II Development		
None		
B. – Total Approved Trips		0.00 trips
C. – Remaining Allowable Phase II Trips (A – B)		**0.00 trips**
Proposed Development Transfers		
114 Hotel Rooms x 3.53 trips/room (from DZ 7)		402.42 trips
5,000 sq. ft. Retail x 4.44 trips/ksf (from DZ 5)		22.20 trips
D. – Total Proposed Allowable Phase II Trips		***424.62 trips***
Proposed Development (Parcel OT)		
114-unit Retirement Facility x 0.17 trips/unit	=	19.38 trips
5,000 sq. ft. Retail x 4.44 trips/ksf	=	22.20 trips
E. – Net Proposed Project Trips		**41.58 trips**
Surplus DZ 6 Allowable Trips (C + (D – E))	**=**	**383.04 trips**

Please contact me if you have any questions.

Sincerely,

Jonathan Louie
Senior Transportation Planner

JL
C19620

Cc: Frank Hickman

APPENDIX H

Water Supply Will-Serve Letters and Fire Flow Availability Forms

LOS ANGELES COUNTY WATERWORKS DISTRICTS *

P. O. Box 1460
Alhambra, CA 91802
Telephone: (626) 300-3306

260 East Avenue K-8
Lancaster, CA 93535
Telephone: (661) 942-1157

23533 Civic Center Way
Malibu, CA 90265
Telephone: (310) 317-1388

TO:

☐ Los Angeles County
Department of Health Services
Environmental Health: Mtn. & Rural/
Water, Sewage & Subdivision Program
5050 Commerce Drive
Baldwin Park, CA 91706-1423

☐ Los Angeles County
Department of Public Works
Building & Safety Division

☐ Los Angeles County
Fire Department

☐ City of Lancaster
Building Department
44933 N. Fern Ave.
Lancaster, CA 93534

☒ City of Malibu
Building Department
23815 W. Stuart Ranch Rd.
Malibu, CA 90265

☐ City of Palmdale
Building Department
38300 N. Sierra Hwy.
Palmdale, CA 93550

4445 ADMIRALTY WAY	MARINA DEL REY	90292
Address	City	Zip Code

Assessor's Parcel Number

Los Angeles County Waterworks District No. 29
***Will serve* water to the above *single lot* property subject to the following conditions:**

☐ Annexation of the property into Los Angeles County Waterworks District is required. **Water service to this property will not be issued until the annexation is completed.**
☐ The appropriate fees must be paid to the District and other related water agencies.
☒ The appropriate connection fees have been paid to Waterworks Districts for the existing services.
☒ Water system improvements will be required to be installed by the developer subject to the requirements set by the Fire Department and the District.
☐ The service connection and water meter serving the property must be installed in accordance with Waterworks District standards.
☒ The property has an existing service connection and meter.
☒ Public water system and sewage disposal system must be in compliance with Health Department separation requirements.
☐ A portion of the existing fronting water main may be required to be replaced if the water service tap cannot be made or if damage occurs to the water main.
☒ Property may experience low water pressure and / or shortage in high demand periods.
☐ The District **CAN NOT** serve water to this property at this time.

By:	SHAWKY BAKHOUM, EA III	(310) 317-1389	05/22/2009
Signature	Print Name	Phone Number	Date

Rev. 03/05

THIS WILL SERVE LETTER WILL EXPIRE ONE YEAR AFTER THE DATE OF ISSUANCE.

LOS ANGELES COUNTY WATERWORKS DISTRICTS *

P. O. Box 1460
Alhambra, CA 91802
Telephone: (626) 300-3306

260 East Avenue K-8
Lancaster, CA 93535
Telephone: (661) 942-1157

23533 Civic Center Way
Malibu, CA 90265
Telephone: (310) 317-1388

TO:

☐ Los Angeles County
Department of Health Services
Environmental Health: Mtn. & Rural/
Water, Sewage & Subdivision Program
5050 Commerce Drive
Baldwin Park, CA 91706-1423

☐ Los Angeles County
Department of Public Works
Building & Safety Division

☐ Los Angeles County
Fire Department

☐ City of Lancaster
Building Department
44933 N. Fern Ave.
Lancaster, CA 93534

☒ City of Malibu
Building Department
23815 W. Stuart Ranch Rd.
Malibu, CA 90265

☐ City of Palmdale
Building Department
38300 N. Sierra Hwy.
Palmdale, CA 93550

14025 PANAY WAY	MARINA DEL REY	90292
Address	City	Zip Code

Assessor's Parcel Number

Los Angeles County Waterworks District No. 29
***Will serve* water to the above *single lot* property subject to the following conditions:**

- ☐ Annexation of the property into Los Angeles County Waterworks District is required. **Water service to this property will not be issued until the annexation is completed.**
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- ☒ The appropriate connection fees have been paid to Waterworks Districts for the existing services.
- ☒ Water system improvements will be required to be installed by the developer subject to the requirements set by the Fire Department and the District.
- ☐ The service connection and water meter serving the property must be installed in accordance with Waterworks District standards.
- ☒ The property has an existing service connection and meter.
- ☒ Public water system and sewage disposal system must be in compliance with Health Department separation requirements.
- ☐ A portion of the existing fronting water main may be required to be replaced if the water service tap cannot be made or if damage occurs to the water main.
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- ☐ The District **CAN NOT** serve water to this property at this time.

By:	SHAWKY BAKHOUM, EA III	(310) 317-1389	05/22/2009
Signature	Print Name	Phone Number	Date

Rev. 03/05

THIS WILL SERVE LETTER WILL EXPIRE ONE YEAR AFTER THE DATE OF ISSUANCE.

TOTAL P.02

FORM 196
Rev. 04/03

COUNTY OF LOS ANGELES FIRE DEPARTMENT
FIRE PREVENTION DIVISION

Fire Prevention Engineering
5823 Rickenbacker Road
Commerce, CA 90040
Telephone (323) 890-4125 Fax (323) 890-4129

Information on Fire Flow Availability for Building Permit

For All Buildings Other Than Single Family Dwellings (R-3)

INSTRUCTIONS:

Complete parts I, II (A) when:
Verifying fire flow, fire hydrant location and fire hydrant size.

Complete parts I, II (A), & II (B) when:
For buildings equipped with fire sprinkler systems, and/or private on-site fire hydrants.

PROJECT INFORMATION
(To Be Completed By Applicant)

PART I

Building Address: 4220 Admiralty Way (Parcel OT) SE side of Washington Blv
City or Area: Marina Del Rey
Nearest Cross Street: Washington Blvd.
Distance of Nearest Cross Street: Palawan Way
Applicant: Madonna Perry / S.E.C Eng Telephone: (818) 782-2788
Address: 16823 Saticoy St. FAX (818) 782-0111
City: Van Nuys, CA. 91406
Occupancy (Use of Building): Luxury Retirement Facility Sprinklered: Yes [X] No [ ]
Type of Construction: 4 Story type III over 1½ levels of public spaces & retail parking in a type 1 concrete podium
Square Footage: 165,865 Number of Stories: 4
Present Zoning: Commercial

Madonna Perry
Applicant's Signature

3-25-09
Date

FIRE HYDRANTS FLOWING SIMULTANEOUSLY

PART II-A **INFORMATION ON FIRE FLOW AVAILABILITY**
(To be completed by Water Purveyor)

Location SOUTH SIDE WASHINGTON BLVD, 63' EAST OF PALAWAN WAY (PVT STREET) Hydrant Number 28255

Distance from Nearest Property Line 10 FT Size of Hydrant 2½" x 4" DFH Size of Water main 12"

Static PSI MAX 92 Residual PSI 76 Orifice size 2½", 4" Pitot N/A

Fire Flow at 20 PSI 3000 GPM Duration CONTINUOUS Flow Test Date / Time HYDRAULIC MODEL

Location SOUTH SIDE WASHINGTON BLVD, 112' WEST OF WILSON AVE. Hydrant Number 28256

Distance from Nearest Property Line 10 FT Size of Hydrant 2½" x 4" Size of Water main 12"

Static PSI 92 Residual PSI 76 Orifice size 2½", 4" Pitot N/A

Fire Flow at 20 PSI 3000 GPM Duration CONTINUOUS Flow Test Date / Time HYDRAULIC MODEL

Location _____

_____ Hydrant Number _____

Distance from Nearest Property Line _____ Size of Hydrant _____ Size of Water main _____

Static PSI _____ Residual PSI _____ Orifice size _____ Pitot _____

Fire Flow at 20 PSI _____ Duration _____ Flow Test Date / Time _____

PART II-B **SPRINKLERED BUILDINGS/PRIVATE FIRE HYDRANTS ONLY**

Detector Location (check one) ☐ Above Grade ☐ Below Grade ☐ Either

Backflow Protection Required (Fire Sprinklers/Private Hydrant) (check one) ☐ Yes ☐ No

Minimum Type of Protection Required (check one) ☐ Single Check Detector Assembly

☐ Double Check Detector Assembly ☐ Reduced Pressure Principle Detector Assembly

---

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER - WATER SYSTEM
WATER DISTRIBUTION SERVICES
Water Purveyor

Michael R. Owens
Signature

MAR 26 2009
Date

WESTERN DISTRICT ENGINEER
Title

This Information is Considered Valid for Twelve Months

Fire Department approval of building plans shall be required prior to the issuance of a Building Permit by the jurisdictional Building Department. Any deficiencies in water systems will need to be resolved by the Fire Prevention Division only prior to this department's approval of building plans.

FORM 196
Rev 04/03

COUNTY OF LOS ANGELES FIRE DEPARTMENT
FIRE PREVENTION DIVISION

Fire Prevention Engineering
5823 Rickenbacker Road
Commerce, CA 90040
Telephone (323) 890-4125 Fax (323) 890-4129

Information on Fire Flow Availability for Building Permit

For All Buildings Other Than Single Family Dwellings (R-3)

INSTRUCTIONS:

Complete parts I, II (A) when:
Verifying fire flow, fire hydrant location and fire hydrant size.

Complete parts I, II (A), & II (B) when:
For buildings equipped with fire sprinkler systems, and/or private on-site fire hydrants.

PROJECT INFORMATION
(To Be Completed By Applicant)

PART I

Building Address: 14025 PANAY WAY

City or Area: MARINA DEL REY

Nearest Cross Street: VIA MARINA

Distance of Nearest Cross Street: 1000 ft.

Applicant: PRESTIGE HOMES Telephone: (310) 280 5010

Address: 5150 OVERLAND AVE.

City: CULVER CITY

Occupancy (Use of Building): MARINE COMMERCIAL Sprinklered: Yes ☒ No ☐

Type of Construction: TYPE I

Square Footage: 210,032 Number of Stories: 1 UNDER 4 VP

Present Zoning: MARINE COMMERCIAL

7/26/07

PART II-A **INFORMATION ON FIRE FLOW AVAILABILITY**
(To be completed by Water Purveyor)

Location ON PANAY WAY, IN FRONT OF 13953 PANAY WAY

Hydrant Number N.A.

Distance from Nearest Property Line 25'± Size of Hydrant 6X4X2½" Size of Water main 10"

Static PSI 101 Residual PSI 78 Orifice size N.A. Pitot N.A.

Fire Flow at 20 PSI 1,822 Duration 2 HRS. Flow Test Date / Time 8/16/07 - 14:00

Location _____

Hydrant Number _____

Distance from Nearest Property Line _____ Size of Hydrant _____ Size of Water main _____

Static PSI _____ Residual PSI _____ Orifice size _____ Pitot _____

Fire Flow at 20 PSI _____ Duration _____ Flow Test Date / Time _____

Location _____

Hydrant Number _____

Distance from Nearest Property Line _____ Size of Hydrant _____ Size of Water main _____

Static PSI _____ Residual PSI _____ Orifice size _____ Pitot _____

Fire Flow at 20 PSI _____ Duration _____ Flow Test Date / Time _____

PART II-B **SPRINKLERED BUILDINGS/PRIVATE FIRE HYDRANTS ONLY**

Detector Location (check one) ☐ Above Grade ☐ Below Grade ☐ Either

Backflow Protection Required (Fire Sprinklers/Private Hydrant) (check one) ☐ Yes ☐ No

Minimum Type of Protection Required (check one) ☐ Single Check Detector Assembly

☐ Double Check Detector Assembly ☐ Reduced Pressure Principle Detector Assembly

---

L.A.CO. WW. #29
Water Purveyor

Signature

8-23-07
Date

EA III
Title

This Information is Considered Valid for Twelve Months

Fire Department approval of building plans shall be required prior to the issuance of a Building Permit by the jurisdictional Building Department. Any deficiencies in water systems will need to be resolved by the Fire Prevention Division only prior to this department's approval of building plans.

Soil Sampling Analyses and Subsurface Methane Gas Investigation

APPENDIX I

ENVIROPRO, INC.
Comprehensive Environmental Services & Technology

RECEIVED
FEB 28 2006
CONSTRUCTION

February 17, 2006

Mr. Kirk Buteyn and Mr. Frank Hickman
Prestige Homes, Inc.
5150 Overland Avenue
Culver City, CA 90230

Project E0304123-1

Subject: Report on Parking Lot Soil Drilling and Sampling for the Property Known as Parcel OT, Marina Del Rey, California

Dear Mr. Buteyn and Mr. Hickman:

Attached is our report for the subject project. The report summarizes the results of our soil sampling and chemical analyses conducted as per scope of work we agreed upon in the field on the day of drilling. The summary section describes the fieldwork activities and analytical methods used for the site assessment - and also presents a summary of our findings. The soil samples were collected from the site on January 23, 2006, and the analytical work was performed by American Analytics, Inc., a state-certified laboratory. A copy of the complete analytical report for all tests conducted is attached as Appendix B.

If you have any questions about the subject report, please call us at 818-998-7197. It was a pleasure to work with you and be of service to your organization, and we very much appreciate your business.

Sincerely,

ENVIROPRO, INC.

Michael M. Uziel, Ph.D.
Vice President

MMU/djs

DESCRIPTION OF THE WORK

Soil drilling and sampling were performed on Parcel OT, commonly known as the public parking lot adjacent to the Marina International Hotel located at 4200 Admiralty Way, in Marina Del Rey, California. The subject site is rectangular in shape and approximately 1.6 acres in size. The site is used as an automobile parking lot.

This project consisted of a field boring and soil sampling program and associated chemical analyses. The chemical analyses were performed by American Analytics, Inc. Refer to the Site Plan (Figure 1, Appendix A) for an overview of the site layout and specific soil sampling locations. Drilling depths were seven (7) feet for locations 1 through 6 and approximately 14-15 feet for locations 7 and 8, which were also used to measure groundwater depths. Locations 7 and 8 are about one foot separated from locations 5 and 8 respectively.

Eight (8) Soil samples (identified as PSL-1 through PSL-8) were collected from the site on January 23, 2006, using a Geoprobe sampling rig. The samples were prepared, identified and taken to American Analytics laboratory for chemical tests under California EPA procedures. Since the site is an old landfill, there is not specific information on the materials stored in it. Therefore, we analyzed for priority pollutants that may render the fill toxic waste if excavated for disposal. We have analyzed for the following:

1. CAM heavy metals, less Hg, by EPA 6000/7000

2. Volatile organic compounds by EPA 8260B

3. Semi-volatile organic compounds by EPA 8270C

4. Pesticides:
   - Organic chlorine pesticides by EPA 8081A
   - Herbicides by EPA 8151A

5. TPH gas and fuel oxygenates by EPA 8260B/5035

6. Carbon chain characterization by EPA 8015M

7. Total mercury by EPA 7470/7471A

All of our analytical test results are attached as an appendix to this report (Appendix B). Most analytical results are not high enough for rendering the materials hazardous waste, if excavated. Figure 2 visually summarizes the relevant chemical concentrations detected at different depths from the borings in which contaminants were found.

Our test results show that several samples had detectable levels of certain metals, volatile organic compounds, pesticides, and petroleum based compounds considered as regulated contaminants. The primary contaminants of concern included elevated levels of lead and copper. For the most part, the detectable concentrations were below residential "Preliminary Remediation Goals" (PRG) used as regulatory guidelines, with the exception of high levels of lead. However, the PRG guidelines are very general and must be applied judiciously on a case-by-case basis according to site specific considerations. Of more importance is that several sample test results exceeded a figure of 10 times their respective "Solubility Threshold Level Concentration" or STLC. This result indicates that some of the soils would be classified

as hazardous. Additional STLC tests could be conducted to confirm and better define the extent of the hazardous waste, if desired.

Groundwater samples were not part of the subject scope of work. However, groundwater was measured at 14 to 15 feet below the ground surface (bgs). This should be evaluated in measuring the elevation of the site, and the adjacent water surface at the lagoon to the northeast and the ocean marina to the south. Groundwater elevations should also be evaluated in reference to the tides.

LIST OF APPENDICES

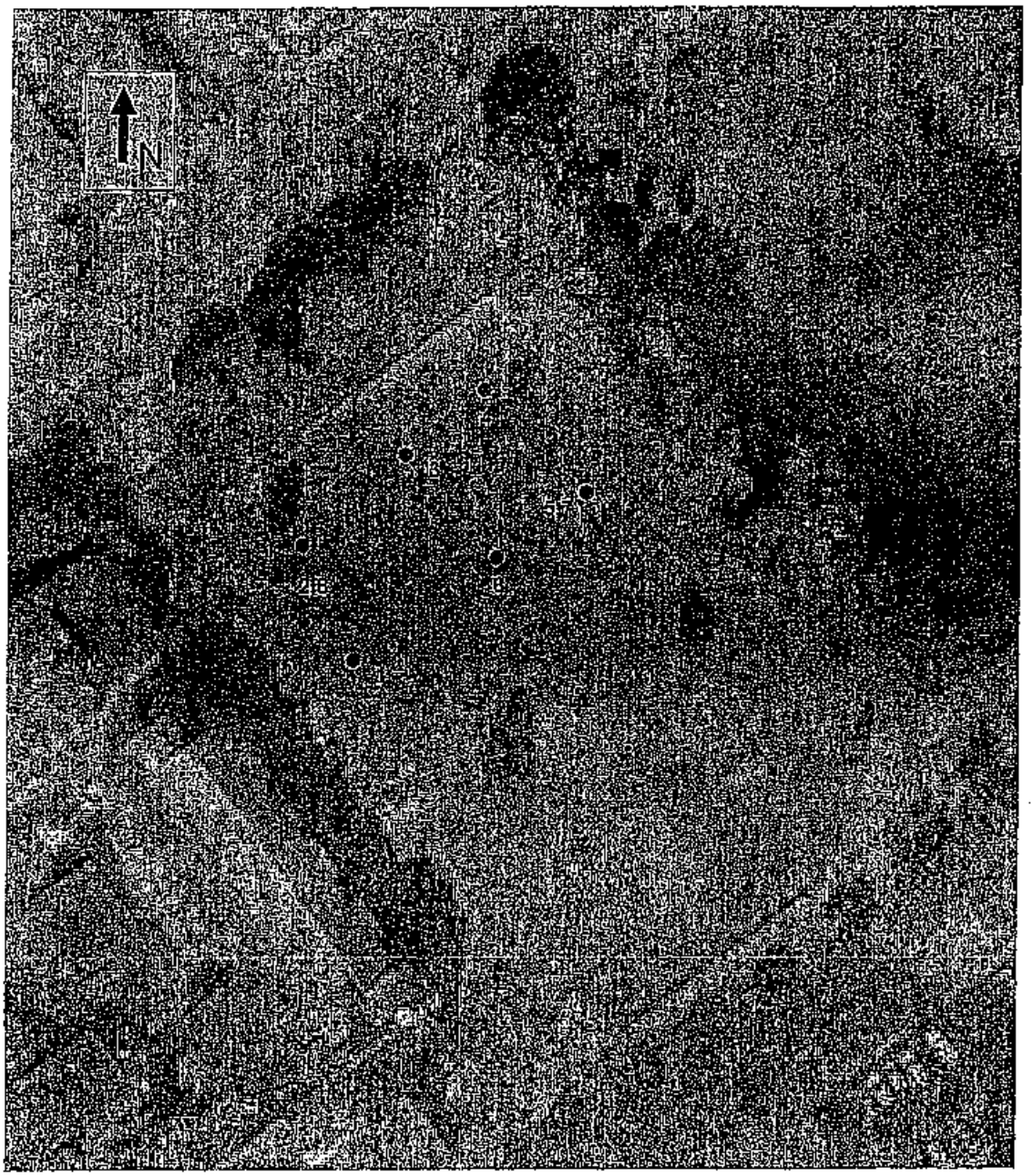
Appendix A: Figures 1 and 2

Appendix B: Detailed Laboratory Reports

APPENDIX A

Figures 1 and 2

FIGURE 1 SITE LAYOUT

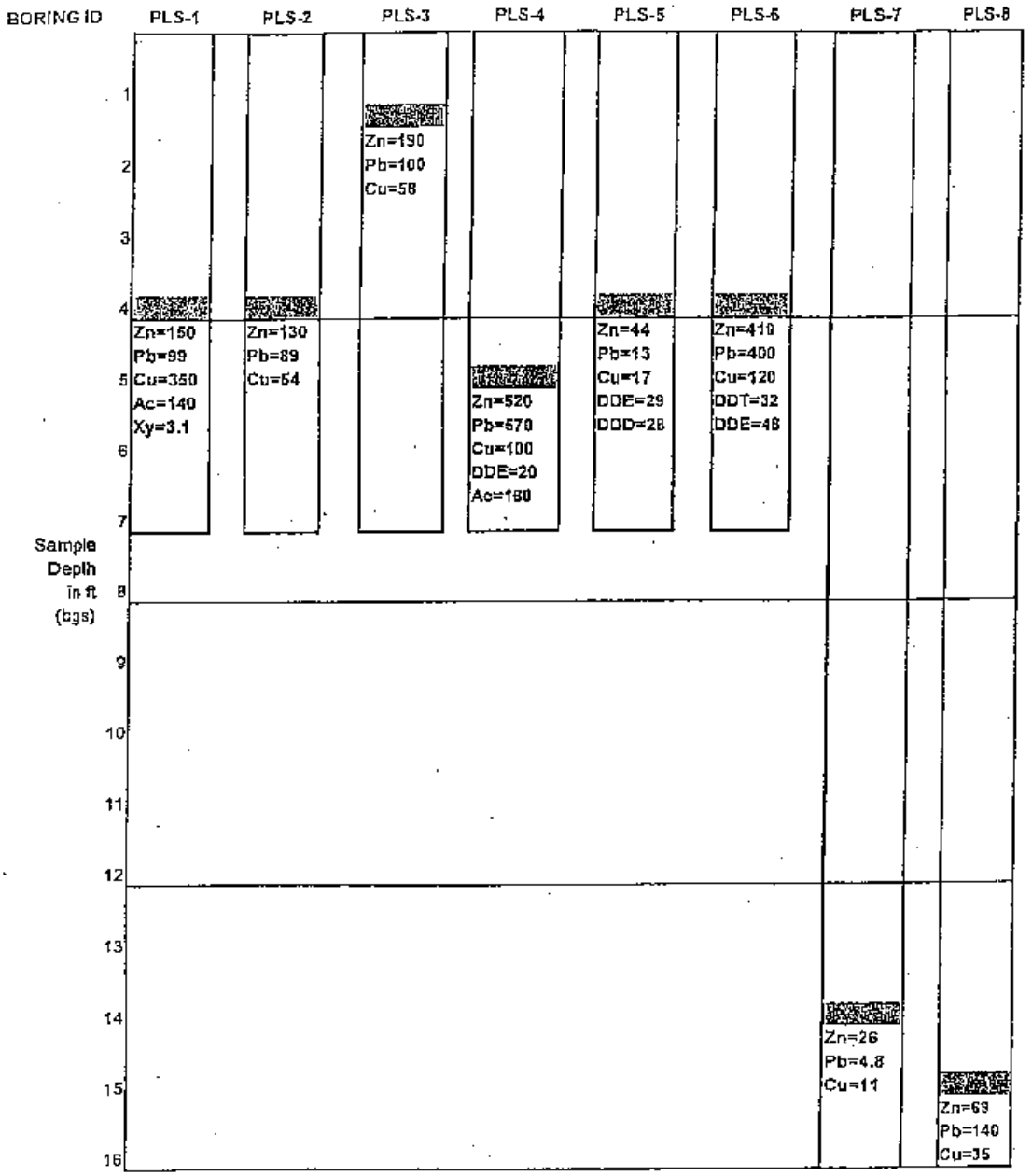


● X INDICATES APPROXIMATE DRILLING LOCATIONS

Prestige Homes, Inc. Mr. Kirk Buteyn

FIGURE 2

Borings and depth locations where soil samples had detectable concentrations of certain contaminants as follows:
1) Metals : Cu=Copper, Pb=Lead, Zn=Zinc (all in milligrams/kg)
2) VOC's & TPH-gas: Ac=Acetone, Xy=Xylene (all in micrograms/kg)
3) Pesticides & Herbicides: DDD, DDE, and DDT (all in micrograms/kg)



Appendix B

Detailed Laboratory Reports

AMERICAN ANALYTICS

9765 Eton Avenue
Chatsworth
California 91311
Tel: (818) 998-5547
Fax: (818) 998-7258

February 02, 2006

Mike Uziel

Enviropro Inc

9765 ETON AVE

CHATSWORTH, CA 91311

Re : Admiralty Construction / E0304123-1

MB1011717 / 6A24002

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received on 01/23/06 16:23 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Assurance Program Manual, applicable standard operating procedures, and other related documentation. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report or require additional information please call me at American Analytics.

Sincerely,

Allen Aminian

QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
8081A OCPs					
PLS-1-4	6A24002-01	Soil	5	01/23/06 08:30	01/23/06 16:23
PLS-2-4	6A24002-02	Soil	5	01/23/06 09:00	01/23/06 16:23
PLS-3-2	6A24002-03	Soil	5	01/23/06 09:35	01/23/06 16:23
PLS-4-5	6A24002-04	Soil	5	01/23/06 10:00	01/23/06 16:23
PLS-5-4	6A24002-05	Soil	5	01/23/06 10:20	01/23/06 16:23
PLS-6-4	6A24002-06	Soil	5	01/23/06 11:00	01/23/06 16:23
PLS-7-14	6A24002-07	Soil	5	01/23/06 13:15	01/23/06 16:23
PLS-8-15	6A24002-08	Soil	5	01/23/06 14:00	01/23/06 16:23
8151A Herbicides					
PLS-1-4	6A24002-01	Soil	5	01/23/06 08:30	01/23/06 16:23
PLS-2-4	6A24002-02	Soil	5	01/23/06 09:00	01/23/06 16:23
PLS-3-2	6A24002-03	Soil	5	01/23/06 09:35	01/23/06 16:23
PLS-4-5	6A24002-04	Soil	5	01/23/06 10:00	01/23/06 16:23
PLS-5-4	6A24002-05	Soil	5	01/23/06 10:20	01/23/06 16:23
PLS-6-4	6A24002-06	Soil	5	01/23/06 11:00	01/23/06 16:23
PLS-7-14	6A24002-07	Soil	5	01/23/06 13:15	01/23/06 16:23

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
PLS-8-15	6A24002-08	Soil	5	01/23/06 14:00	01/23/06 16:23
8260B/5035 Soil+OXY+TPHG					
PLS-1-4	6A24002-01	Soil	5	01/23/06 08:30	01/23/06 16:23
PLS-2-4	6A24002-02	Soil	5	01/23/06 09:00	01/23/06 16:23
PLS-3-2	6A24002-03	Soil	5	01/23/06 09:35	01/23/06 16:23
PLS-4-5	6A24002-04	Soil	5	01/23/06 10:00	01/23/06 16:23
PLS-5-4	6A24002-05	Soil	5	01/23/06 10:20	01/23/06 16:23
PLS-6-4	6A24002-06	Soil	5	01/23/06 11:00	01/23/06 16:23
PLS-7-14	6A24002-07	Soil	5	01/23/06 13:15	01/23/06 16:23
PLS-8-15	6A24002-08	Soil	5	01/23/06 14:00	01/23/06 16:23
8270C					
PLS-1-4	6A24002-01	Soil	5	01/23/06 08:30	01/23/06 16:23
PLS-2-4	6A24002-02	Soil	5	01/23/06 09:00	01/23/06 16:23
PLS-3-2	6A24002-03	Soil	5	01/23/06 09:35	01/23/06 16:23
PLS-4-5	6A24002-04	Soil	5	01/23/06 10:00	01/23/06 16:23
PLS-5-4	6A24002-05	Soil	5	01/23/06 10:20	01/23/06 16:23
PLS-6-4	6A24002-06	Soil	5	01/23/06 11:00	01/23/06 16:23

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
PLS-7-14	6A24002-07	Soil	5	01/23/06 13:15	01/23/06 16:23
PLS-8-15	6A24002-08	Soil	5	01/23/06 14:00	01/23/06 16:23
CAM Metals Less Hg 6000/7000					
PLS-1-4	6A24002-01	Soil	5	01/23/06 08:30	01/23/06 16:23
PLS-2-4	6A24002-02	Soil	5	01/23/06 09:00	01/23/06 16:23
PLS-3-2	6A24002-03	Soil	5	01/23/06 09:35	01/23/06 16:23
PLS-4-5	6A24002-04	Soil	5	01/23/06 10:00	01/23/06 16:23
PLS-5-4	6A24002-05	Soil	5	01/23/06 10:20	01/23/06 16:23
PLS-6-4	6A24002-06	Soil	5	01/23/06 11:00	01/23/06 16:23
PLS-7-14	6A24002-07	Soil	5	01/23/06 13:15	01/23/06 16:23
PLS-8-15	6A24002-08	Soil	5	01/23/06 14:00	01/23/06 16:23
Carbon Chain Characterization 8015M					
PLS-1-4	6A24002-01	Soil	5	01/23/06 08:30	01/23/06 16:23
PLS-2-4	6A24002-02	Soil	5	01/23/06 09:00	01/23/06 16:23
PLS-3-2	6A24002-03	Soil	5	01/23/06 09:35	01/23/06 16:23
PLS-4-5	6A24002-04	Soil	5	01/23/06 10:00	01/23/06 16:23
PLS-5-4	6A24002-05	Soil	5	01/23/06 10:20	01/23/06 16:23

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
PLS-6-4	6A24002-06	Soil	5	01/23/06 11:00	01/23/06 16:23
PLS-7-14	6A24002-07	Soil	5	01/23/06 13:15	01/23/06 16:23
PLS-8-15	6A24002-08	Soil	5	01/23/06 14:00	01/23/06 16:23
Mercury Total EPA 7470A/7471A					
PLS-1-4	6A24002-01	Soil	5	01/23/06 08:30	01/23/06 16:23
PLS-2-4	6A24002-02	Soil	5	01/23/06 09:00	01/23/06 16:23
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PLS-5-4	6A24002-05	Soil	5	01/23/06 10:20	01/23/06 16:23
PLS-6-4	6A24002-06	Soil	5	01/23/06 11:00	01/23/06 16:23
PLS-7-14	6A24002-07	Soil	5	01/23/06 13:15	01/23/06 16:23
PLS-8-15	6A24002-08	Soil	5	01/23/06 14:00	01/23/06 16:23

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction
Sample Matrix: Soil
Method: Semivolatile Organics by GC/MS

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06
Units: mg/kg

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/27/06	01/27/06	01/27/06	01/27/06	
AA ID No:	6A24002-01	6A24002-02	6A24002-03	6A24002-04	
Client ID No:	PLS-1-4	PLS-2-4	PLS-3-2	PLS-4-5	
Dilution Factor:	10	10	1	10	MRL
8270C (EPA 8270C)					
3,3'-Dichlorobenzidine	<4.0	<4.0	<0.40	<4.0	0.40
Acenaphthene	<1.0	<1.0	<0.10	<1.0	0.10
Acenaphthylene	<1.0	<1.0	<0.10	<1.0	0.10
Aniline	<2.0	<2.0	<0.20	<2.0	0.20
Anthracene	<1.0	<1.0	<0.10	<1.0	0.10
Azobenzene	<1.0	<1.0	<0.10	<1.0	0.10
Benzidine	<4.0	<4.0	<0.40	<4.0	0.40
Benzo(a)anthracene	<1.0	<1.0	<0.10	<1.0	0.10
Benzo(a)pyrene	<1.0	<1.0	<0.10	<1.0	0.10
Benzo(b)fluoranthene	<1.0	<1.0	<0.10	<1.0	0.10
Benzo(g,h,i)perylene	<1.0	<1.0	<0.10	<1.0	0.10
Benzoic acid	<10	<10	<1.0	<10	1.0
Benzo(k)fluoranthene	<1.0	<1.0	<0.10	<1.0	0.10
Benzyl alcohol	<1.0	<1.0	<0.10	<1.0	0.10
4-Bromophenyl phenyl ether	<1.0	<1.0	<0.10	<1.0	0.10
Butyl benzyl phthalate	<5.0	<5.0	<0.50	<5.0	0.50
4-Chloro-3-methylphenol	<2.0	<2.0	<0.20	<2.0	0.20
4-Chloroaniline	<4.0	<4.0	<0.40	<4.0	0.40
Bis(2-chloroethoxy)methane	<1.0	<1.0	<0.10	<1.0	0.10
Bis(2-chloroethyl)ether	<1.0	<1.0	<0.10	<1.0	0.10
Bis(2-chloroisopropyl)ether	<1.0	<1.0	<0.10	<1.0	0.10
2-Chloronaphthalene	<1.0	<1.0	<0.10	<1.0	0.10
2-Chlorophenol	<1.0	<1.0	<0.10	<1.0	0.10
4-Chlorophenyl phenyl ether	<1.0	<1.0	<0.10	<1.0	0.10
Chrysene	<1.0	<1.0	<0.10	<1.0	0.10
Dibenzo(a,h)anthracene	<1.0	<1.0	<0.10	<1.0	0.10
Dibenzofuran	<1.0	<1.0	<0.10	<1.0	0.10

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011717
Project No:	E0304123-1	Date Received:	01/23/06
Project Name:	Admiralty Construction	Date Reported:	02/02/06
Sample Matrix:	Soil	Units:	mg/kg
Method:	Semivolatile Organics by GC/MS		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/27/06	01/27/06	01/27/06	01/27/06	
AA ID No:	6A24002-01	6A24002-02	6A24002-03	6A24002-04	
Client ID No:	PLS-1-4	PLS-2-4	PLS-3-2	PLS-4-5	
Dilution Factor:	10	10	1	10	MRL
8270C (EPA 8270C) (continued)					
Di-n-butyl phthalate	<20	<20	<2.0	<20	2.0
1,2-Dichlorobenzene	<1.0	<1.0	<0.10	<1.0	0.10
1,3-Dichlorobenzene	<1.0	<1.0	<0.10	<1.0	0.10
1,4-Dichlorobenzene	<1.0	<1.0	<0.10	<1.0	0.10
2,4-Dichlorophenol	<1.0	<1.0	<0.10	<1.0	0.10
Diethyl phthalate	<8.0	<8.0	<0.80	<8.0	0.80
2,4-Dimethylphenol	<1.0	<1.0	<0.10	<1.0	0.10
Dimethyl phthalate	<2.0	<2.0	<0.20	<2.0	0.20
4,6-Dinitro-2-methylphenol	<2.0	<2.0	<0.20	<2.0	0.20
2,4-Dinitrophenol	<4.0	<4.0	<0.40	<4.0	0.40
2,6-Dinitrotoluene	<1.0	<1.0	<0.10	<1.0	0.10
2,4-Dinitrotoluene	<1.0	<1.0	<0.10	<1.0	0.10
Di-n-octyl phthalate	<1.0	<1.0	<0.10	<1.0	0.10
1,2-Diphenylhydrazine	<1.0	<1.0	<0.10	<1.0	0.10
Bis(2-ethylhexyl)phthalate	<2.0	<2.0	<0.20	<2.0	0.20
Fluoranthene	<1.0	<1.0	<0.10	<1.0	0.10
Fluorene	<1.0	<1.0	<0.10	<1.0	0.10
Hexachlorobenzene	<1.0	<1.0	<0.10	<1.0	0.10
Hexachlorobutadiene	<1.0	<1.0	<0.10	<1.0	0.10
Hexachlorocyclopentadiene	<1.0	<1.0	<0.10	<1.0	0.10
Hexachloroethane	<1.0	<1.0	<0.10	<1.0	0.10
Indeno (1,2,3-cd) pyrene	<4.0	<4.0	<0.40	<4.0	0.40
Isophorone	<1.0	<1.0	<0.10	<1.0	0.10
2-Methylnaphthalene	<1.0	<1.0	<0.10	<1.0	0.10
2-Methylphenol	<2.0	<2.0	<0.20	<2.0	0.20
3-Methylphenol	<2.0	<2.0	<0.20	<2.0	0.20
4-Methylphenol	<2.0	<2.0	<0.20	<2.0	0.20

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	**AA Project No:**	MB1011717
Project No:	E0304123-1	**Date Received:**	01/23/06
Project Name:	Admiralty Construction	**Date Reported:**	02/02/06
Sample Matrix:	Soil	**Units:**	mg/kg
Method:	Semivolatile Organics by GC/MS		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/27/06	01/27/06	01/27/06	01/27/06	
AA ID No:	6A24002-01	6A24002-02	6A24002-03	6A24002-04	
Client ID No:	PLS-1-4	PLS-2-4	PLS-3-2	PLS-4-5	
Dilution Factor:	10	10	1	10	MRL
8270C (EPA 8270C) (continued)					
Naphthalene	<1.0	<1.0	<0.10	<1.0	0.10
4-Nitroaniline	<5.0	<5.0	<0.50	<5.0	0.50
3-Nitroaniline	<4.0	<4.0	<0.40	<4.0	0.40
2-Nitroaniline	<1.0	<1.0	<0.10	<1.0	0.10
Nitrobenzene	<1.0	<1.0	<0.10	<1.0	0.10
2-Nitrophenol	<2.0	<2.0	<0.20	<2.0	0.20
4-Nitrophenol	<2.0	<2.0	<0.20	<2.0	0.20
N-Nitrosodimethylamine	<1.0	<1.0	<0.10	<1.0	0.10
N-Nitrosodiphenylamine	<1.0	<1.0	<0.10	<1.0	0.10
N-Nitrosodi-n-propylamine	<1.0	<1.0	<0.10	<1.0	0.10
Pentachlorophenol	<1.0	<1.0	<0.10	<1.0	0.10
Phenanthrene	<1.0	<1.0	<0.10	<1.0	0.10
Phenol	<1.0	<1.0	<0.10	<1.0	0.10
Pyrene	<1.0	<1.0	<0.10	<1.0	0.10
1,2,4-Trichlorobenzene	<1.0	<1.0	<0.10	<1.0	0.10
2,4,5-Trichlorophenol	<2.0	<2.0	<0.20	<2.0	0.20
2,4,6-Trichlorophenol	<2.0	<2.0	<0.20	<2.0	0.20
Surrogates					**%REC Limits**
2-Fluorobiphenyl	87.6%	82.8%	51.3%	73.2%	43-116
2-Fluorophenol	55.5%	53.5%	37.8%	48.9%	21-100
Nitrobenzene-d5	65.8%	62.8%	46.3%	54.2%	35-134
Phenol-d6	60.0%	59.0%	38.4%	48.9%	10-94
Terphenyl-d14	106%	108%	53.2%	90.8%	33-141
2,4,6-Tribromophenol	41.6%	50.0%	5.70% [3]	33.5%	10-123

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011717
Project No:	E0304123-1	Date Received:	01/23/06
Project Name:	Admiralty Construction	Date Reported:	02/02/06
Sample Matrix:	Soil	Units:	mg/kg
Method:	Semivolatile Organics by GC/MS		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/27/06	01/27/06	01/27/06	01/27/06	
AA ID No:	6A24002-05	6A24002-06	6A24002-07	6A24002-08	
Client ID No:	PLS-5-4	PLS-6-4	PLS-7-14	PLS-8-15	
Dilution Factor:	1	10	1	1	MRL
8270C (EPA 8270C)					
3,3'-Dichlorobenzidine	<0.40	<4.0	<0.40	<0.40	0.40
Acenaphthene	<0.10	<1.0	<0.10	<0.10	0.10
Acenaphthylene	<0.10	<1.0	<0.10	<0.10	0.10
Aniline	<0.20	<2.0	<0.20	<0.20	0.20
Anthracene	<0.10	<1.0	<0.10	<0.10	0.10
Azobenzene	<0.10	<1.0	<0.10	<0.10	0.10
Benzidine	<0.40	<4.0	<0.40	<0.40	0.40
Benzo(a)anthracene	<0.10	<1.0	<0.10	<0.10	0.10
Benzo(a)pyrene	<0.10	<1.0	<0.10	<0.10	0.10
Benzo(b)fluoranthene	<0.10	<1.0	<0.10	<0.10	0.10
Benzo(g,h,i)perylene	<0.10	<1.0	<0.10	<0.10	0.10
Benzoic acid	<1.0	<10	<1.0	<1.0	1.0
Benzo(k)fluoranthene	<0.10	<1.0	<0.10	<0.10	0.10
Benzyl alcohol	<0.10	<1.0	<0.10	<0.10	0.10
4-Bromophenyl phenyl ether	<0.10	<1.0	<0.10	<0.10	0.10
Butyl benzyl phthalate	<0.50	<5.0	<0.50	<0.50	0.50
4-Chloro-3-methylphenol	<0.20	<2.0	<0.20	<0.20	0.20
4-Chloroaniline	<0.40	<4.0	<0.40	<0.40	0.40
Bis(2-chloroethoxy)methane	<0.10	<1.0	<0.10	<0.10	0.10
Bis(2-chloroethyl)ether	<0.10	<1.0	<0.10	<0.10	0.10
Bis(2-chloroisopropyl)ether	<0.10	<1.0	<0.10	<0.10	0.10
2-Chloronaphthalene	<0.10	<1.0	<0.10	<0.10	0.10
2-Chlorophenol	<0.10	<1.0	<0.10	<0.10	0.10
4-Chlorophenyl phenyl ether	<0.10	<1.0	<0.10	<0.10	0.10
Chrysene	<0.10	<1.0	<0.10	<0.10	0.10
Dibenzo(a,h)anthracene	<0.10	<1.0	<0.10	<0.10	0.10
Dibenzofuran	<0.10	<1.0	<0.10	<0.10	0.10

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011717
Project No:	E0304123-1	Date Received:	01/23/06
Project Name:	Admiralty Construction	Date Reported:	02/02/06
Sample Matrix:	Soil	Units:	mg/kg
Method:	Semivolatile Organics by GC/MS		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/27/06	01/27/06	01/27/06	01/27/06	
AA ID No:	6A24002-05	6A24002-06	6A24002-07	6A24002-08	
Client ID No:	PLS-5-4	PLS-5-4	PLS-7-14	PLS-8-15	
Dilution Factor:	1	10	1	1	MRL
8270C (EPA 8270C) (continued)					
Di-n-butyl phthalate	<2.0	<20	<2.0	<2.0	2.0
1,2-Dichlorobenzene	<0.10	<1.0	<0.10	<0.10	0.10
1,3-Dichlorobenzene	<0.10	<1.0	<0.10	<0.10	0.10
1,4-Dichlorobenzene	<0.10	<1.0	<0.10	<0.10	0.10
2,4-Dichlorophenol	<0.10	<1.0	<0.10	<0.10	0.10
Diethyl phthalate	<0.80	<8.0	<0.80	<0.80	0.80
2,4-Dimethylphenol	<0.10	<1.0	<0.10	<0.10	0.10
Dimethyl phthalate	<0.20	<2.0	<0.20	<0.20	0.20
4,6-Dinitro-2-methylphenol	<0.20	<2.0	<0.20	<0.20	0.20
2,4-Dinitrophenol	<0.40	<4.0	<0.40	<0.40	0.40
2,6-Dinitrotoluene	<0.10	<1.0	<0.10	<0.10	0.10
2,4-Dinitrotoluene	<0.10	<1.0	<0.10	<0.10	0.10
Di-n-octyl phthalate	<0.10	<1.0	<0.10	<0.10	0.10
1,2-Diphenylhydrazine	<0.10	<1.0	<0.10	<0.10	0.10
Bis(2-ethylhexyl)phthalate	<0.20	<2.0	<0.20	<0.20	0.20
Fluoranthene	<0.10	<1.0	<0.10	<0.10	0.10
Fluorene	<0.10	<1.0	<0.10	<0.10	0.10
Hexachlorobenzene	<0.10	<1.0	<0.10	<0.10	0.10
Hexachlorobutadiene	<0.10	<1.0	<0.10	<0.10	0.10
Hexachlorocyclopentadiene	<0.10	<1.0	<0.10	<0.10	0.10
Hexachloroethane	<0.10	<1.0	<0.10	<0.10	0.10
Indeno (1,2,3-cd) pyrene	<0.40	<4.0	<0.40	<0.40	0.40
Isophorone	<0.10	<1.0	<0.10	<0.10	0.10
2-Methylnaphthalene	<0.10	<1.0	<0.10	<0.10	0.10
2-Methylphenol	<0.20	<2.0	<0.20	<0.20	0.20
3-Methylphenol	<0.20	<2.0	<0.20	<0.20	0.20
4-Methylphenol	<0.20	<2.0	<0.20	<0.20	0.20

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction
Sample Matrix: Soil
Method: Semivolatile Organics by GC/MS

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06
Units: mg/kg

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/27/06	01/27/06	01/27/06	01/27/06	
AA ID No:	6A24002-05	6A24002-06	6A24002-07	6A24002-08	
Client ID No:	PLS-5-4	PLS-6-4	PLS-7-14	PLS-8-15	
Dilution Factor:	1	10	1	1	MRL
8270C (EPA 8270C) (continued)					
Naphthalene	<0.10	<1.0	<0.10	<0.10	0.10
4-Nitroaniline	<0.50	<5.0	<0.50	<0.50	0.50
3-Nitroaniline	<0.40	<4.0	<0.40	<0.40	0.40
2-Nitroaniline	<0.10	<1.0	<0.10	<0.10	0.10
Nitrobenzene	<0.10	<1.0	<0.10	<0.10	0.10
2-Nitrophenol	<0.20	<2.0	<0.20	<0.20	0.20
4-Nitrophenol	<0.20	<2.0	<0.20	<0.20	0.20
N-Nitrosodimethylamine	<0.10	<1.0	<0.10	<0.10	0.10
N-Nitrosodiphenylamine	<0.10	<1.0	<0.10	<0.10	0.10
N-Nitrosodi-n-propylamine	<0.10	<1.0	<0.10	<0.10	0.10
Pentachlorophenol	<0.10	<1.0	<0.10	<0.10	0.10
Phenanthrene	<0.10	<1.0	<0.10	<0.10	0.10
Phenol	<0.10	<1.0	<0.10	<0.10	0.10
Pyrene	<0.10	<1.0	<0.10	<0.10	0.10
1,2,4-Trichlorobenzene	<0.10	<1.0	<0.10	<0.10	0.10
2,4,5-Trichlorophenol	<0.20	<2.0	<0.20	<0.20	0.20
2,4,6-Trichlorophenol	<0.20	<2.0	<0.20	<0.20	0.20
Surrogates					%REC Limits
2-Fluorobiphenyl	53.1%	84.8%	48.2%	49.8%	43-116
2-Fluorophenol	35.7%	55.0%	33.8%	36.7%	21-100
Nitrobenzene-d5	50.6%	62.6%	43.1%	46.3%	35-134
Phenol-d6	40.7%	57.0%	36.2%	39.2%	10-94
Terphenyl-d14	54.6%	113%	53.1%	56.9%	33-141
2,4,6-Tribromophenol	21.9%	32.7%	3.26% [3]	6.60% [3]	10-123

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction
Sample Matrix: Soil
Method: Organochlorine Pesticides by GC

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06
Units: ug/kg

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/26/06	01/26/06	01/26/06	01/26/06	
AA ID No:	6A24002-01	6A24002-02	6A24002-03	6A24002-04	
Client ID No:	PLS-1-4	PLS-2-4	PLS-3-2	PLS-4-5	
Dilution Factor:	5	5	5	5	MRL
8081A OCPs (EPA 8081A)					
4,4'-DDD	<20	<20	<20	<20	4.0
4,4'-DDE	<20	<20	<20	20	4.0
4,4'-DDT	<20	<20	<20	<20	4.0
Aldrin	<10	<10	<10	<10	2.0
beta-BHC	<10	<10	<10	<10	2.0
delta-BHC	<10	<10	<10	<10	2.0
alpha-BHC	<10	<10	<10	<10	2.0
gamma-BHC (Lindane)	<20	<20	<20	<20	4.0
gamma-Chlordane	<20	<20	<20	<20	4.0
alpha-Chlordane	<20	<20	<20	<20	4.0
Chlordane	<100	<100	<100	<100	20
Dieldrin	<20	<20	<20	<20	4.0
Endosulfan I	<10	<10	<10	<10	2.0
Endosulfan II	<20	<20	<20	<20	4.0
Endosulfan sulfate	<20	<20	<20	<20	4.0
Endrin	<20	<20	<20	<20	4.0
Endrin aldehyde	<20	<20	<20	<20	4.0
Endrin ketone	<20	<20	<20	<20	4.0
Heptachlor	<10	<10	<10	<10	2.0
Heptachlor epoxide	<10	<10	<10	<10	2.0
Methoxychlor	<100	<100	<100	<100	20
Toxaphene	<500	<500	<500	<500	100
Surrogates					**%REC Limits**
Tetrachloro-meta-xylene	115%	85.0%	73.0%	101%	50-150

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	**AA Project No:**	MB1011717
Project No:	E0304123-1	**Date Received:**	01/23/06
Project Name:	Admiralty Construction	**Date Reported:**	02/02/06
Sample Matrix:	Soil	**Units:**	ug/kg
Method:	Organochlorine Pesticides by GC		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/26/06	01/26/06	01/26/06	01/26/06	
AA ID No:	6A24002-05	6A24002-06	6A24002-07	6A24002-08	
Client ID No:	PLS-5-4	PLS-6-4	PLS-7-14	PLS-8-15	
Dilution Factor:	5	5	10	1	MRL
8081A OCPs (EPA 8081A)					
4,4'-DDD	28	<20	<40	<4.0	4.0
4,4'-DDE	29	48	<40	<4.0	4.0
4,4'-DDT	<20	32	<40	<4.0	4.0
Aldrin	<10	<10	<20	<2.0	2.0
beta-BHC	<10	<10	<20	<2.0	2.0
delta-BHC	<10	<10	<20	<2.0	2.0
alpha-BHC	<10	<10	<20	<2.0	2.0
gamma-BHC (Lindane)	<20	<20	<40	<4.0	4.0
gamma-Chlordane	<20	<20	<40	<4.0	4.0
alpha-Chlordane	<20	<20	<40	<4.0	4.0
Chlordane	<100	<100	<200	<20	20
Dieldrin	<20	<20	<40	<4.0	4.0
Endosulfan I	<10	<10	<20	<2.0	2.0
Endosulfan II	<20	<20	<40	<4.0	4.0
Endosulfan sulfate	<20	<20	<40	<4.0	4.0
Endrin	<20	<20	<40	<4.0	4.0
Endrin aldehyde	<20	<20	<40	<4.0	4.0
Endrin ketone	<20	<20	<40	<4.0	4.0
Heptachlor	<10	<10	<20	<2.0	2.0
Heptachlor epoxide	<10	<10	<20	<2.0	2.0
Methoxychlor	<100	<100	<200	<20	20
Toxaphene	<500	<500	<1000	<100	100
Surrogates					**%REC Limits**
Tetrachloro-meta-xylene	81.0%	93.0%	66.0%	65.8%	50-150

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011717
Project No:	E0304123-1	Date Received:	01/23/06
Project Name:	Admiralty Construction	Date Reported:	02/02/06
Sample Matrix:	Soil	Units:	ug/kg
Method:	Herbicides by EPA 8151A		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/26/06	01/26/06	01/26/06	01/26/06	
Date Analyzed:	01/30/06	01/30/06	01/30/06	01/30/06	
AA ID No:	6A24002-01	6A24002-02	6A24002-03	6A24002-04	
Client ID No:	PLS-1-4	PLS-2-4	PLS-3-2	PLS-4-5	
Dilution Factor:	1	1	1	1	MRL
8151A Herbicides (EPA 8151A)					
Dalapon	<5.5 [1]	<5.5 [1]	<5.5 [1]	<5.5 [1]	5.5
Dicamba	<1.5 [1]	<1.5 [1]	<1.5 [1]	<1.5 [1]	1.5
Dichloroprop	<1.5 [1]	<1.5 [1]	<1.5 [1]	<1.5 [1]	1.5
Dinoseb	<2.0 [1]	<2.0 [1]	<2.0 [1]	<2.0 [1]	2.0
MCPA	<250 [1]	<250 [1]	<250 [1]	<250 [1]	250
MCPP	<250 [1]	<250 [1]	<250 [1]	<250 [1]	250
4-Nitrophenol	<6.0 [1]	<6.0 [1]	<6.0 [1]	<6.0 [1]	6.0
Pentachlorophenol	<1.0 [1]	<1.0 [1]	<1.0 [1]	<1.0 [1]	1.0
2,4-D	<2.0 [1]	<2.0 [1]	<2.0 [1]	<2.0 [1]	2.0
2,4-DB	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	5.0
2,4,5-T	<2.0 [1]	<2.0 [1]	<2.0 [1]	<2.0 [1]	2.0
2,4,5-TP (Silvex)	<2.0 [1]	<2.0 [1]	<2.0 [1]	<2.0 [1]	2.0
Surrogates					%REC Limits
DCAA	124% [1]	135% [1]	123% [1]	145% [1]	43-169

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011717
Project No:	E0304123-1	Date Received:	01/23/06
Project Name:	Admiralty Construction	Date Reported:	02/02/06
Sample Matrix:	Soil	Units:	ug/kg
Method:	Herbicides by EPA 8151A		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/26/06	01/26/06	01/26/06	01/26/06	
Date Analyzed:	01/30/06	01/30/06	01/30/06	01/30/06	
AA ID No:	6A24002-05	6A24002-06	6A24002-07	6A24002-08	
Client ID No:	PLS-5-4	PLS-6-4	PLS-7-14	PLS-8-15	
Dilution Factor:	1	1	1	1	MRL
8151A Herbicides (EPA 8151A)					
Dalapon	<5.5 [1]	<5.5 [1]	<5.5 [1]	<5.5 [1]	5.5
Dicamba	<1.5 [1]	<1.5 [1]	<1.5 [1]	<1.5 [1]	1.5
Dichloroprop	<1.5 [1]	<1.5 [1]	<1.5 [1]	<1.5 [1]	1.5
Dinoseb	<2.0 [1]	<2.0 [1]	<2.0 [1]	<2.0 [1]	2.0
MCPA	<250 [1]	<250 [1]	<250 [1]	<250 [1]	250
MCPP	<250 [1]	<250 [1]	<250 [1]	<250 [1]	250
4-Nitrophenol	<6.0 [1]	<6.0 [1]	<6.0 [1]	<6.0 [1]	6.0
Pentachlorophenol	<1.0 [1]	<1.0 [1]	<1.0 [1]	<1.0 [1]	1.0
2,4-D	<2.0 [1]	<2.0 [1]	<2.0 [1]	<2.0 [1]	2.0
2,4-DB	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	5.0
2,4,5-T	<2.0 [1]	<2.0 [1]	<2.0 [1]	<2.0 [1]	2.0
2,4,5-TP (Silvex)	<2.0 [1]	<2.0 [1]	<2.0 [1]	<2.0 [1]	2.0
Surrogates					**%REC Limits**
DCAA	140% [1]	149% [1]	135% [1]	124% [1]	43-169

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011717
Project No:	E0304123-1	Date Received:	01/23/06
Project Name:	Admiralty Construction	Date Reported:	02/02/06
Sample Matrix:	Soil	Units:	ug/kg
Method:	VOCs, OXY & TPHG by GC/MS Soil		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/25/06	01/25/06	01/25/06	01/25/06	
AA ID No:	6A24002-01	6A24002-02	6A24002-03	6A24002-04	
Client ID No:	PLS-1-4	PLS-2-4	PLS-3-2	PLS-4-5	
Dilution Factor:	1	1	1	1	MRL
8260B/5035 Soil+OXY+TPHG (EPA 8260B/5035)					
Acetone	**140**	<50	<50	**160**	50
tert-Amyl Methyl Ether (TAME)	<5.0	<5.0	<5.0	<5.0	5.0
Benzene	<2.0	<2.0	<2.0	<2.0	2.0
Bromobenzene	<5.0	<5.0	<5.0	<5.0	5.0
Bromochloromethane	<5.0	<5.0	<5.0	<5.0	5.0
Bromodichloromethane	<5.0	<5.0	<5.0	<5.0	5.0
Bromoform	<5.0	<5.0	<5.0	<5.0	5.0
Bromomethane	<5.0	<5.0	<5.0	<5.0	5.0
2-Butanone (MEK)	<50	<50	<50	<50	50
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
sec-Butylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
tert-Butylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
n-Butylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
Carbon Disulfide	<5.0	<5.0	<5.0	<5.0	5.0
Carbon Tetrachloride	<5.0	<5.0	<5.0	<5.0	5.0
Chlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0
Chloroethane	<5.0	<5.0	<5.0	<5.0	5.0
Chloroform	<5.0	<5.0	<5.0	<5.0	5.0
Chloromethane	<5.0	<5.0	<5.0	<5.0	5.0
2-Chlorotoluene	<5.0	<5.0	<5.0	<5.0	5.0
4-Chlorotoluene	<5.0	<5.0	<5.0	<5.0	5.0
1,2-Dibromo-3-chloropropane	<10	<10	<10	<10	10
Dibromochloromethane	<5.0	<5.0	<5.0	<5.0	5.0
1,2-Dibromoethane (EDB)	<5.0	<5.0	<5.0	<5.0	5.0
Dibromomethane	<5.0	<5.0	<5.0	<5.0	5.0
1,4-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0
1,3-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	M81011717
Project No:	E0304123-1	Date Received:	01/23/06
Project Name:	Admiralty Construction	Date Reported:	02/02/06
Sample Matrix:	Soil	Units:	ug/kg
Method:	VOCs, OXY & TPHG by GC/MS Soil		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/25/06	01/25/06	01/25/06	01/25/06	
AA ID No:	6A24002-01	6A24002-02	6A24002-03	6A24002-04	
Client ID No:	PLS-1-4	PLS-2-4	PLS-3-2	PLS-4-5	
Dilution Factor:	1	1	1	1	MRL
8260B/5035 Soil+OXY+TPHG (EPA 8260B/5035) (continued)					
1,2-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0
Dichlorodifluoromethane (R12)	<5.0	<5.0	<5.0	<5.0	5.0
1,1-Dichloroethane	<5.0	<5.0	<5.0	<5.0	5.0
1,2-Dichloroethane (EDC)	<5.0	<5.0	<5.0	<5.0	5.0
trans-1,2-Dichloroethylene	<5.0	<5.0	<5.0	<5.0	5.0
cis-1,2-Dichloroethylene	<5.0	<5.0	<5.0	<5.0	5.0
1,1-Dichloroethylene	<5.0	<5.0	<5.0	<5.0	5.0
2,2-Dichloropropane	<5.0	<5.0	<5.0	<5.0	5.0
1,3-Dichloropropane	<5.0	<5.0	<5.0	<5.0	5.0
1,2-Dichloropropane	<5.0	<5.0	<5.0	<5.0	5.0
trans-1,3-Dichloropropylene	<5.0	<5.0	<5.0	<5.0	5.0
1,1-Dichloropropylene	<5.0	<5.0	<5.0	<5.0	5.0
cis-1,3-Dichloropropylene	<5.0	<5.0	<5.0	<5.0	5.0
Diisopropyl ether (DIPE)	<5.0	<5.0	<5.0	<5.0	5.0
Ethylbenzene	<2.0	<2.0	<2.0	<2.0	2.0
Ethyl-tert-Butyl Ether (ETBE)	<5.0	<5.0	<5.0	<5.0	5.0
Gasoline Range Organics (GRO)	<500	<500	<500	<500	500
Hexachlorobutadiene	<10	<10	<10	<10	10
2-Hexanone (MBK)	<50	<50	<50	<50	50
Isopropylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
4-Isopropyltoluene	<5.0	<5.0	<5.0	<5.0	5.0
Methyl-tert-Butyl Ether (MTBE)	<5.0	<5.0	<5.0	<5.0	5.0
Methylene Chloride	<50	<50	<50	<50	50
4-Methyl-2-pentanone (MIBK)	<50	<50	<50	<50	50
Naphthalene	<10	<10	<10	<10	10
n-Propylbenzene	<5.0	<5.0	<5.0	<5.0	5.0

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011717
Project No:	E0304123-1	Date Received:	01/23/06
Project Name:	Admiralty Construction	Date Reported:	02/02/06
Sample Matrix:	Soil	Units:	ug/kg
Method:	VOCs, OXY & TPHG by GC/MS Soil		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/25/06	01/25/06	01/25/06	01/25/06	
AA ID No:	6A24002-01	6A24002-02	6A24002-03	6A24002-04	
Client ID No:	PLS-1-4	PLS-2-4	PLS-3-2	PLS-4-5	
Dilution Factor:	1	1	1	1	MRL
8260B/5035 Soil+OXY+TPHG (EPA 8260B/5035) (continued)					
Styrene	<5.0	<5.0	<5.0	<5.0	5.0
1,1,1,2-Tetrachloroethane	<5.0	<5.0	<5.0	<5.0	5.0
1,1,2,2-Tetrachloroethane	<5.0	<5.0	<5.0	<5.0	5.0
Tetrachloroethylene (PCE)	<5.0	<5.0	<5.0	<5.0	5.0
Toluene	<2.0	<2.0	<2.0	<2.0	2.0
1,2,4-Trichlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0
1,2,3-Trichlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0
1,1,2-Trichloroethane	<5.0	<5.0	<5.0	<5.0	5.0
1,1,1-Trichloroethane	<5.0	<5.0	<5.0	<5.0	5.0
Trichloroethylene (TCE)	<5.0	<5.0	<5.0	<5.0	5.0
Trichlorofluoromethane (R11)	<5.0	<5.0	<5.0	<5.0	5.0
1,2,3-Trichloropropane	<5.0	<5.0	<5.0	<5.0	5.0
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<5.0	<5.0	<5.0	<5.0	5.0
1,3,5-Trimethylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
1,2,4-Trimethylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
Vinyl chloride	<5.0	<5.0	<5.0	<5.0	5.0
o-Xylene	<2.0	<2.0	<2.0	<2.0	2.0
m,p-Xylenes	3.1	<2.0	<2.0	<2.0	2.0
Surrogates					%REC Limits
4-Bromofluorobenzene	102%	94.0%	88.0%	94.0%	80-120
Dibromofluoromethane	100%	86.0%	88.0%	84.0%	80-120
Toluene-d8	114%	112%	110%	116%	80-120

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction
Sample Matrix: Soil
Method: VOCs, OXY & TPHG by GC/MS Soil

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06
Units: ug/kg

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/25/06	01/25/06	01/25/06	01/25/06	
AA ID No:	6A24002-05	6A24002-06	6A24002-07	6A24002-08	
Client ID No:	PLS-5-4	PLS-6-4	PLS-7-14	PLS-8-15	
Dilution Factor:	1	1	1	1	MRL
8260B/5035 Soil+OXY+TPHG (EPA 8260B/5035)					
Acetone	<50	<50	<50	<50	50
tert-Amyl Methyl Ether (TAME)	<5.0	<5.0	<5.0	<5.0	5.0
Benzene	<2.0	<2.0	<2.0	<2.0	2.0
Bromobenzene	<5.0	<5.0	<5.0	<5.0	5.0
Bromochloromethane	<5.0	<5.0	<5.0	<5.0	5.0
Bromodichloromethane	<5.0	<5.0	<5.0	<5.0	5.0
Bromoform	<5.0	<5.0	<5.0	<5.0	5.0
Bromomethane	<5.0	<5.0	<5.0	<5.0	5.0
2-Butanone (MEK)	<50	<50	<50	<50	50
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
sec-Butylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
tert-Butylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
n-Butylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
Carbon Disulfide	<5.0	<5.0	<5.0	<5.0	5.0
Carbon Tetrachloride	<5.0	<5.0	<5.0	<5.0	5.0
Chlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0
Chloroethane	<5.0	<5.0	<5.0	<5.0	5.0
Chloroform	<5.0	<5.0	<5.0	<5.0	5.0
Chloromethane	<5.0	<5.0	<5.0	<5.0	5.0
2-Chlorotoluene	<5.0	<5.0	<5.0	<5.0	5.0
4-Chlorotoluene	<5.0	<5.0	<5.0	<5.0	5.0
1,2-Dibromo-3-chloropropane	<10	<10	<10	<10	10
Dibromochloromethane	<5.0	<5.0	<5.0	<5.0	5.0
1,2-Dibromoethane (EDB)	<5.0	<5.0	<5.0	<5.0	5.0
Dibromomethane	<5.0	<5.0	<5.0	<5.0	5.0
1,4-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0
1,3-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction
Sample Matrix: Soil
Method: VOCs, OXY & TPHG by GC/MS Soil

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06
Units: ug/kg

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/25/06	01/25/06	01/25/06	01/25/06	
AA ID No:	6A24002-05	6A24002-06	6A24002-07	6A24002-08	
Client ID No:	PLS-5-4	PLS-6-4	PLS-7-14	PLS-8-15	
Dilution Factor:	1	1	1	1	MRL
8260B/5035 Soil+OXY+TPHG (EPA 8260B/5035) (continued)					
1,2-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0
Dichlorodifluoromethane (R12)	<5.0	<5.0	<5.0	<5.0	5.0
1,1-Dichloroethane	<5.0	<5.0	<5.0	<5.0	5.0
1,2-Dichloroethane (EDC)	<5.0	<5.0	<5.0	<5.0	5.0
trans-1,2-Dichloroethylene	<5.0	<5.0	<5.0	<5.0	5.0
cis-1,2-Dichloroethylene	<5.0	<5.0	<5.0	<5.0	5.0
1,1-Dichloroethylene	<5.0	<5.0	<5.0	<5.0	5.0
2,2-Dichloropropane	<5.0	<5.0	<5.0	<5.0	5.0
1,3-Dichloropropane	<5.0	<5.0	<5.0	<5.0	5.0
1,2-Dichloropropane	<5.0	<5.0	<5.0	<5.0	5.0
trans-1,3-Dichloropropylene	<5.0	<5.0	<5.0	<5.0	5.0
1,1-Dichloropropylene	<5.0	<5.0	<5.0	<5.0	5.0
cis-1,3-Dichloropropylene	<5.0	<5.0	<5.0	<5.0	5.0
Diisopropyl ether (DIPE)	<5.0	<5.0	<5.0	<5.0	5.0
Ethylbenzene	<2.0	<2.0	<2.0	<2.0	2.0
Ethyl-tert-Butyl Ether (ETBE)	<5.0	<5.0	<5.0	<5.0	5.0
Gasoline Range Organics (GRO)	<500	<500	<500	<500	500
Hexachlorobutadiene	<10	<10	<10	<10	10
2-Hexanone (MBK)	<50	<50	<50	<50	50
Isopropylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
4-Isopropyltoluene	<5.0	<5.0	<5.0	<5.0	5.0
Methyl-tert-Butyl Ether (MTBE)	<5.0	<5.0	<5.0	<5.0	5.0
Methylene Chloride	<50	<50	<50	<50	50
4-Methyl-2-pentanone (MIBK)	<50	<50	<50	<50	50
Naphthalene	<10	<10	<10	<10	10
n-Propylbenzene	<5.0	<5.0	<5.0	<5.0	5.0

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011717
Project No:	E0304123-1	Date Received:	01/23/06
Project Name:	Admiralty Construction	Date Reported:	02/02/06
Sample Matrix:	Soil	Units:	ug/kg
Method:	VOCs, OXY & TPHG by GC/MS Soil		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/25/06	01/25/06	01/25/06	01/25/06	
AA ID No:	6A24002-05	6A24002-06	6A24002-07	6A24002-08	
Client ID No:	PLS-5-4	PLS-6-4	PLS-7-14	PLS-8-15	
Dilution Factor:	1	1	1	1	MRL
8260B/5035 Soil+OXY+TPHG (EPA 8260B/5035) (continued)					
Styrene	<5.0	<5.0	<5.0	<5.0	5.0
1,1,1,2-Tetrachloroethane	<5.0	<5.0	<5.0	<5.0	5.0
1,1,2,2-Tetrachloroethane	<5.0	<5.0	<5.0	<5.0	5.0
Tetrachloroethylene (PCE)	<5.0	<5.0	<5.0	<5.0	5.0
Toluene	<2.0	<2.0	<2.0	<2.0	2.0
1,2,4-Trichlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0
1,2,3-Trichlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0
1,1,2-Trichloroethane	<5.0	<5.0	<5.0	<5.0	5.0
1,1,1-Trichloroethane	<5.0	<5.0	<5.0	<5.0	5.0
Trichloroethylene (TCE)	<5.0	<5.0	<5.0	<5.0	5.0
Trichlorofluoromethane (R11)	<5.0	<5.0	<5.0	<5.0	5.0
1,2,3-Trichloropropane	<5.0	<5.0	<5.0	<5.0	5.0
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<5.0	<5.0	<5.0	<5.0	5.0
1,3,5-Trimethylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
1,2,4-Trimethylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
Vinyl chloride	<5.0	<5.0	<5.0	<5.0	5.0
o-Xylene	<2.0	<2.0	<2.0	<2.0	2.0
m,p-Xylenes	<2.0	<2.0	<2.0	<2.0	2.0
Surrogates					**%REC Limits**
4-Bromofluorobenzene	92.0%	88.0%	82.0%	88.0%	80-120
Dibromofluoromethane	84.0%	84.0%	82.0%	82.0%	80-120
Toluene-d8	112%	110%	110%	110%	80-120

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011717
Project No:	E0304123-1	Date Received:	01/23/06
Project Name:	Admiralty Construction	Date Reported:	02/02/06
Sample Matrix:	Soil	Units:	mg/kg
Method:	Total Metals CAM 17		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/30/06	01/30/06	01/30/06	01/30/06	
Date Analyzed:	01/30/06	01/30/06	01/30/06	01/30/06	
AA ID No:	6A24002-01	6A24002-02	6A24002-03	6A24002-04	
Client ID No:	PLS-1-4	PLS-2-4	PLS-3-2	PLS-4-5	
Dilution Factor:	1	1	1	1	MRL
CAM Metals Less Hg 6000/7000 (EPA 6010B/7000)					
Antimony	<10	<10	<10	<10	10
Arsenic	3.9	4.2	4.8	8.8	0.50
Barium	150	160	180	310	10
Beryllium	<1.0	<1.0	<1.0	<1.0	1.0
Cadmium	<1.0	<1.0	1.1	2.2	1.0
Chromium	22	21	29	34	3.0
Cobalt	3.8	5.9	4.9	5.9	3.0
Copper	350	54	58	100	3.0
Lead	99	89	100	570	3.0
Molybdenum	<5.0	<5.0	<5.0	<5.0	5.0
Nickel	10	15	17	21	3.0
Selenium	<0.50	<0.50	<0.50	<0.50	0.50
Silver	<1.0	<1.0	<1.0	<1.0	1.0
Thallium	<5.0	<5.0	<5.0	<5.0	5.0
Vanadium	33	32	45	39	10
Zinc	150	130	190	520	3.0

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	**AA Project No:**	M81011717
Project No:	E0304123-1	**Date Received:**	01/23/06
Project Name:	Admiralty Construction	**Date Reported:**	02/02/06
Sample Matrix:	Soil	**Units:**	mg/kg
Method:	Total Metals CAM 17		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/30/06	01/30/06	01/30/06	01/30/06	
Date Analyzed:	01/30/06	01/30/06	01/30/06	01/30/06	
AA ID No:	6A24002-05	6A24002-06	6A24002-07	6A24002-08	
Client ID No:	PLS-5-4	PLS-6-4	PLS-7-14	PLS-8-15	
Dilution Factor:	1	1	1	1	MRL
CAM Metals Less Hg 6000/7000 (EPA 6010B/7000)					
Antimony	<10	<10	<10	<10	10
Arsenic	1.2	6.4	<0.50	5.7	0.50
Barium	66	270	47	75	10
Beryllium	<1.0	<1.0	<1.0	<1.0	1.0
Cadmium	<1.0	2.9	<1.0	<1.0	1.0
Chromium	16	40	14	26	3.0
Cobalt	4.4	4.4	<3.0	8.1	3.0
Copper	17	120	11	35	3.0
Lead	13	400	4.8	14	3.0
Molybdenum	<5.0	<5.0	<5.0	<5.0	5.0
Nickel	8.7	21	6.9	16	3.0
Selenium	<0.50	<0.50	<0.50	<0.50	0.50
Silver	<1.0	<1.0	<1.0	<1.0	1.0
Thallium	<5.0	<5.0	<5.0	<5.0	5.0
Vanadium	29	51	19	45	10
Zinc	44	410	26	69	3.0

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011717
Project No:	E0304123-1	Date Received:	01/23/06
Project Name:	Admiralty Construction	Date Reported:	02/02/06
Sample Matrix:	Soil	Units:	mg/kg
Method:	Total Metals CAM 17		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/26/06	01/26/06	01/26/06	01/26/06	
Date Analyzed:	01/26/06	01/26/06	01/26/06	01/26/06	
AA ID No:	6A24002-01	6A24002-02	6A24002-03	6A24002-04	
Client ID No:	PLS-1-4	PLS-2-4	PLS-3-2	PLS-4-5	
Dilution Factor:	1	1	1	1	MRL
Mercury Total EPA 7470A/7471A (EPA 7471A)					
Mercury	0.080	0.10	0.070	0.073	0.020

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011717
Project No:	E0304123-1	Date Received:	01/23/06
Project Name:	Admiralty Construction	Date Reported:	02/02/06
Sample Matrix:	Soil	Units:	mg/kg
Method:	Total Metals CAM 17		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/26/06	01/26/06	01/26/06	01/26/06	
Date Analyzed:	01/26/06	01/26/06	01/26/06	01/26/06	
AA ID No:	6A24002-05	6A24002-06	6A24002-07	6A24002-08	
Client ID No:	PLS-5-4	PLS-5-4	PLS-7-14	PLS-8-15	
Dilution Factor:	1	1	1	1	MRL
Mercury Total EPA 7470A/7471A (EPA 7471A)					
Mercury	0.034	0.088	0.063	0.084	0.020

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011717
Project No:	E0304123-1	Date Received:	01/23/06
Project Name:	Admiralty Construction	Date Reported:	02/02/06
Sample Matrix:	Soil	Units:	mg/kg
Method:	Carbon Chain by GC/FID		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/25/06	01/25/06	01/25/06	01/25/06	
AA ID No:	6A24002-01	6A24002-02	6A24002-03	6A24002-04	
Client ID No:	PLS-1-4	PLS-2-4	PLS-3-2	PLS-4-5	
Dilution Factor:	1	1	1	1	MRL
Carbon Chain Characterization 8015M (EPA 8015M)					
C6-C8	<1.0	<1.0	<1.0	<1.0	1.0
C8-C10	<1.0	<1.0	<1.0	<1.0	1.0
C10-C12	<1.0	<1.0	<1.0	<1.0	1.0
C12-C14	<1.0	<1.0	<1.0	<1.0	1.0
C14-C16	<1.0	1.7	<1.0	<1.0	1.0
C16-C18	<1.0	5.3	<1.0	<1.0	1.0
C18-C20	<1.0	6.0	<1.0	<1.0	1.0
C20-C22	<1.0	8.6	<1.0	2.0	1.0
C22-C24	1.4	7.6	1.5	9.2	1.0
C24-C26	1.8	6.7	2.9	13	1.0
C26-C28	2.7	5.7	6.9	16	1.0
C28-C32	9.1	15	28	65	1.0
C32-C34	<1.0	<1.0	8.3	11	1.0
C34-C36	<1.0	<1.0	1.2	<1.0	1.0
C36-C40	<1.0	<1.0	<1.0	<1.0	1.0
C40-C44	<1.0	<1.0	<1.0	<1.0	1.0
TPH (C6-C44)	15	57	49	120	10
Surrogates					%REC Limits
o-Terphenyl	56.0%	92.0%	94.0%	92.0%	50-150

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011717
Project No:	E0304123-1	Date Received:	01/23/06
Project Name:	Admiralty Construction	Date Reported:	02/02/06
Sample Matrix:	Soil	Units:	mg/kg
Method:	Carbon Chain by GC/FID		

Date Sampled:	01/23/06	01/23/06	01/23/06	01/23/06	
Date Prepared:	01/25/06	01/25/06	01/25/06	01/25/06	
Date Analyzed:	01/25/06	01/25/06	01/25/06	01/25/06	
AA ID No:	6A24002-05	6A24002-06	6A24002-07	6A24002-08	
Client ID No:	PLS-5-4	PLS-6-4	PLS-7-14	PLS-8-15	
Dilution Factor:	1	1	1	1	MRL
Carbon Chain Characterization 8015M (EPA 8015M)					
C6-C8	<1.0	<1.0	<1.0	<1.0	1.0
C8-C10	<1.0	<1.0	<1.0	<1.0	1.0
C10-C12	<1.0	<1.0	<1.0	<1.0	1.0
C12-C14	<1.0	<1.0	<1.0	<1.0	1.0
C14-C16	<1.0	<1.0	<1.0	<1.0	1.0
C16-C18	<1.0	<1.0	<1.0	<1.0	1.0
C18-C20	<1.0	<1.0	<1.0	<1.0	1.0
C20-C22	3.9	<1.0	<1.0	<1.0	1.0
C22-C24	5.3	<1.0	<1.0	<1.0	1.0
C24-C26	6.0	<1.0	<1.0	<1.0	1.0
C26-C28	8.4	1.6	<1.0	<1.0	1.0
C28-C32	9.0	6.7	<1.0	<1.0	1.0
C32-C34	<1.0	<1.0	<1.0	<1.0	1.0
C34-C36	<1.0	<1.0	<1.0	<1.0	1.0
C36-C40	<1.0	<1.0	<1.0	<1.0	1.0
C40-C44	<1.0	<1.0	<1.0	<1.0	1.0
TPH (C6-C44)	46	<10	<10	<10	10
Surrogates					**%REC Limits**
o-Terphenyl	106%	75.0%	68.0%	55.0%	50-150

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Semivolatile Organics by GC/MS - Quality Control										
Batch B6A2523 - EPA 3550B										
Blank (B6A2523-BLK1)				Prepared: 01/24/06 Analyzed: 01/27/06						
3,3'-Dichlorobenzidine	<0.40	0.40	mg/kg							
Acenaphthene	<0.10	0.10	mg/kg							
Acenaphthylene	<0.10	0.10	mg/kg							
Aniline	<0.20	0.20	mg/kg							
Anthracene	<0.10	0.10	mg/kg							
Azobenzene	<0.10	0.10	mg/kg							
Benzidine	<0.40	0.40	mg/kg							
Benzo(a)anthracene	<0.10	0.10	mg/kg							
Benzo(a)pyrene	<0.10	0.10	mg/kg							
Benzo(b)fluoranthene	<0.10	0.10	mg/kg							
Benzo(g,h,i)perylene	<0.10	0.10	mg/kg							
Benzoic acid	<1.0	1.0	mg/kg							
Benzo(k)fluoranthene	<0.10	0.10	mg/kg							
Benzyl alcohol	<0.10	0.10	mg/kg							
4-Bromophenyl phenyl ether	<0.10	0.10	mg/kg							
Butyl benzyl phthalate	<0.50	0.50	mg/kg							
4-Chloro-3-methylphenol	<0.20	0.20	mg/kg							
4-Chloroaniline	<0.40	0.40	mg/kg							
Bis(2-chloroethoxy)methane	<0.10	0.10	mg/kg							
Bis(2-chloroethyl)ether	<0.10	0.10	mg/kg							
Bis(2-chloroisopropyl)ether	<0.10	0.10	mg/kg							
2-Chloronaphthalene	<0.10	0.10	mg/kg							
2-Chlorophenol	<0.10	0.10	mg/kg							
4-Chlorophenyl phenyl ether	<0.10	0.10	mg/kg							
Chrysene	<0.10	0.10	mg/kg							
Dibenzo(a,h)anthracene	<0.10	0.10	mg/kg							
Dibenzofuran	<0.10	0.10	mg/kg							
Di-n-butyl phthalate	<2.0	2.0	mg/kg							
1,2-Dichlorobenzene	<0.10	0.10	mg/kg							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Semivolatile Organics by GC/MS - Quality Control										
Batch B6A2523 - EPA 3550B										
Blank (B6A2523-BLK1) Continued				Prepared: 01/24/06 Analyzed: 01/27/06						
1,3-Dichlorobenzene	<0.10	0.10	mg/kg							
1,4-Dichlorobenzene	<0.10	0.10	mg/kg							
2,4-Dichlorophenol	<0.10	0.10	mg/kg							
Diethyl phthalate	<0.80	0.80	mg/kg							
2,4-Dimethylphenol	<0.10	0.10	mg/kg							
Dimethyl phthalate	<0.20	0.20	mg/kg							
4,6-Dinitro-2-methylphenol	<0.20	0.20	mg/kg							
2,4-Dinitrophenol	<0.40	0.40	mg/kg							
2,6-Dinitrotoluene	<0.10	0.10	mg/kg							
2,4-Dinitrotoluene	<0.10	0.10	mg/kg							
Di-n-octyl phthalate	<0.10	0.10	mg/kg							
1,2-Diphenylhydrazine	<0.10	0.10	mg/kg							
Bis(2-ethylhexyl)phthalate	<0.20	0.20	mg/kg							
Fluoranthene	<0.10	0.10	mg/kg							
Fluorene	<0.10	0.10	mg/kg							
Hexachlorobenzene	<0.10	0.10	mg/kg							
Hexachlorobutadiene	<0.10	0.10	mg/kg							
Hexachlorocyclopentadiene	<0.10	0.10	mg/kg							
Hexachloroethane	<0.10	0.10	mg/kg							
Indeno (1,2,3-cd) pyrene	<0.40	0.40	mg/kg							
Isophorone	<0.10	0.10	mg/kg							
2-Methylnaphthalene	<0.10	0.10	mg/kg							
2-Methylphenol	<0.20	0.20	mg/kg							
3-Methylphenol	<0.20	0.20	mg/kg							
4-Methylphenol	<0.20	0.20	mg/kg							
Naphthalene	<0.10	0.10	mg/kg							
4-Nitroaniline	<0.50	0.50	mg/kg							
3-Nitroaniline	<0.40	0.40	mg/kg							
2-Nitroaniline	<0.10	0.10	mg/kg							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Semivolatile Organics by GC/MS - Quality Control										
Batch B6A2523 - EPA 3550B										
Blank (B6A2523-BLK1) Continued				Prepared: 01/24/06 Analyzed: 01/27/06						
Nitrobenzene	<0.10	0.10	mg/kg							
2-Nitrophenol	<0.20	0.20	mg/kg							
4-Nitrophenol	<0.20	0.20	mg/kg							
N-Nitrosodimethylamine	<0.10	0.10	mg/kg							
N-Nitrosodiphenylamine	<0.10	0.10	mg/kg							
N-Nitrosodi-n-propylamine	<0.10	0.10	mg/kg							
Pentachlorophenol	<0.10	0.10	mg/kg							
Phenanthrene	<0.10	0.10	mg/kg							
Phenol	<0.10	0.10	mg/kg							
Pyrene	<0.10	0.10	mg/kg							
1,2,4-Trichlorobenzene	<0.10	0.10	mg/kg							
2,4,5-Trichlorophenol	<0.20	0.20	mg/kg							
2,4,6-Trichlorophenol	<0.20	0.20	mg/kg							
Surrogate: 2-Fluorobiphenyl	*0.629*		*mg/kg*	*1.00*		*62.9*	*43-116*			
Surrogate: 2-Fluorophenol	*0.891*		*mg/kg*	*2.00*		*44.6*	*21-100*			
Surrogate: Nitrobenzene-d5	*0.580*		*mg/kg*	*1.00*		*58.0*	*35-134*			
Surrogate: Phenol-d6	*0.937*		*mg/kg*	*2.00*		*46.8*	*10-94*			
Surrogate: Terphenyl-dl4	*0.972*		*mg/kg*	*1.00*		*97.2*	*33-141*			
Surrogate: 2,4,6-Tribromophenol	*1.16*		*mg/kg*	*2.00*		*58.0*	*10-123*			
LCS (B6A2523-BS1)				Prepared: 01/24/06 Analyzed: 01/27/06						
Acenaphthene	0.558	0.10	mg/kg	1.00		55.8	50-121			
Anthracene	0.646	0.10	mg/kg	1.00		64.6	41-121			
Benzo(a)pyrene	0.554	0.10	mg/kg	1.00		55.4	17-163			
Benzo(b)fluoranthene	0.525	0.10	mg/kg	1.00		52.5	33-137			
Butyl benzyl phthalate	0.405	0.50	mg/kg	1.00		40.5	19-139			
4-Chloro-3-methylphenol	0.939	0.20	mg/kg	1.00		93.9	22-147			
Bis(2-chloroethyl)ether	0.585	0.10	mg/kg	1.00		58.5	26-122			
2-Chloronaphthalene	0.677	0.10	mg/kg	1.00		67.7	60-118			
4-Chlorophenyl phenyl ether	0.622	0.10	mg/kg	1.00		62.2	41-128			
1,4-Dichlorobenzene	0.594	0.10	mg/kg	1.00		59.4	26-105			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Semivolatile Organics by GC/MS - Quality Control										
Batch B6A2523 - EPA 3550B										
LCS (B6A2523-BS1) Continued				Prepared: 01/24/06 Analyzed: 01/27/06						
2,4-Dichlorophenol	0.529	0.10	mg/kg	1.00		52.9	39-135			
Di-n-octyl phthalate	0.226	0.10	mg/kg	1.00		22.6	4-146			
Fluoranthene	0.453	0.10	mg/kg	1.00		45.3	47-125			
Fluorene	0.615	0.10	mg/kg	1.00		61.5	60-120			
Hexachlorobenzene	0.599	0.10	mg/kg	1.00		59.9	2-152			
Hexachlorobutadiene	0.579	0.10	mg/kg	1.00		57.9	24-116			
Hexachloroethane	0.642	0.10	mg/kg	1.00		64.2	40-113			
Isophorone	0.454	0.10	mg/kg	1.00		45.4	21-196			
Naphthalene	0.568	0.10	mg/kg	1.00		56.8	25-121			
Nitrobenzene	0.550	0.10	mg/kg	1.00		55.0	38-133			
2-Nitrophenol	0.666	0.20	mg/kg	1.00		66.6	2-163			
N-Nitrosodi-n-propylamine	0.630	0.10	mg/kg	1.00		63.0	2-230			
Pentachlorophenol	0.723	0.10	mg/kg	1.00		72.3	14-176			
Phenol	0.575	0.10	mg/kg	1.00		57.5	5-112			
Pyrene	0.804	0.10	mg/kg	1.00		80.4	52-115			
1,2,4-Trichlorobenzene	0.540	0.10	mg/kg	1.00		54.0	44-142			
2,4,6-Trichlorophenol	0.777	0.20	mg/kg	1.00		77.7	37-144			
Surrogate: 2-Fluorobiphenyl	*0.630*		*mg/kg*	*1.00*		*63.0*	*43-116*			
Surrogate: 2-Fluorophenol	*0.933*		*mg/kg*	*2.00*		*46.6*	*21-100*			
Surrogate: Nitrobenzene-d5	*0.554*		*mg/kg*	*1.00*		*55.4*	*35-134*			
Surrogate: Phenol-d6	*0.987*		*mg/kg*	*2.00*		*49.4*	*10-94*			
Surrogate: Terphenyl-d14	*0.812*		*mg/kg*	*1.00*		*81.2*	*33-141*			
Surrogate: 2,4,6-Tribromophenol	*1.51*		*mg/kg*	*2.00*		*75.5*	*10-123*			
Matrix Spike (B6A2523-MS1)				Prepared: 01/24/06 Analyzed: 01/27/06						
Acenaphthene	0.404	0.10	mg/kg	1.00		40.4	47-145			
Anthracene	0.455	0.10	mg/kg	1.00		45.5	27-133			
Benzo(a)pyrene	0.380	0.10	mg/kg	1.00		38.0	17-163			
Benzo(b)fluoranthene	0.348	0.10	mg/kg	1.00		34.8	24-159			
Butyl benzyl phthalate	0.218	0.50	mg/kg	1.00		21.8	2-152			
4-Chloro-3-methylphenol	0.755	0.20	mg/kg	1.00		75.5	22-147			
Bis(2-chloroethyl)ether	0.391	0.10	mg/kg	1.00		39.1	12-158			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Semivolatile Organics by GC/MS - Quality Control										
Batch B6A2523 - EPA 3550B										
Matrix Spike (B6A2523-MS1) Continued				Prepared: 01/24/06 Analyzed: 01/27/06						
2-Chloronaphthalene	0.502	0.10	mg/kg	1.00		50.2	60-118			
4-Chlorophenyl phenyl ether	0.471	0.10	mg/kg	1.00		47.1	25-158			
1,4-Dichlorobenzene	0.348	0.10	mg/kg	1.00		34.8	20-124			
2,4-Dichlorophenol	0.370	0.10	mg/kg	1.00		37.0	39-135			
Di-n-octyl phthalate	0.163	0.10	mg/kg	1.00		16.3	4-146			
Fluoranthene	0.330	0.10	mg/kg	1.00		33.0	26-137			
Fluorene	0.459	0.10	mg/kg	1.00		45.9	59-121			
Hexachlorobenzene	0.449	0.10	mg/kg	1.00		44.9	2-152			
Hexachlorobutadiene	0.376	0.10	mg/kg	1.00		37.6	24-116			
Hexachloroethane	0.352	0.10	mg/kg	1.00		35.2	40-113			
Isophorone	0.328	0.10	mg/kg	1.00		32.8	21-196			
Naphthalene	0.342	0.10	mg/kg	1.00		34.2	21-133			
Nitrobenzene	0.389	0.10	mg/kg	1.00		38.9	35-180			
2-Nitrophenol	0.284	0.20	mg/kg	1.00		28.4	2-163			
N-Nitrosodi-n-propylamine	0.423	0.10	mg/kg	1.00		42.3	2-230			
Pentachlorophenol	0.460	0.10	mg/kg	1.00		46.0	14-176			
Phenol	0.396	0.10	mg/kg	1.00		39.6	5-112			
Pyrene	0.456	0.10	mg/kg	1.00		45.6	52-115			
1,2,4-Trichlorobenzene	0.350	0.10	mg/kg	1.00		35.0	44-142			
2,4,6-Trichlorophenol	0.557	0.20	mg/kg	1.00		55.7	37-144			
Surrogate: 2-Fluorobiphenyl	*0.416*		*mg/kg*	*1.00*		*41.6*	*43-116*			
Surrogate: 2-Fluorophenol	*0.624*		*mg/kg*	*2.00*		*31.2*	*21-100*			
Surrogate: Nitrobenzene-d5	*0.378*		*mg/kg*	*1.00*		*37.8*	*35-134*			
Surrogate: Phenol-d6	*0.706*		*mg/kg*	*2.00*		*35.3*	*10-94*			
Surrogate: Terphenyl-dl4	*0.512*		*mg/kg*	*1.00*		*51.2*	*33-141*			
Surrogate: 2,4,6-Tribromophenol	*1.03*		*mg/kg*	*2.00*		*51.5*	*10-123*			
Matrix Spike Dup (B6A2523-MSD1)				Prepared: 01/24/06 Analyzed: 01/27/06						
Acenaphthene	0.479	0.10	mg/kg	1.00		47.9	47-145	17.0	40	
Anthracene	0.524	0.10	mg/kg	1.00		52.4	27-133	14.1	40	
Benzo(a)pyrene	0.470	0.10	mg/kg	1.00		47.0	17-163	21.2	40	
Benzo(b)fluoranthene	0.397	0.10	mg/kg	1.00		39.7	24-159	13.2	40	

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Semivolatile Organics by GC/MS - Quality Control										
Batch B6A2523 - EPA 3550B										
Matrix Spike Dup (B6A2523-MSD1) Prepared: 01/24/06 Analyzed: 01/27/06										
Continued										
Butyl benzyl phthalate	0.288	0.50	mg/kg	1.00		28.8	2-152	27.7	40	
4-Chloro-3-methylphenol	0.850	0.20	mg/kg	1.00		85.0	22-147	11.8	40	
Bis(2-chloroethyl)ether	0.468	0.10	mg/kg	1.00		46.8	12-158	17.9	40	
2-Chloronaphthalene	0.569	0.10	mg/kg	1.00		56.9	60-118	12.5	40	
4-Chlorophenyl phenyl ether	0.525	0.10	mg/kg	1.00		52.5	25-158	10.8	40	
1,4-Dichlorobenzene	0.439	0.10	mg/kg	1.00		43.9	20-124	23.1	40	
2,4-Dichlorophenol	0.450	0.10	mg/kg	1.00		45.0	39-135	19.5	40	
Di-n-octyl phthalate	0.227	0.10	mg/kg	1.00		22.7	4-146	32.8	40	
Fluoranthene	0.389	0.10	mg/kg	1.00		38.9	26-137	16.4	40	
Fluorene	0.515	0.10	mg/kg	1.00		51.5	59-121	11.5	40	
Hexachlorobenzene	0.490	0.10	mg/kg	1.00		49.0	2-152	8.73	40	
Hexachlorobutadiene	0.470	0.10	mg/kg	1.00		47.0	24-116	22.2	40	
Hexachloroethane	0.458	0.10	mg/kg	1.00		45.8	40-113	26.2	40	
Isophorone	0.383	0.10	mg/kg	1.00		38.3	21-196	15.5	40	
Naphthalene	0.440	0.10	mg/kg	1.00		44.0	21-133	25.1	40	
Nitrobenzene	0.467	0.10	mg/kg	1.00		46.7	35-180	18.2	40	
2-Nitrophenol	0.356	0.20	mg/kg	1.00		35.6	2-163	22.5	40	
N-Nitrosodi-n-propylamine	0.503	0.10	mg/kg	1.00		50.3	2-230	17.3	40	
Pentachlorophenol	0.580	0.10	mg/kg	1.00		58.0	14-176	23.1	40	
Phenol	0.464	0.10	mg/kg	1.00		46.4	5-112	15.8	40	
Pyrene	0.423	0.10	mg/kg	1.00		42.3	52-115	7.51	40	
1,2,4-Trichlorobenzene	0.442	0.10	mg/kg	1.00		44.2	44-142	23.2	40	
2,4,6-Trichlorophenol	0.629	0.20	mg/kg	1.00		62.9	37-144	12.1	40	
Surrogate: 2-Fluorobiphenyl	*0.476*		*mg/kg*	*1.00*		*47.6*	*43-116*			
Surrogate: 2-Fluorophenol	*0.750*		*mg/kg*	*2.00*		*37.5*	*21-100*			
Surrogate: Nitrobenzene-d5	*0.448*		*mg/kg*	*1.00*		*44.8*	*35-134*			
Surrogate: Phenol-d6	*0.817*		*mg/kg*	*2.00*		*40.8*	*10-94*			
Surrogate: Terphenyl-d14	*0.500*		*mg/kg*	*1.00*		*50.0*	*33-141*			
Surrogate: 2,4,6-Tribromophenol	*1.21*		*mg/kg*	*2.00*		*60.5*	*10-123*			
Organochlorine Pesticides by GC - Quality Control										

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Organochlorine Pesticides by GC - Quality Control										
Batch B6A2522 - EPA 3510C										
Blank (B6A2522-BLK1)				Prepared: 01/25/06 Analyzed: 01/26/06						
4,4'-DDD	<4.0	4.0	ug/kg							
4,4'-DDE	<4.0	4.0	ug/kg							
4,4'-DDT	<4.0	4.0	ug/kg							
Aldrin	<2.0	2.0	ug/kg							
beta-BHC	<2.0	2.0	ug/kg							
delta-BHC	<2.0	2.0	ug/kg							
alpha-BHC	<2.0	2.0	ug/kg							
gamma-BHC (Lindane)	<4.0	4.0	ug/kg							
gamma-Chlordane	<4.0	4.0	ug/kg							
alpha-Chlordane	<4.0	4.0	ug/kg							
Chlordane	<20	20	ug/kg							
Dieldrin	<4.0	4.0	ug/kg							
Endosulfan I	<2.0	2.0	ug/kg							
Endosulfan II	<4.0	4.0	ug/kg							
Endosulfan sulfate	<4.0	4.0	ug/kg							
Endrin	<4.0	4.0	ug/kg							
Endrin aldehyde	<4.0	4.0	ug/kg							
Endrin ketone	<4.0	4.0	ug/kg							
Heptachlor	<2.0	2.0	ug/kg							
Heptachlor epoxide	<2.0	2.0	ug/kg							
Methoxychlor	<20	20	ug/kg							
Toxaphene	<100	100	ug/kg							
Surrogate: Tetrachloro-meta-xylene	*6.17*		*ug/kg*	*5.00*		*123*	*50-150*			
LCS (B6A2522-BS1)				Prepared: 01/25/06 Analyzed: 01/26/06						
4,4'-DDD	4.86	4.0	ug/kg	5.00		97.2	60-140			
4,4'-DDE	5.20	4.0	ug/kg	5.00		104	60-140			
4,4'-DDT	4.39	4.0	ug/kg	5.00		87.8	60-140			
Aldrin	4.65	2.0	ug/kg	5.00		93.0	60-140			
beta-BHC	5.67	2.0	ug/kg	5.00		113	60-140			

Allen Aminfan
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Organochlorine Pesticides by GC - Quality Control										
Batch B6A2522 - EPA 3510C										
LCS (B6A2522-BS1) Continued				Prepared: 01/25/06 Analyzed: 01/26/06						
delta-BHC	4.79	2.0	ug/kg	5.00		95.8	60-140			
alpha-BHC	5.07	2.0	ug/kg	5.00		101	60-140			
gamma-BHC (Lindane)	5.23	4.0	ug/kg	5.00		105	60-140			
gamma-Chlordane	4.81	4.0	ug/kg	5.00		96.2	60-140			
alpha-Chlordane	4.66	4.0	ug/kg	5.00		93.2	60-140			
Dieldrin	4.63	4.0	ug/kg	5.00		92.6	60-140			
Endosulfan I	5.26	2.0	ug/kg	5.00		105	60-140			
Endosulfan II	4.86	4.0	ug/kg	5.00		97.2	60-140			
Endosulfan sulfate	6.08	4.0	ug/kg	5.00		122	60-140			
Endrin	5.24	4.0	ug/kg	5.00		105	60-140			
Endrin aldehyde	5.94	4.0	ug/kg	5.00		119	60-140			
Endrin ketone	5.88	4.0	ug/kg	5.00		118	60-140			
Heptachlor	4.72	2.0	ug/kg	5.00		94.4	60-140			
Heptachlor epoxide	4.48	2.0	ug/kg	5.00		89.6	60-140			
Methoxychlor	4.94	20	ug/kg	5.00		98.8	60-140			
Surrogate: Tetrachloro-meta-xylene	*5.40*		*ug/kg*	*5.00*		*108*	*50-150*			
LCS Dup (B6A2522-BSD1)				Prepared: 01/25/06 Analyzed: 01/30/06						
4,4'-DDD	5.05	4.0	ug/kg	5.00		101	60-140	3.83	40	
4,4'-DDE	5.75	4.0	ug/kg	5.00		115	60-140	10.2	40	
4,4'-DDT	4.38	4.0	ug/kg	5.00		87.6	60-140	0.228	40	
Aldrin	3.66	2.0	ug/kg	5.00		73.2	60-140	23.8	40	
beta-BHC	5.73	2.0	ug/kg	5.00		115	60-140	1.05	40	
delta-BHC	4.54	2.0	ug/kg	5.00		90.8	60-140	5.36	40	
alpha-BHC	4.07	2.0	ug/kg	5.00		81.4	60-140	21.9	40	
gamma-BHC (Lindane)	4.29	4.0	ug/kg	5.00		85.8	60-140	19.7	40	
gamma-Chlordane	4.28	4.0	ug/kg	5.00		85.6	60-140	11.7	40	
alpha-Chlordane	4.17	4.0	ug/kg	5.00		83.4	60-140	11.1	40	
Dieldrin	4.23	4.0	ug/kg	5.00		84.6	60-140	9.03	40	
Endosulfan I	4.63	2.0	ug/kg	5.00		92.6	60-140	12.7	40	
Endosulfan II	5.05	4.0	ug/kg	5.00		101	60-140	3.83	40	
Endosulfan sulfate	6.48	4.0	ug/kg	5.00		130	60-140	6.37	40	

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Organochlorine Pesticides by GC - Quality Control										
Batch B6A2522 - EPA 3510C										
LCS Dup (B6A2522-BSD1) Continued				Prepared: 01/25/06 Analyzed: 01/30/06						
Endrin	5.28	4.0	ug/kg	5.00		106	60-140	0.760	40	
Endrin aldehyde	5.36	4.0	ug/kg	5.00		107	60-140	10.3	40	
Endrin ketone	6.06	4.0	ug/kg	5.00		121	60-140	3.02	40	
Heptachlor	3.88	2.0	ug/kg	5.00		77.6	60-140	19.5	40	
Heptachlor epoxide	3.86	2.0	ug/kg	5.00		77.2	60-140	14.9	40	
Methoxychlor	4.23	20	ug/kg	5.00		84.6	60-140	15.5	40	
Surrogate: Tetrachloro-meta-xylene	*6.45*		*ug/kg*	*5.00*		*129*	*50-150*			
Herbicides by EPA 8151A - Quality Control										
Batch B6B0206 - EPA 3550B										
Blank (B6B0206-BLK1)				Prepared: 01/26/06 Analyzed: 01/30/06						*
Dalapon	<5.5	5.5	ug/kg							
Dicamba	<1.5	1.5	ug/kg							
Dichloroprop	<1.5	1.5	ug/kg							
Dinoseb	<2.0	2.0	ug/kg							
MCPA	<250	250	ug/kg							
MCPP	<250	250	ug/kg							
4-Nitrophenol	<6.0	6.0	ug/kg							
Pentachlorophenol	<1.0	1.0	ug/kg							
2,4-D	<2.0	2.0	ug/kg							
2,4-DB	<5.0	5.0	ug/kg							
2,4,5-T	<2.0	2.0	ug/kg							
2,4,5-TP (Silvex)	<2.0	2.0	ug/kg							
Surrogate: DCAA	*8.00*		*ug/kg*	*5.00*		*160*	*43-169*			
LCS (B6B0206-BS1)				Prepared: 01/26/06 Analyzed: 01/30/06						*
2,4-D	11.0	2.0	ug/kg	10.0		110	50-180			
2,4,5-T	10.3	2.0	ug/kg	10.0		103	68-160			
2,4,5-TP (Silvex)	9.50	2.0	ug/kg	10.0		95.0	42-180			
Surrogate: DCAA	*5.15*		*ug/kg*	*5.00*		*103*	*43-169*			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS Soil - Quality Control										
Batch B6A2517 - EPA 5035										
Blank (B6A2517-BLK1)				Prepared & Analyzed: 01/25/06						
Acetone	<50	50	ug/kg							
tert-Amyl Methyl Ether (TAME)	<5.0	5.0	ug/kg							
Benzene	<2.0	2.0	ug/kg							
Bromobenzene	<5.0	5.0	ug/kg							
Bromochloromethane	<5.0	5.0	ug/kg							
Bromodichloromethane	<5.0	5.0	ug/kg							
Bromoform	<5.0	5.0	ug/kg							
Bromomethane	<5.0	5.0	ug/kg							
2-Butanone (MEK)	<50	50	ug/kg							
tert-Butyl alcohol (TBA)	<20	20	ug/kg							
sec-Butylbenzene	<5.0	5.0	ug/kg							
tert-Butylbenzene	<5.0	5.0	ug/kg							
n-Butylbenzene	<5.0	5.0	ug/kg							
Carbon Disulfide	<5.0	5.0	ug/kg							
Carbon Tetrachloride	<5.0	5.0	ug/kg							
Chlorobenzene	<5.0	5.0	ug/kg							
Chloroethane	<5.0	5.0	ug/kg							
Chloroform	<5.0	5.0	ug/kg							
Chloromethane	<5.0	5.0	ug/kg							
2-Chlorotoluene	<5.0	5.0	ug/kg							
4-Chlorotoluene	<5.0	5.0	ug/kg							
1,2-Dibromo-3-chloropropane	<10	10	ug/kg							
Dibromochloromethane	<5.0	5.0	ug/kg							
1,2-Dibromoethane (EDB)	<5.0	5.0	ug/kg							
Dibromomethane	<5.0	5.0	ug/kg							
1,4-Dichlorobenzene	<5.0	5.0	ug/kg							
1,3-Dichlorobenzene	<5.0	5.0	ug/kg							
1,2-Dichlorobenzene	<5.0	5.0	ug/kg							
Dichlorodifluoromethane (R12)	<5.0	5.0	ug/kg							

Alfen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS Soil - Quality Control										
Batch B6A2517 - EPA 5035										
Blank (B6A2517-BLK1) Continued				Prepared & Analyzed: 01/25/06						
1,1-Dichloroethane	<5.0	5.0	ug/kg							
1,2-Dichloroethane (EDC)	<5.0	5.0	ug/kg							
trans-1,2-Dichloroethylene	<5.0	5.0	ug/kg							
cis-1,2-Dichloroethylene	<5.0	5.0	ug/kg							
1,1-Dichloroethylene	<5.0	5.0	ug/kg							
2,2-Dichloropropane	<5.0	5.0	ug/kg							
1,3-Dichloropropane	<5.0	5.0	ug/kg							
1,2-Dichloropropane	<5.0	5.0	ug/kg							
trans-1,3-Dichloropropylene	<5.0	5.0	ug/kg							
1,1-Dichloropropylene	<5.0	5.0	ug/kg							
cis-1,3-Dichloropropylene	<5.0	5.0	ug/kg							
Diisopropyl ether (DIPE)	<5.0	5.0	ug/kg							
Ethylbenzene	<2.0	2.0	ug/kg							
Ethyl-tert-Butyl Ether (ETBE)	<5.0	5.0	ug/kg							
Gasoline Range Organics (GRO)	<500	500	ug/kg							
Hexachlorobutadiene	<10	10	ug/kg							
2-Hexanone (MBK)	<50	50	ug/kg							
Isopropylbenzene	<5.0	5.0	ug/kg							
4-Isopropyltoluene	<5.0	5.0	ug/kg							
Methyl-tert-Butyl Ether (MTBE)	<5.0	5.0	ug/kg							
Methylene Chloride	<50	50	ug/kg							
4-Methyl-2-pentanone (MIBK)	<50	50	ug/kg							
Naphthalene	<10	10	ug/kg							
n-Propylbenzene	<5.0	5.0	ug/kg							
Styrene	<5.0	5.0	ug/kg							
1,1,1,2-Tetrachloroethane	<5.0	5.0	ug/kg							
1,1,2,2-Tetrachloroethane	<5.0	5.0	ug/kg							
Tetrachloroethylene (PCE)	<5.0	5.0	ug/kg							
Toluene	<2.0	2.0	ug/kg							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admirally Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS Soil - Quality Control										
Batch B6A2517 - EPA 5035										
Blank (B6A2517-BLK1) Continued				Prepared & Analyzed: 01/25/06						
1,2,4-Trichlorobenzene	<5.0	5.0	ug/kg							
1,2,3-Trichlorobenzene	<5.0	5.0	ug/kg							
1,1,2-Trichloroethane	<5.0	5.0	ug/kg							
1,1,1-Trichloroethane	<5.0	5.0	ug/kg							
Trichloroethylene (TCE)	<5.0	5.0	ug/kg							
Trichlorofluoromethane (R11)	<5.0	5.0	ug/kg							
1,2,3-Trichloropropane	<5.0	5.0	ug/kg							
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<5.0	5.0	ug/kg							
1,3,5-Trimethylbenzene	<5.0	5.0	ug/kg							
1,2,4-Trimethylbenzene	<5.0	5.0	ug/kg							
Vinyl chloride	<5.0	5.0	ug/kg							
o-Xylene	<2.0	2.0	ug/kg							
m,p-Xylenes	<2.0	2.0	ug/kg							
Surrogate: 4-Bromofluorobenzene	*85.4*		*ug/kg*	*100*		*85.4*	*80-120*			
Surrogate: Dibromofluoromethane	*83.8*		*ug/kg*	*100*		*83.8*	*80-120*			
Surrogate: Toluene-d8	*106*		*ug/kg*	*100*		*106*	*80-120*			
LCS (B6A2517-BS1)				Prepared & Analyzed: 01/25/06						
Benzene	41.2	2.0	ug/kg	40.0		103	75-125			
Bromodichloromethane	37.2	5.0	ug/kg	40.0		93.0	75-125			
Bromoform	35.0	5.0	ug/kg	40.0		87.5	75-125			
Carbon Tetrachloride	36.0	5.0	ug/kg	40.0		90.0	75-125			
Chlorobenzene	40.0	5.0	ug/kg	40.0		100	75-125			
Chloroethane	40.4	5.0	ug/kg	40.0		101	75-125			
Chloroform	38.6	5.0	ug/kg	40.0		96.5	75-125			
Chloromethane	40.6	5.0	ug/kg	40.0		102	75-125			
Dibromochloromethane	41.4	5.0	ug/kg	40.0		104	75-125			
1,4-Dichlorobenzene	39.8	5.0	ug/kg	40.0		99.5	75-125			
1,1-Dichloroethane	41.2	5.0	ug/kg	40.0		103	75-125			
1,2-Dichloroethane (EDC)	38.4	5.0	ug/kg	40.0		96.0	75-125			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS Soil - Quality Control										
Batch B6A2517 - EPA 5035										
LCS (B6A2517-BS1) Continued				Prepared & Analyzed: 01/25/06						
trans-1,2-Dichloroethylene	40.8	5.0	ug/kg	40.0		102	75-125			
cis-1,2-Dichloroethylene	40.6	5.0	ug/kg	40.0		102	75-125			
1,1-Dichloroethylene	38.6	5.0	ug/kg	40.0		96.5	75-125			
1,2-Dichloropropane	41.6	5.0	ug/kg	40.0		104	75-125			
cis-1,3-Dichloropropylene	43.4	5.0	ug/kg	40.0		108	75-125			
Ethylbenzene	42.4	2.0	ug/kg	40.0		106	75-125			
Methyl-tert-Butyl Ether (MTBE)	38.6	5.0	ug/kg	40.0		96.5	75-125			
Methylene Chloride	51.0	50	ug/kg	40.0		128	75-125			
n-Propylbenzene	36.0	5.0	ug/kg	40.0		90.0	75-125			
1,1,2,2-Tetrachloroethane	44.8	5.0	ug/kg	40.0		112	75-125			
Tetrachloroethylene (PCE)	47.4	5.0	ug/kg	40.0		118	75-125			
Toluene	42.4	2.0	ug/kg	40.0		106	75-125			
1,1,2-Trichloroethane	43.2	5.0	ug/kg	40.0		108	75-125			
1,1,1-Trichloroethane	35.2	5.0	ug/kg	40.0		88.0	75-125			
Trichloroethylene (TCE)	39.8	5.0	ug/kg	40.0		99.5	75-125			
Vinyl chloride	41.0	5.0	ug/kg	40.0		102	75-125			
o-Xylene	39.8	2.0	ug/kg	40.0		99.5	75-125			
Surrogate: 4-Bromofluorobenzene	*82.8*		*ug/kg*	*100*		*82.8*	*80-120*			
Surrogate: Dibromofluoromethane	*87.2*		*ug/kg*	*100*		*87.2*	*80-120*			
Surrogate: Toluene-d8	*102*		*ug/kg*	*100*		*102*	*80-120*			
Matrix Spike (B6A2517-MS1)			Source: 6A24002-02	Prepared & Analyzed: 01/25/06						
Benzene	40.2	2.0	ug/kg	40.0	<2.0	100	70-130			
Bromoform	33.0	5.0	ug/kg	40.0	<5.0	82.5	70-130			
Chlorobenzene	41.0	5.0	ug/kg	40.0	<5.0	102	70-130			
Chloroform	38.2	5.0	ug/kg	40.0	<5.0	95.5	70-130			
1,1-Dichloroethane	34.4	5.0	ug/kg	40.0	<5.0	86.0	70-130			
cis-1,2-Dichloroethylene	34.0	5.0	ug/kg	40.0	<5.0	85.0	70-130			
1,1-Dichloroethylene	39.2	5.0	ug/kg	40.0	<5.0	98.0	70-130			
1,2-Dichloropropane	35.2	5.0	ug/kg	40.0	<5.0	88.0	70-130			
Ethylbenzene	44.0	2.0	ug/kg	40.0	<2.0	110	70-130			
Methyl-tert-Butyl Ether (MTBE)	33.2	5.0	ug/kg	40.0	<5.0	83.0	70-130			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS Soil - Quality Control										
Batch B6A2517 - EPA 5035										
Matrix Spike (B6A2517-MS1) Continued Source: 6A24002-02 Prepared & Analyzed: 01/25/06										
n-Propylbenzene	38.2	5.0	ug/kg	40.0	<5.0	95.5	70-130			
Tetrachloroethylene (PCE)	44.0	5.0	ug/kg	40.0	<5.0	110	70-130			
Toluene	43.8	2.0	ug/kg	40.0	<2.0	110	70-130			
1,1,1-Trichloroethane	34.8	5.0	ug/kg	40.0	<5.0	87.0	70-130			
Trichloroethylene (TCE)	40.4	5.0	ug/kg	40.0	<5.0	101	70-130			
1,3,5-Trimethylbenzene	35.6	5.0	ug/kg	40.0	<5.0	89.0	70-130			
Vinyl chloride	42.6	5.0	ug/kg	40.0	<5.0	106	70-130			
Surrogate: 4-Bromofluorobenzene	*85.0*		*ug/kg*	*100*		*85.0*	*80-120*			
Surrogate: Dibromofluoromethane	*85.4*		*ug/kg*	*100*		*85.4*	*80-120*			
Surrogate: Toluene-d8	*106*		*ug/kg*	*100*		*106*	*80-120*			
Matrix Spike Dup (B6A2517-MSD1) Source: 6A24002-02 Prepared & Analyzed: 01/25/06										
Benzene	40.8	2.0	ug/kg	40.0	<2.0	102	70-130	1.48	40	
Bromoform	34.0	5.0	ug/kg	40.0	<5.0	85.0	70-130	2.99	40	
Chlorobenzene	41.2	5.0	ug/kg	40.0	<5.0	103	70-130	0.487	40	
Chloroform	34.2	5.0	ug/kg	40.0	<5.0	85.5	70-130	11.0	40	
1,1-Dichloroethane	37.0	5.0	ug/kg	40.0	<5.0	92.5	70-130	7.28	40	
cis-1,2-Dichloroethylene	36.2	5.0	ug/kg	40.0	<5.0	90.5	70-130	6.27	40	
1,1-Dichloroethylene	39.6	5.0	ug/kg	40.0	<5.0	99.0	70-130	1.02	40	
1,2-Dichloropropane	40.0	5.0	ug/kg	40.0	<5.0	100	70-130	12.8	40	
Ethylbenzene	43.4	2.0	ug/kg	40.0	<2.0	108	70-130	1.37	40	
Methyl-tert-Butyl Ether (MTBE)	33.2	5.0	ug/kg	40.0	<5.0	83.0	70-130	0.00	40	
n-Propylbenzene	35.6	5.0	ug/kg	40.0	<5.0	89.0	70-130	7.05	40	
Tetrachloroethylene (PCE)	42.6	5.0	ug/kg	40.0	<5.0	106	70-130	3.23	40	
Toluene	43.2	2.0	ug/kg	40.0	<2.0	108	70-130	1.38	40	
1,1,1-Trichloroethane	34.6	5.0	ug/kg	40.0	<5.0	86.5	70-130	0.576	40	
Trichloroethylene (TCE)	39.6	5.0	ug/kg	40.0	<5.0	99.0	70-130	2.00	40	
1,3,5-Trimethylbenzene	33.8	5.0	ug/kg	40.0	<5.0	84.5	70-130	5.19	40	
Vinyl chloride	45.2	5.0	ug/kg	40.0	<5.0	113	70-130	5.92	40	
Surrogate: 4-Bromofluorobenzene	*81.4*		*ug/kg*	*100*		*81.4*	*80-120*			
Surrogate: Dibromofluoromethane	*86.0*		*ug/kg*	*100*		*86.0*	*80-120*			
Surrogate: Toluene-d8	*104*		*ug/kg*	*100*		*104*	*80-120*			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Metals CAM 17 - Quality Control										
Batch B6A3014 - EPA 3050B										
Blank (B6A3014-BLK1)				Prepared & Analyzed: 01/30/06						
Antimony	<10	10	mg/kg							
Arsenic	<0.50	0.50	mg/kg							
Barium	<10	10	mg/kg							
Beryllium	<1.0	1.0	mg/kg							
Cadmium	<1.0	1.0	mg/kg							
Chromium	<3.0	3.0	mg/kg							
Cobalt	<3.0	3.0	mg/kg							
Copper	<3.0	3.0	mg/kg							
Lead	<3.0	3.0	mg/kg							
Molybdenum	<5.0	5.0	mg/kg							
Nickel	<3.0	3.0	mg/kg							
Selenium	<0.50	0.50	mg/kg							
Silver	<1.0	1.0	mg/kg							
Thallium	<5.0	5.0	mg/kg							
Vanadium	<10	10	mg/kg							
Zinc	<3.0	3.0	mg/kg							
LCS (B6A3014-BS1)				Prepared & Analyzed: 01/30/06						
Antimony	52.2	10	mg/kg	50.0		104	80-120			
Arsenic	52.4	0.50	mg/kg	50.0		105	80-120			
Barium	50.6	10	mg/kg	50.0		101	80-120			
Beryllium	52.0	1.0	mg/kg	50.0		104	80-120			
Cadmium	51.6	1.0	mg/kg	50.0		103	80-120			
Chromium	51.3	3.0	mg/kg	50.0		103	80-120			
Cobalt	52.2	3.0	mg/kg	50.0		104	80-120			
Copper	51.6	3.0	mg/kg	50.0		103	80-120			
Lead	51.6	3.0	mg/kg	50.0		103	80-120			
Molybdenum	52.8	5.0	mg/kg	50.0		106	80-120			
Nickel	51.2	3.0	mg/kg	50.0		102	80-120			
Selenium	53.0	0.50	mg/kg	50.0		106	80-120			
Silver	51.4	1.0	mg/kg	50.0		103	80-120			

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QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Metals CAM 17 - Quality Control										
Batch B6A3014 - EPA 3050B										
LCS (B6A3014-BS1) Continued				Prepared & Analyzed: 01/30/06						
Thallium	52.2	5.0	mg/kg	50.0		104	80-120			
Vanadium	51.4	10	mg/kg	50.0		103	80-120			
Zinc	51.5	3.0	mg/kg	50.0		103	80-120			
LCS Dup (B6A3014-BSD1)				Prepared & Analyzed: 01/30/06						
Antimony	51.8	10	mg/kg	50.0		104	80-120	0.769	20	
Arsenic	52.0	0.50	mg/kg	50.0		104	80-120	0.766	20	
Barium	49.8	10	mg/kg	50.0		99.6	80-120	1.59	20	
Beryllium	51.5	1.0	mg/kg	50.0		103	80-120	0.966	20	
Cadmium	51.0	1.0	mg/kg	50.0		102	80-120	1.17	20	
Chromium	50.7	3.0	mg/kg	50.0		101	80-120	1.18	20	
Cobalt	51.6	3.0	mg/kg	50.0		103	80-120	1.16	20	
Copper	50.9	3.0	mg/kg	50.0		102	80-120	1.37	20	
Lead	51.0	3.0	mg/kg	50.0		102	80-120	1.17	20	
Molybdenum	52.5	5.0	mg/kg	50.0		105	80-120	0.570	20	
Nickel	50.7	3.0	mg/kg	50.0		101	80-120	0.981	20	
Selenium	52.7	0.50	mg/kg	50.0		105	80-120	0.568	20	
Silver	50.9	1.0	mg/kg	50.0		102	80-120	0.978	20	
Thallium	52.0	5.0	mg/kg	50.0		104	80-120	0.384	20	
Vanadium	50.8	10	mg/kg	50.0		102	80-120	1.17	20	
Zinc	50.8	3.0	mg/kg	50.0		102	80-120	1.37	20	
Matrix Spike (B6A3014-MS1)		Source: 6A24002-01		Prepared & Analyzed: 01/30/06						
Antimony	54.8	10	mg/kg	50.0	<10	110	75-125			
Arsenic	58.2	0.50	mg/kg	50.0	3.9	109	75-125			
Barium	200	10	mg/kg	50.0	150	100	75-125			
Beryllium	54.8	1.0	mg/kg	50.0	<1.0	110	75-125			
Cadmium	51.6	1.0	mg/kg	50.0	<1.0	103	75-125			
Chromium	73.8	3.0	mg/kg	50.0	22	104	75-125			
Cobalt	56.9	3.0	mg/kg	50.0	3.8	106	75-125			
Copper	395	3.0	mg/kg	50.0	350	90.0	75-125			
Lead	149	3.0	mg/kg	50.0	99	100	75-125			
Molybdenum	56.9	5.0	mg/kg	50.0	<5.0	114	75-125			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Metals CAM 17 - Quality Control										
Batch B6A3014 - EPA 3050B										
Matrix Spike (B6A3014-MS1) Continued Source: 6A24002-01 Prepared & Analyzed: 01/30/06										
Nickel	61.8	3.0	mg/kg	50.0	10	104	75-125			
Selenium	44.1	0.50	mg/kg	50.0	<0.50	88.2	75-125			
Silver	55.0	1.0	mg/kg	50.0	<1.0	110	75-125			
Thallium	48.0	5.0	mg/kg	50.0	<5.0	96.0	75-125			
Vanadium	85.2	10	mg/kg	50.0	33	104	75-125			
Zinc	195	3.0	mg/kg	50.0	150	90.0	75-125			
Matrix Spike Dup (B6A3014-MSD1) Source: 6A24002-01 Prepared & Analyzed: 01/30/06										
Antimony	53.8	10	mg/kg	50.0	<10	108	75-125	1.84	40	
Arsenic	57.0	0.50	mg/kg	50.0	3.9	106	75-125	2.08	40	
Barium	194	10	mg/kg	50.0	150	88.0	75-125	3.05	40	
Beryllium	53.6	1.0	mg/kg	50.0	<1.0	107	75-125	2.21	40	
Cadmium	50.3	1.0	mg/kg	50.0	<1.0	101	75-125	2.55	40	
Chromium	72.0	3.0	mg/kg	50.0	22	100	75-125	2.47	40	
Cobalt	55.6	3.0	mg/kg	50.0	3.8	104	75-125	2.31	40	
Copper	384	3.0	mg/kg	50.0	350	68.0	75-125	2.82	40	QM-4X
Lead	146	3.0	mg/kg	50.0	99	94.0	75-125	2.03	40	
Molybdenum	55.8	5.0	mg/kg	50.0	<5.0	112	75-125	1.95	40	
Nickel	60.0	3.0	mg/kg	50.0	10	100	75-125	2.96	40	
Selenium	43.6	0.50	mg/kg	50.0	<0.50	87.2	75-125	1.14	40	
Silver	53.8	1.0	mg/kg	50.0	<1.0	108	75-125	2.21	40	
Thallium	47.0	5.0	mg/kg	50.0	<5.0	94.0	75-125	2.11	40	
Vanadium	83.2	10	mg/kg	50.0	33	100	75-125	2.38	40	
Zinc	191	3.0	mg/kg	50.0	150	82.0	75-125	2.07	40	
Total Metals CAM 17 - Quality Control										
Batch B6A3015 - EPA 7471A Prep										
Blank (B6A3015-BLK1) Prepared & Analyzed: 01/26/06										
Mercury	<0.020	0.020	mg/kg							
LCS (B6A3015-BS1) Prepared & Analyzed: 01/26/06										
Mercury	0.966	0.020	mg/kg	1.00		96.6	85-115			
LCS Dup (B6A3015-BSD1) Prepared & Analyzed: 01/26/06										

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Metals CAM 17 - Quality Control										
Batch B6A3015 - EPA 7471A Prep										
LCS Dup (B6A3015-BSD1) Continued				Prepared & Analyzed: 01/26/06						
Mercury	0.990	0.020	mg/kg	1.00		99.0	85-115	2.45	25	
Matrix Spike (B6A3015-MS1)			Source: 6A24002-01	Prepared & Analyzed: 01/26/06						
Mercury	1.02	0.020	mg/kg	1.00	0.080	94.0	75-125			
Matrix Spike Dup (B6A3015-MSD1)			Source: 6A24002-01	Prepared & Analyzed: 01/26/06						
Mercury	1.02	0.020	mg/kg	1.00	0.080	94.0	75-125	0.00	25	
Carbon Chain by GC/FID - Quality Control										
Batch B6A2521 - EPA 3550B										
Blank (B6A2521-BLK1)				Prepared & Analyzed: 01/25/06						
C6-C8	<1.0	1.0	mg/kg							
C8-C10	<1.0	1.0	mg/kg							
C10-C12	<1.0	1.0	mg/kg							
C12-C14	<1.0	1.0	mg/kg							
C14-C16	<1.0	1.0	mg/kg							
C16-C18	<1.0	1.0	mg/kg							
C18-C20	<1.0	1.0	mg/kg							
C20-C22	<1.0	1.0	mg/kg							
C22-C24	<1.0	1.0	mg/kg							
C24-C26	<1.0	1.0	mg/kg							
C26-C28	<1.0	1.0	mg/kg							
C28-C32	<1.0	1.0	mg/kg							
C32-C34	<1.0	1.0	mg/kg							
C34-C36	<1.0	1.0	mg/kg							
C36-C40	<1.0	1.0	mg/kg							
C40-C44	<1.0	1.0	mg/kg							
TPH (C6-C44)	<10	10	mg/kg							
Surrogate: o-Terphenyl	*9.20*		*mg/kg*	*10.0*		*92.0*	*50-150*			
LCS (B6A2521-BS1)				Prepared & Analyzed: 01/25/06						
Diesel Range Organics as Diesel	169	10	mg/kg	200		84.5	75-125			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304123-1
Project Name: Admiralty Construction

AA Project No: MB1011717
Date Received: 01/23/06
Date Reported: 02/02/06

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Carbon Chain by GC/FID - Quality Control										
Batch B6A2521 - EPA 3550B										
LCS (B6A2521-BS1) Continued				Prepared & Analyzed: 01/25/06						
Surrogate: o-Terphenyl	*9.70*		*mg/kg*	*10.0*		*97.0*	*50-150*			
Matrix Spike (B6A2521-MS1)			Source: 6A24002-08	Prepared & Analyzed: 01/25/06						
Diesel Range Organics as Diesel	169	10	mg/kg	200	<10	84.5	70-130			
Surrogate: o-Terphenyl	*10.4*		*mg/kg*	*10.0*		*104*	*50-150*			
Matrix Spike Dup (B6A2521-MSD1)			Source: 6A24002-08	Prepared & Analyzed: 01/25/06						
Diesel Range Organics as Diesel	151	10	mg/kg	200	<10	75.5	70-130	11.2	40	
Surrogate: o-Terphenyl	*11.5*		*mg/kg*	*10.0*		*115*	*50-150*			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011717
Project No:	E0304123-1	Date Received:	01/23/06
Project Name:	Admiralty Construction	Date Reported:	02/02/06

Special Notes

[1] = * : Subcontracted to a DOHS State-Certified Laboratory

[2] = QM-4X : The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

[3] = S-04 : The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.

Allen Aminian
QA/QC Manager

AMERICAN ANALYTICS CHAIN-OF-CUSTODY RECORD

9765 ETON AVE., CHATSWORTH, CA 91311
Tel: 818-998-5547 FAX: 818-998-7258

№ 309509
DATE: 1-23-06
PAGE 1 OF 1

AA Client: ENVIRO PRO	Phone	Sampler's Name (Print)	
Project Manager: M. UZICK	P.O. No.	Sampler's Signature	
Project Name: ADMIRALTY CONSTRUCTION TRN	Client's Project No. E03041123-1	Project Manager's Signature	
Job Name and Address: MARINA DEL REY, CA			

ANALYSIS REQUIRED (Test Name)

Client's I.D.	A.A. I.D.#	Date	Time	Sample Type	Number of Containers	8260B OXY + GAS	8270	CAM METALS	8081A	8151A	CARBON CHAIN	C03.5	Client's Comment Special Test Requirements / Comments (i.e., - Turnaround Time Detection Limits Data Package...)
PLS1-4	6A24002-01	01-23-06	0830	S	1	X	X	X	X	X	X		
PLS2-4	-02		0910	S	1	X	X	X	X	X	X		5 DAY T.A.T.
PLS3-2	-03		0935	S	1	X	X	X	X	X	X		
PLS4-5	-04		1000	S	1	X	X	X	X	X	X		
PLS5-4	-05		1020	S	1	X	X	X	X	X	X		
PLS6-4	-06		1100	S	1	X	X	X	X	X	X		
PLS7-14	-07		1135	S	1	X	X	X	X	X	X		
PLS8-15	-08	↓	1400	S	1	X	X	X	X	X	X		

06 JAN 23 PM 4:13

LAB COMMENTS

Relinquished by	Date	Time	Received by
[signature]	1-23-06	1624	[signature]

Approved as Work Order by: Print Name: Allen Amirjan Signature: [signature] Date/Time: 1/24/06

AA Project No.: 6A24002

DISTRIBUTION: Page 1, White - Laboratory Page 2, Yellow - Laboratory Page 3, Pink - Account Executive Page 4, Gold - Client

ENVIROPRO, INC.
Comprehensive Environmental Services & Technology

REPORT
ON
SOIL BORING, SAMPLING AND ENVIRONMENTAL ANALYSIS

Parcels 19, 20, and 21
Panay Way
Marina del Rey, CA

March 7, 2006

Enviropro, Inc.
Project No. E0304125

Prepared for

Mr. Frank Hickman and Mr. Kirk Buteyn
Prestige Homes, Inc.
5150 Overland Avenue
Culver City, CA 90230
Tel: (310) 280-5057
Fax No. (310) 280-5013

ENVIROPRO, INC.
Comprehensive Environmental Services & Technology

March 7, 2006

Mr. Frank Hickman and Mr. Kirk Buteyn
Prestige Homes, Inc.
5150 Overland Avenue
Culver City, CA 90230

Via E-mail: fdhickman@gkind.com
kbuteyn@gkind.com
and Fax No. 310-280-5013

Enviropro, Inc. Project E0304125

Subject: Report on Soil Boring, Sampling and Environmental Analysis for Parcels 19, 20, and 21, Panay Way, Marina del Rey, California

Dear Mr. Buteyn and Mr. Hickman:

Attached is our report for the subject project. **This study found no priority pollutants in the samples analyzed.** The report summarizes the results of our soil sampling and chemical analyses conducted as per scope of work we agreed upon earlier and in the field on the day of drilling. The summary section describes the fieldwork activities and analytical methods used for the site assessment - and also presents a summary of our findings. The soil samples were collected from the site on February 16, 2006, and the analytical work was performed by American Analytics, Inc., a state-certified environmental analytical laboratory. A copy of the complete analytical report for all tests conducted is attached as Appendix B.

If you have any questions about the subject report, please call Michael Uziel at 818-998-7197. It was a pleasure to work with you and be of service to your organization, and we very much appreciate your business.

Sincerely,

ENVIROPRO, INC.

Michael M. Uziel, Ph.D.
Vice President/Principal Engineer

K. Craig Klein, P.E. No. 7884
Senior Geologist

PROFESSIONAL GEOLOGIST
K. CRAIG KLEIN
No. 7884
STATE OF CALIFORNIA

MMU/KCK/ds
Attachments

DESCRIPTION OF THE WORK

Soil drilling and sampling were performed on Parcels 19, 20, and 21 located along the northern side of Panay Way, in Marina del Rey, California (Figure 1). The subject site adjoins the piers to the north, is rectangular in shape and approximately 3 acres in size. The majority of the site is used as an automobile parking lot and has two small buildings.

This project consisted of a field boring and soil sampling program, and associated chemical analyses for priority pollutants regulated by the EPA. The chemical analyses were performed by American Analytics, Inc., an environmental state-certified laboratory. Refer to the Site Plan (Figure 2, Appendix A) for an overview of the site layout and specific soil sampling locations.

Five (5) random undisturbed soil samples (identified as S-1 through S-5) were collected from the site on February 16, 2006, using a Geoprobe™ sampling rig. Samples destined for VOC analysis were collected in accordance with the requirements of EPA Method 5035. Drilling depths were five (5) feet below ground surface (bgs) at each boring location. The samples were prepared, identified and taken to the American Analytics laboratory for chemical analyses by the EPA analytical procedures described below. Since the site is an old ocean fill, there is not specific information on the fill materials. Therefore, we analyzed for priority pollutants that may render the fill toxic waste if excavated for disposal. We have analyzed for the following:

1. CAM heavy metals, less Hg, by EPA 6000/7000 (CAM: California Assessment Manual)

2. Volatile organic compounds by EPA 8260B/5035

3. Semi-volatile organic compounds by EPA 8270C

4. Pesticides:
   - Organochlorine pesticides by EPA 8081A
   - Herbicides by EPA 8151A

5. TPH gas and fuel oxygenates by EPA 8260B/5035

6. Carbon chain characterization by EPA 8015M

7. Total mercury by EPA 7470/7471A

A copy of the original laboratory report of all of our analytical test results is attached as Appendix B to this report. Our test results show that several samples had detectable levels of certain regulated metals. However, these concentrations may be attributed to naturally occurring metals, and if they are a part of an artificial fill, the levels are very low and below any regulatory criteria. The analytical results for all samples are not high enough for rendering the materials hazardous waste, if excavated. No organic priority pollutants were detected. Therefore, the analytical results indicate that no waste or toxic fill is part of the samples analyzed.

Groundwater samples were not part of the subject scope of work. However, ocean water was measured at 6 to 10 feet bgs. This water consists of unusable ocean saltwater of Marina del Rey, California.

LIST OF APPENDICES

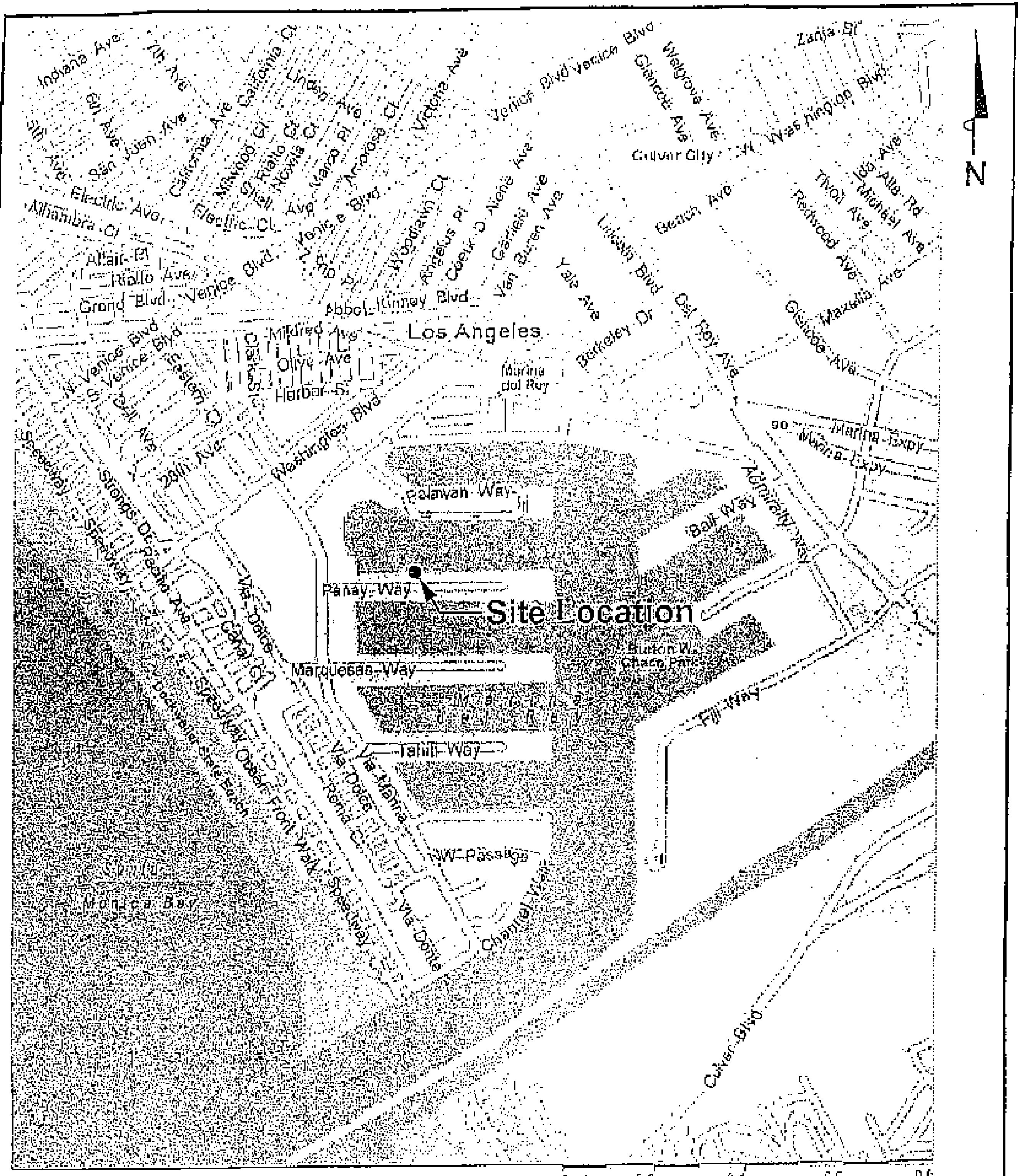
Appendix A: Figures 1 and 2

Appendix B: Detailed Laboratory Reports

APPENDIX A

Figure 1: Site Location Map

Figure 2: Site Plan with Soil Boring Locations



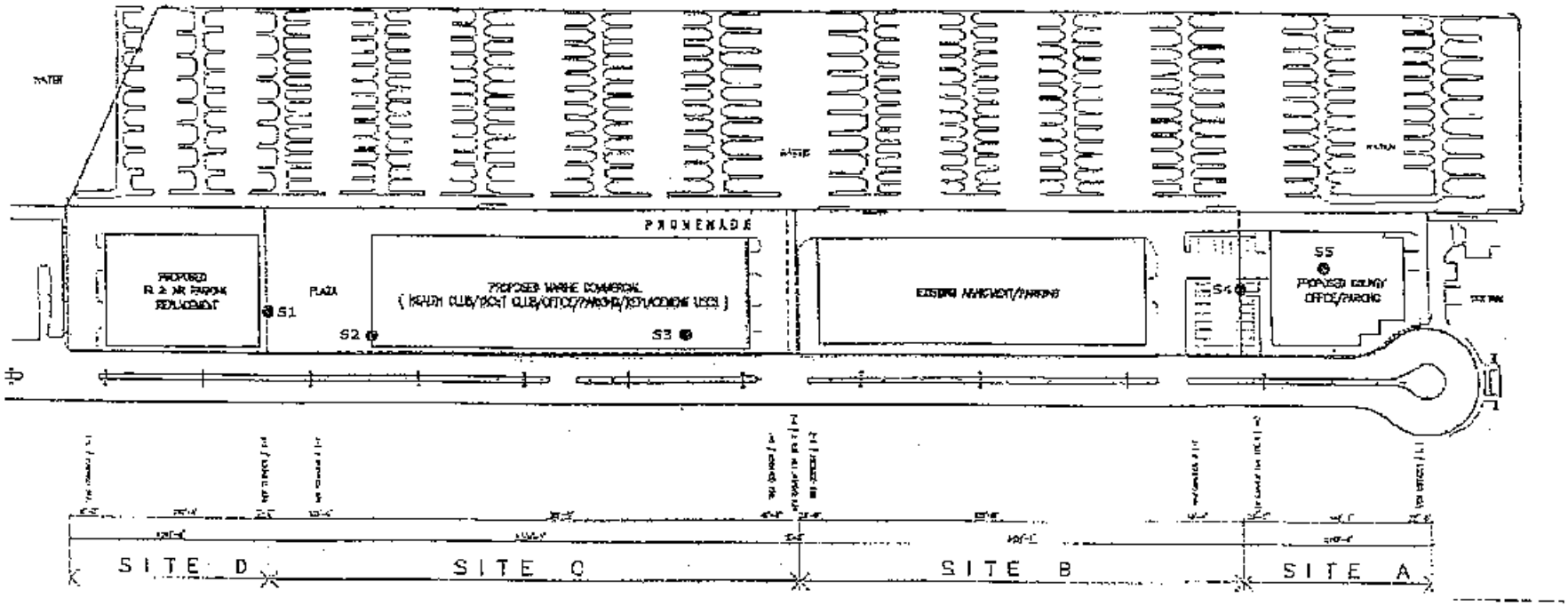
ENVIROPRO, INC.

Comprehensive Environmental Services & Technology
9765 Eton Avenue • Chatsworth, CA 91311

Drawn by: T.B.	
Date: 03/09/2006	
Project No. E0304125	
File Name: SiteLocationMap	

SITE LOCATION MAP
Parcels 19, 20, 21
Panay Way
Marina Del Rey, California

FIGURE NUMBER:
1



LEGEND

S1 ● SOIL BORING LOCATION

N

NOT TO SCALE

SOURCE: GOLDRICH & KEST

ENVIROPRO, INC.
Comprehensive Environmental Services & Technology
9765 Eton Avenue • Chatsworth, CA 91311

Drawn by: T.B.
Date: 03/09/2006
Project No. 60304125
File Name: Fig2SoilBorings

SITE PLAN WITH SOIL BORING LOCATIONS
Parcels 19, 20 21
Panay Way
Marina Del Rey, California

FIGURE NUMBER:
2

APPENDIX B

Detailed Laboratory Reports

AMERICAN ANALYTICS

9765 Eton Avenue
Chatsworth
California 91311
Tel: (818) 998-5547
Fax: (818) 998-7258

March 09, 2006

Mike Uziel

Enviropro inc

9765 ETON AVE

CHATSWORTH, CA 91311

Re : Panay Way / E0304125

MB1011720 / 6B16004

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received on 02/16/06 14:24 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Assurance Program Manual, applicable standard operating procedures, and other related documentation. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report or require additional information please call me at American Analytics.

Sincerely,

Allen Aminian

QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: M31011720
Date Received: 02/16/06
Date Reported: 03/09/06

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
8081A OCPs					
S1-5	6B16004-01	Soil	10	02/16/06 07:15	02/16/06 14:24
S2-5	6B16004-03	Soil	10	02/16/06 09:00	02/16/06 14:24
S3-5	6B16004-04	Soil	10	02/16/06 10:50	02/16/06 14:24
S4-5	6B16004-05	Soil	10	02/16/06 11:40	02/16/06 14:24
S5-5	6B16004-06	Soil	10	02/16/06 12:15	02/16/06 14:24
8082 PCBs					
S1-5	6B16004-01	Soil	10	02/16/06 07:15	02/16/06 14:24
S2-5	6B16004-03	Soil	10	02/16/06 09:00	02/16/06 14:24
S3-5	6B16004-04	Soil	10	02/16/06 10:50	02/16/06 14:24
S4-5	6B16004-05	Soil	10	02/16/06 11:40	02/16/06 14:24
S5-5	6B16004-06	Soil	10	02/16/06 12:15	02/16/06 14:24
8151A Herbicides					
S1-5	6B16004-01	Soil	10	02/16/06 07:15	02/16/06 14:24
S2-5	6B16004-03	Soil	10	02/16/06 09:00	02/16/06 14:24
S3-5	6B16004-04	Soil	10	02/16/06 10:50	02/16/06 14:24
S4-5	6B16004-05	Soil	10	02/16/06 11:40	02/16/06 14:24
S5-5	6B16004-06	Soil	10	02/16/06 12:15	02/16/06 14:24
8260B/5035 +OXY+TPHG					
S1-5	6B16004-01	Soil	10	02/16/06 07:15	02/16/06 14:24
S2-5	6B16004-03	Soil	10	02/16/06 09:00	02/16/06 14:24
S3-5	6B16004-04	Soil	10	02/16/06 10:50	02/16/06 14:24

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
S4-5	6B16004-05	Soil	10	02/16/06 11:40	02/16/06 14:24
S5-5	6B16004-06	Soil	10	02/16/06 12:15	02/16/06 14:24
8270C					
S1-5	6B16004-01	Soil	10	02/16/06 07:15	02/16/06 14:24
S2-5	6B16004-03	Soil	10	02/16/06 09:00	02/16/06 14:24
S3-5	6B16004-04	Soil	10	02/16/06 10:50	02/16/06 14:24
S4-5	6B16004-05	Soil	10	02/16/06 11:40	02/16/06 14:24
S5-5	6B16004-06	Soil	10	02/16/06 12:15	02/16/06 14:24
CAM Metals Less Hg 6000/7000					
S1-5	6B16004-01	Soil	10	02/16/06 07:15	02/16/06 14:24
S2-5	6B16004-03	Soil	10	02/16/06 09:00	02/16/06 14:24
S3-5	6B16004-04	Soil	10	02/16/06 10:50	02/16/06 14:24
S4-5	6B16004-05	Soil	10	02/16/06 11:40	02/16/06 14:24
S5-5	6B16004-06	Soil	10	02/16/06 12:15	02/16/06 14:24
Carbon Chain Characterization 8015M					
S1-5	6B16004-01	Soil	10	02/16/06 07:15	02/16/06 14:24
S2-5	6B16004-03	Soil	10	02/16/06 09:00	02/16/06 14:24
S3-5	6B16004-04	Soil	10	02/16/06 10:50	02/16/06 14:24
S4-5	6B16004-05	Soil	10	02/16/06 11:40	02/16/06 14:24
S5-5	6B16004-06	Soil	10	02/16/06 12:15	02/16/06 14:24
Mercury Total EPA 7470A/7471A					
S1-5	6B16004-01	Soil	10	02/16/06 07:15	02/16/06 14:24

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
S2-5	6B16004-03	Soil	10	02/16/06 09:00	02/16/06 14:24
S3-5	6B16004-04	Soil	10	02/16/06 10:50	02/16/06 14:24
S4-5	6B16004-05	Soil	10	02/16/06 11:40	02/16/06 14:24
S5-5	6B16004-06	Soil	10	02/16/06 12:15	02/16/06 14:24

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way
Method: Semivolatile Organics by GC/MS

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06
Units: mg/kg

Date Sampled:	02/16/06	02/16/06	02/16/06	02/16/06	
Date Prepared:	02/21/06	02/21/06	02/21/06	02/21/06	
Date Analyzed:	02/22/06	02/22/06	02/22/06	02/22/06	
AA ID No:	6B16004-01	6B16004-03	6B16004-04	6B16004-05	
Client ID No:	S1-5	S2-5	S3-5	S4-5	
Matrix:	Soil	Soil	Soil	Soil	
Dilution Factor:	1	1	1	1	MRL
8270C (EPA 8270C)					
3,3'-Dichlorobenzidine	<0.40	<0.40	<0.40	<0.40	0.40
Acenaphthene	<0.10	<0.10	<0.10	<0.10	0.10
Acenaphthylene	<0.10	<0.10	<0.10	<0.10	0.10
Aniline	<0.20	<0.20	<0.20	<0.20	0.20
Anthracene	<0.10	<0.10	<0.10	<0.10	0.10
Azobenzene	<0.10	<0.10	<0.10	<0.10	0.10
Benzidine	<0.40	<0.40	<0.40	<0.40	0.40
Benzo(a)anthracene	<0.10	<0.10	<0.10	<0.10	0.10
Benzo(a)pyrene	<0.10	<0.10	<0.10	<0.10	0.10
Benzo(b)fluoranthene	<0.10	<0.10	<0.10	<0.10	0.10
Benzo(g,h,i)perylene	<0.10	<0.10	<0.10	<0.10	0.10
Benzoic acid	<1.0	<1.0	<1.0	<1.0	1.0
Benzo(k)fluoranthene	<0.10	<0.10	<0.10	<0.10	0.10
Benzyl alcohol	<0.10	<0.10	<0.10	<0.10	0.10
4-Bromophenyl phenyl ether	<0.10	<0.10	<0.10	<0.10	0.10
Butyl benzyl phthalate	<0.50	<0.50	<0.50	<0.50	0.50
4-Chloro-3-methylphenol	<0.20	<0.20	<0.20	<0.20	0.20
4-Chloroaniline	<0.40	<0.40	<0.40	<0.40	0.40
Bis(2-chloroethoxy)methane	<0.10	<0.10	<0.10	<0.10	0.10
Bis(2-chloroethyl)ether	<0.10	<0.10	<0.10	<0.10	0.10
Bis(2-chloroisopropyl)ether	<0.10	<0.10	<0.10	<0.10	0.10
2-Chloronaphthalene	<0.10	<0.10	<0.10	<0.10	0.10
2-Chlorophenol	<0.10	<0.10	<0.10	<0.10	0.10
4-Chlorophenyl phenyl ether	<0.10	<0.10	<0.10	<0.10	0.10
Chrysene	<0.10	<0.10	<0.10	<0.10	0.10
Dibenzo(a,h)anthracene	<0.10	<0.10	<0.10	<0.10	0.10
Dibenzofuran	<0.10	<0.10	<0.10	<0.10	0.10

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way
Method: Semivolatile Organics by GC/MS

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06
Units: mg/kg

Date Sampled:	02/16/06	02/16/06	02/16/06	02/16/06	
Date Prepared:	02/21/06	02/21/06	02/21/06	02/21/06	
Date Analyzed:	02/22/06	02/22/06	02/22/06	02/22/06	
AA ID No:	6B16004-01	6B16004-03	6B16004-04	6B16004-05	
Client ID No:	S1-5	S2-5	S3-5	S4-5	
Matrix:	Soil	Soil	Soil	Soil	
Dilution Factor:	1	1	1	1	MRL
8270C (EPA 8270C) (continued)					
Di-n-butyl phthalate	<2.0	<2.0	<2.0	<2.0	2.0
1,2-Dichlorobenzene	<0.10	<0.10	<0.10	<0.10	0.10
1,3-Dichlorobenzene	<0.10	<0.10	<0.10	<0.10	0.10
1,4-Dichlorobenzene	<0.10	<0.10	<0.10	<0.10	0.10
2,4-Dichlorophenol	<0.10	<0.10	<0.10	<0.10	0.10
Diethyl phthalate	<0.80	<0.80	<0.80	<0.80	0.80
2,4-Dimethylphenol	<0.10	<0.10	<0.10	<0.10	0.10
Dimethyl phthalate	<0.20	<0.20	<0.20	<0.20	0.20
4,6-Dinitro-2-methylphenol	<0.20	<0.20	<0.20	<0.20	0.20
2,4-Dinitrophenol	<0.40	<0.40	<0.40	<0.40	0.40
2,6-Dinitrotoluene	<0.10	<0.10	<0.10	<0.10	0.10
2,4-Dinitrotoluene	<0.10	<0.10	<0.10	<0.10	0.10
Di-n-octyl phthalate	<0.10	<0.10	<0.10	<0.10	0.10
1,2-Diphenylhydrazine	<0.10	<0.10	<0.10	<0.10	0.10
Bis(2-ethylhexyl)phthalate	<0.20	<0.20	<0.20	<0.20	0.20
Fluoranthene	<0.10	<0.10	<0.10	<0.10	0.10
Fluorene	<0.10	<0.10	<0.10	<0.10	0.10
Hexachlorobenzene	<0.10	<0.10	<0.10	<0.10	0.10
Hexachlorobutadiene	<0.10	<0.10	<0.10	<0.10	0.10
Hexachlorocyclopentadiene	<0.10	<0.10	<0.10	<0.10	0.10
Hexachloroethane	<0.10	<0.10	<0.10	<0.10	0.10
Indeno (1,2,3-cd) pyrene	<0.40	<0.40	<0.40	<0.40	0.40
Isophorone	<0.10	<0.10	<0.10	<0.10	0.10
2-Methylnaphthalene	<0.10	<0.10	<0.10	<0.10	0.10
2-Methylphenol	<0.20	<0.20	<0.20	<0.20	0.20
3-Methylphenol	<0.20	<0.20	<0.20	<0.20	0.20
4-Methylphenol	<0.20	<0.20	<0.20	<0.20	0.20

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way
Method: Semivolatile Organics by GC/MS

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06
Units: mg/kg

Date Sampled:	02/16/06	02/16/06	02/16/06	02/16/06	
Date Prepared:	02/21/06	02/21/06	02/21/06	02/21/06	
Date Analyzed:	02/22/06	02/22/06	02/22/06	02/22/06	
AA ID No:	6B16004-01	6B16004-03	6B16004-04	6B16004-05	
Client ID No:	S1-5	S2-5	S3-5	S4-5	
Matrix:	Soil	Soil	Soil	Soil	
Dilution Factor:	1	1	1	1	MRL
8270C (EPA 8270C) (continued)					
Naphthalene	<0.10	<0.10	<0.10	<0.10	0.10
4-Nitroaniline	<0.50	<0.50	<0.50	<0.50	0.50
3-Nitroaniline	<0.40	<0.40	<0.40	<0.40	0.40
2-Nitroaniline	<0.10	<0.10	<0.10	<0.10	0.10
Nitrobenzene	<0.10	<0.10	<0.10	<0.10	0.10
2-Nitrophenol	<0.20	<0.20	<0.20	<0.20	0.20
4-Nitrophenol	<0.20	<0.20	<0.20	<0.20	0.20
N-Nitrosodimethylamine	<0.10	<0.10	<0.10	<0.10	0.10
N-Nitrosodiphenylamine	<0.10	<0.10	<0.10	<0.10	0.10
N-Nitrosodi-n-propylamine	<0.10	<0.10	<0.10	<0.10	0.10
Pentachlorophenol	<0.10	<0.10	<0.10	<0.10	0.10
Phenanthrene	<0.10	<0.10	<0.10	<0.10	0.10
Phenol	<0.10	<0.10	0.37	<0.10	0.10
Pyrene	<0.10	<0.10	<0.10	<0.10	0.10
1,2,4-Trichlorobenzene	<0.10	<0.10	<0.10	<0.10	0.10
2,4,5-Trichlorophenol	<0.20	<0.20	<0.20	<0.20	0.20
2,4,6-Trichlorophenol	<0.20	<0.20	<0.20	<0.20	0.20
Surrogates					%REC Limits
2-Fluorobiphenyl	51.7%	51.0%	31.5%	56.2%	43-116
2-Fluorophenol	38.8%	37.4%	24.5%	46.8%	21-100
Nitrobenzene-d5	48.0%	45.8%	27.7%	52.4%	35-134
Phenol-d6	39.8%	38.9%	24.0%	45.2%	10-94
Terphenyl-d14	52.4%	54.7%	55.2%	71.4%	33-141
2,4,6-Tribromophenol	48.2%	48.2%	30.3%	54.0%	10-123

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011720
Project No:	E0304125	Date Received:	02/16/06
Project Name:	Panay Way	Date Reported:	03/09/06
Method:	Semivolatile Organics by GC/MS	Units:	mg/kg

Date Sampled:	02/16/06	
Date Prepared:	02/21/06	
Date Analyzed:	02/22/06	
AA ID No:	6B16004-06	
Client ID No:	S5-5	
Matrix:	Soil	
Dilution Factor:	10	MRL
8270C (EPA 8270C)		
3,3'-Dichlorobenzidine	<4.0	0.40
Acenaphthene	<1.0	0.10
Acenaphthylene	<1.0	0.10
Aniline	<2.0	0.20
Anthracene	<1.0	0.10
Azobenzene	<1.0	0.10
Benzidine	<4.0	0.40
Benzo(a)anthracene	<1.0	0.10
Benzo(a)pyrene	<1.0	0.10
Benzo(b)fluoranthene	<1.0	0.10
Benzo(g,h,i)perylene	<1.0	0.10
Benzoic acid	<10	1.0
Benzo(k)fluoranthene	<1.0	0.10
Benzyl alcohol	<1.0	0.10
4-Bromophenyl phenyl ether	<1.0	0.10
Butyl benzyl phthalate	<5.0	0.50
4-Chloro-3-methylphenol	<2.0	0.20
4-Chloroaniline	<4.0	0.40
Bis(2-chloroethoxy)methane	<1.0	0.10
Bis(2-chloroethyl)ether	<1.0	0.10
Bis(2-chloroisopropyl)ether	<1.0	0.10
2-Chloronaphthalene	<1.0	0.10
2-Chlorophenol	<1.0	0.10
4-Chlorophenyl phenyl ether	<1.0	0.10
Chrysene	<1.0	0.10
Dibenzo(a,h)anthracene	<1.0	0.10
Dibenzofuran	<1.0	0.10

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1C11720
Project No:	E0304125	Date Received:	02/16/06
Project Name:	Panay Way	Date Reported:	03/09/06
Method:	Semivolatile Organics by GC/MS	Units:	mg/kg

Date Sampled:	02/16/06	
Date Prepared:	02/21/06	
Date Analyzed:	02/22/06	
AA ID No:	6B16004-06	
Client ID No:	S5-5	
Matrix:	Soil	
Dilution Factor:	10	MRL
8270C (EPA 8270C) (continued)		
Di-n-butyl phthalate	<20	2.0
1,2-Dichlorobenzene	<1.0	0.10
1,3-Dichlorobenzene	<1.0	0.10
1,4-Dichlorobenzene	<1.0	0.10
2,4-Dichlorophenol	<1.0	0.10
Diethyl phthalate	<8.0	0.80
2,4-Dimethylphenol	<1.0	0.10
Dimethyl phthalate	<2.0	0.20
4,6-Dinitro-2-methylphenol	<2.0	0.20
2,4-Dinitrophenol	<4.0	0.40
2,6-Dinitrotoluene	<1.0	0.10
2,4-Dinitrotoluene	<1.0	0.10
Di-n-octyl phthalate	<1.0	0.10
1,2-Diphenylhydrazine	<1.0	0.10
Bis(2-ethylhexyl)phthalate	<2.0	0.20
Fluoranthene	<1.0	0.10
Fluorene	<1.0	0.10
Hexachlorobenzene	<1.0	0.10
Hexachlorobutadiene	<1.0	0.10
Hexachlorocyclopentadiene	<1.0	0.10
Hexachloroethane	<1.0	0.10
Indeno (1,2,3-cd) pyrene	<4.0	0.40
Isophorone	<1.0	0.10
2-Methylnaphthalene	<1.0	0.10
2-Methylphenol	<2.0	0.20
3-Methylphenol	<2.0	0.20
4-Methylphenol	<2.0	0.20

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011720
Project No:	E0304125	Date Received:	02/16/06
Project Name:	Panay Way	Date Reported:	03/09/06
Method:	Semivolatile Organics by GC/MS	Units:	mg/kg

Date Sampled:	02/16/06	
Date Prepared:	02/21/06	
Date Analyzed:	02/22/06	
AA ID No:	6B16004-06	
Client ID No:	S5-5	
Matrix:	Soil	
Dilution Factor:	10	MRL
8270C (EPA 8270C) (continued)		
Naphthalene	<1.0	0.10
4-Nitroaniline	<5.0	0.50
3-Nitroaniline	<4.0	0.40
2-Nitroaniline	<1.0	0.10
Nitrobenzene	<1.0	0.10
2-Nitrophenol	<2.0	0.20
4-Nitrophenol	<2.0	0.20
N-Nitrosodimethylamine	<1.0	0.10
N-Nitrosodiphenylamine	<1.0	0.10
N-Nitrosodi-n-propylamine	<1.0	0.10
Pentachlorophenol	<1.0	0.10
Phenanthrene	<1.0	0.10
Phenol	<1.0	0.10
Pyrene	<1.0	0.10
1,2,4-Trichlorobenzene	<1.0	0.10
2,4,5-Trichlorophenol	<2.0	0.20
2,4,6-Trichlorophenol	<2.0	0.20

Surrogates		%REC Limits
2-Fluorobiphenyl	44.0%	43-116
2-Fluorophenol	29.7%	21-100
Nitrobenzene-d5	30.0%	35-134
Phenol-d6	27.8%	10-94
Terphenyl-d14	46.0%	33-141
2,4,6-Tribromophenol	35.4%	10-123

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way
Method: Polychlorinated Biphenyls by GC

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06
Units: ug/kg

Date Sampled:	02/16/06	02/16/06	02/16/06	02/16/06	
Date Prepared:	02/22/06	02/22/06	02/22/06	02/22/06	
Date Analyzed:	02/24/06	02/24/06	02/24/06	02/24/06	
AA ID No:	6B16004-01	6B16004-03	6B16004-04	6B16004-05	
Client ID No:	S1-5	S2-5	S3-5	S4-5	
Matrix:	Soil	Soil	Soil	Soil	
Dilution Factor:	10	10	10	10	MRL
8082 PCBs (EPA 8082)					
Aroclor-1016	<200	<200	<200	<200	20
Aroclor-1221	<200	<200	<200	<200	20
Aroclor-1232	<200	<200	<200	<200	20
Aroclor-1242	<200	<200	<200	<200	20
Aroclor-1248	<200	<200	<200	<200	20
Aroclor-1254	<200	<200	<200	<200	20
Aroclor-1260	<200	<200	<200	<200	20
Surrogates					%REC Limits
Tetrachloro-meta-xylene	120%	116%	118%	112%	50-150

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011720
Project No:	E0304125	Date Received:	02/16/06
Project Name:	Panay Way	Date Reported:	03/09/06
Method:	Polychlorinated Biphenyls by GC	Units:	ug/kg

Date Sampled:	02/16/06	
Date Prepared:	02/22/06	
Date Analyzed:	02/24/06	
AA ID No:	6B16004-06	
Client ID No:	S5-5	
Matrix:	Soil	
Dilution Factor:	10	MRL
8082 PCBs (EPA 8082)		
Aroclor-1016	<200	20
Aroclor-1221	<200	20
Aroclor-1232	<200	20
Aroclor-1242	<200	20
Aroclor-1248	<200	20
Aroclor-1254	<200	20
Aroclor-1260	<200	20
Surrogates		**%REC Limits**
Tetrachloro-meta-xylene	130%	50-150

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way
Method: Organochlorine Pesticides by GC EPA 8081A

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06
Units: ug/kg

Date Sampled:	02/16/06	02/16/06	02/16/06	02/16/06	
Date Prepared:	02/22/06	02/22/06	02/22/06	02/22/06	
Date Analyzed:	02/24/06	02/24/06	02/24/06	02/24/06	
AA ID No:	6B16004-01	6B16004-03	6B16004-04	6B16004-05	
Client ID No:	S1-5	S2-5	S3-5	S4-5	
Matrix:	Soil	Soil	Soil	Soil	
Dilution Factor:	10	10	10	10	MRL
8081A OCPs (EPA 8081A)					
4,4'-DDD	<40	<40	<40	<40	4.0
4,4'-DDE	<40	<40	<40	<40	4.0
4,4'-DDT	<40	<40	<40	<40	4.0
Aldrin	<20	<20	<20	<20	2.0
beta-BHC	<20	<20	<20	<20	2.0
delta-BHC	<20	<20	<20	<20	2.0
alpha-BHC	<20	<20	<20	<20	2.0
gamma-BHC (Lindane)	<40	<40	<40	<40	4.0
gamma-Chlordane	<40	<40	<40	<40	4.0
alpha-Chlordane	<40	<40	<40	<40	4.0
Chlordane	<200	<200	<200	<200	20
Dieldrin	<40	<40	<40	<40	4.0
Endosulfan I	<20	<20	<20	<20	2.0
Endosulfan II	<40	<40	<40	<40	4.0
Endosulfan sulfate	<40	<40	<40	<40	4.0
Endrin	<40	<40	<40	<40	4.0
Endrin aldehyde	<40	<40	<40	<40	4.0
Endrin ketone	<40	<40	<40	<40	4.0
Heptachlor	<20	<20	<20	<20	2.0
Heptachlor epoxide	<20	<20	<20	<20	2.0
Methoxychlor	<200	<200	<200	<200	20
Toxaphene	<1000	<1000	<1000	<1000	100
Surrogates					%REC Limits
Tetrachloro-meta-xylene	120%	116%	118%	112%	50-150

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Envircpro Inc	AA Project No:	MB1011720
Project No:	E0304125	Date Received:	02/16/06
Project Name:	Panay Way	Date Reported:	03/09/06
Method:	Organochlorine Pesticides by GC EPA 8081A	Units:	ug/kg

Date Sampled:	02/16/06	
Date Prepared:	02/22/06	
Date Analyzed:	02/24/06	
AA ID No:	6B16004-06	
Client ID No:	S5-5	
Matrix:	Soil	
Dilution Factor:	10	MRL
8081A OCPs (EPA 8081A)		
4,4'-DDD	<40	4.0
4,4'-DDE	<40	4.0
4,4'-DDT	<40	4.0
Aldrin	<20	2.0
beta-BHC	<20	2.0
delta-BHC	<20	2.0
alpha-BHC	<20	2.0
gamma-BHC (Lindane)	<40	4.0
gamma-Chlordane	<40	4.0
alpha-Chlordane	<40	4.0
Chlordane	<200	20
Dieldrin	<40	4.0
Endosulfan I	<20	2.0
Endosulfan II	<40	4.0
Endosulfan sulfate	<40	4.0
Endrin	<40	4.0
Endrin aldehyde	<40	4.0
Endrin ketone	<40	4.0
Heptachlor	<20	2.0
Heptachlor epoxide	<20	2.0
Methoxychlor	<200	20
Toxaphene	<1000	100
Surrogates		**%REC Limits**
Tetrachloro-meta-xylene	130%	50-150

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way
Method: Herbicides by EPA 8151A

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06
Units: ug/kg

Date Sampled:	02/16/06	02/16/06	02/16/06	02/16/06	
Date Prepared:	02/24/06	02/24/06	02/24/06	02/24/06	
Date Analyzed:	02/27/06	02/27/06	02/27/06	02/27/06	
AA ID No:	6B16004-01	6B16004-03	6B16004-04	6B16004-05	
Client ID No:	S1-5	S2-5	S3-5	S4-5	
Matrix:	Soil	Soil	Soil	Soil	
Dilution Factor:	1	1	1	1	MRL
8151A Herbicides (EPA 8151A)					
Dalapon	<5.5	<5.5	<5.5	<5.5	5.5
Dicamba	<1.5	<1.5	<1.5	<1.5	1.5
Dichloroprop	<1.5	<1.5	<1.5	<1.5	1.5
Dinoseb	<2.0	<2.0	<2.0	<2.0	2.0
MCPA	<250	<250	<250	<250	250
MCPP	<250	<250	<250	<250	250
4-Nitrophenol	<6.0	<6.0	<6.0	<6.0	6.0
Pentachlorophenol	<1.0	<1.0	<1.0	<1.0	1.0
2,4-D	<2.0	<2.0	<2.0	<2.0	2.0
2,4-DB	<5.0	<5.0	<5.0	<5.0	5.0
2,4,5-T	<2.0	<2.0	<2.0	<2.0	2.0
2,4,5-TP (Silvex)	<2.0	<2.0	<2.0	<2.0	2.0
Surrogates					%REC Limits
DCAA	128%	129%	135%	130%	43-169

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011720
Project No:	E0304125	Date Received:	02/16/06
Project Name:	Panay Way	Date Reported:	03/09/06
Method:	Herbicides by EPA 8151A	Units:	ug/kg

Date Sampled:	02/16/06	
Date Prepared:	02/24/06	
Date Analyzed:	02/27/06	
AA ID No:	6B16004-06	
Client ID No:	S5-5	
Matrix:	Soil	
Dilution Factor:	1	MRL
8151A Herbicides (EPA 8151A)		
Dalapon	<5.5	5.5
Dicamba	<1.5	1.5
Dichloroprop	<1.5	1.5
Dinoseb	<2.0	2.0
MCPA	<250	250
MCPP	<250	250
4-Nitrophenol	<6.0	6.0
Pentachlorophenol	<1.0	1.0
2,4-D	<2.0	2.0
2,4-DB	<5.0	5.0
2,4,5-T	<2.0	2.0
2,4,5-TP (Silvex)	<2.0	2.0
Surrogates		**%REC Limits**
DCAA	110%	43-169

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011720
Project No:	E0304125	Date Received:	02/16/06
Project Name:	Panay Way	Date Reported:	03/09/06
Method:	VOCs, OXY & TPHG by GC/MS EPA 5035	Units:	ug/kg

Date Sampled:	02/16/06	02/16/06	02/16/06	02/16/06	
Date Prepared:	02/22/06	02/22/06	02/22/06	02/22/06	
Date Analyzed:	02/22/06	02/22/06	02/22/06	02/22/06	
AA ID No:	6B16004-01	6B16004-03	6B16004-04	6B16004-05	
Client ID No:	S1-5	S2-5	S3-5	S4-5	
Matrix:	Soil	Soil	Soil	Soil	
Dilution Factor:	1	1	1	1	MRL
8260B/5035 +OXY+TPHG (EPA 8260B/5035)					
Acetone	77	<50	<50	<50	50
tert-Amyl Methyl Ether (TAME)	<5.0	<5.0	<5.0	<5.0	5.0
Benzene	<2.0	<2.0	<2.0	<2.0	2.0
Bromobenzene	<5.0	<5.0	<5.0	<5.0	5.0
Bromochloromethane	<5.0	<5.0	<5.0	<5.0	5.0
Bromodichloromethane	<5.0	<5.0	<5.0	<5.0	5.0
Bromoform	<5.0	<5.0	<5.0	<5.0	5.0
Bromomethane	<5.0	<5.0	<5.0	<5.0	5.0
2-Butanone (MEK)	<50	<50	<50	<50	50
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
sec-Butylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
tert-Butylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
n-Butylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
Carbon Disulfide	<5.0	<5.0	<5.0	<5.0	5.0
Carbon Tetrachloride	<5.0	<5.0	<5.0	<5.0	5.0
Chlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0
Chloroethane	<5.0	<5.0	<5.0	<5.0	5.0
Chloroform	<5.0	<5.0	<5.0	<5.0	5.0
Chloromethane	<5.0	<5.0	<5.0	<5.0	5.0
2-Chlorotoluene	<5.0	<5.0	<5.0	<5.0	5.0
4-Chlorotoluene	<5.0	<5.0	<5.0	<5.0	5.0
1,2-Dibromo-3-chloropropane	<10	<10	<10	<10	10
Dibromochloromethane	<5.0	<5.0	<5.0	<5.0	5.0
1,2-Dibromoethane (EDB)	<5.0	<5.0	<5.0	<5.0	5.0
Dibromomethane	<5.0	<5.0	<5.0	<5.0	5.0
1,4-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0
1,3-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011720
Project No:	E0304125	Date Received:	02/16/06
Project Name:	Panay Way	Date Reported:	03/09/06
Method:	VOCs, OXY & TPHG by GC/MS EPA 5035	Units:	ug/kg

Date Sampled:	02/16/06	02/16/06	02/16/06	02/16/06	
Date Prepared:	02/22/06	02/22/06	02/22/06	02/22/06	
Date Analyzed:	02/22/06	02/22/06	02/22/06	02/22/06	
AA ID No:	6B16004-01	6B16004-03	6B16004-04	6B16004-05	
Client ID No:	S1-5	S2-5	S3-5	S4-5	
Matrix:	Soil	Soil	Soil	Soil	
Dilution Factor:	1	1	1	1	MRL
8260B/5035 +OXY+TPHG (EPA 8260B/5035) (continued)					
1,2-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0
Dichlorodifluoromethane (R12)	<5.0	<5.0	<5.0	<5.0	5.0
1,1-Dichloroethane	<5.0	<5.0	<5.0	<5.0	5.0
1,2-Dichloroethane (EDC)	<5.0	<5.0	<5.0	<5.0	5.0
trans-1,2-Dichloroethylene	<5.0	<5.0	<5.0	<5.0	5.0
cis-1,2-Dichloroethylene	<5.0	<5.0	<5.0	<5.0	5.0
1,1-Dichloroethylene	<5.0	<5.0	<5.0	<5.0	5.0
2,2-Dichloropropane	<5.0	<5.0	<5.0	<5.0	5.0
1,3-Dichloropropane	<5.0	<5.0	<5.0	<5.0	5.0
1,2-Dichloropropane	<5.0	<5.0	<5.0	<5.0	5.0
trans-1,3-Dichloropropylene	<5.0	<5.0	<5.0	<5.0	5.0
1,1-Dichloropropylene	<5.0	<5.0	<5.0	<5.0	5.0
cis-1,3-Dichloropropylene	<5.0	<5.0	<5.0	<5.0	5.0
Diisopropyl ether (DIPE)	<5.0	<5.0	<5.0	<5.0	5.0
Ethylbenzene	<2.0	<2.0	<2.0	<2.0	2.0
Ethyl-tert-Butyl Ether (ETBE)	<5.0	<5.0	<5.0	<5.0	5.0
Gasoline Range Organics (GRO)	<500	<500	<500	<500	500
Hexachlorobutadiene	<10	<10	<10	<10	10
2-Hexanone (MBK)	<50	<50	<50	<50	50
Isopropylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
4-Isopropyltoluene	<5.0	<5.0	<5.0	<5.0	5.0
Methyl-tert-Butyl Ether (MTBE)	<5.0	<5.0	<5.0	<5.0	5.0
Methylene Chloride	<50	<50	<50	<50	50
4-Methyl-2-pentanone (MIBK)	<50	<50	<50	<50	50
Naphthalene	<10	<10	<10	<10	10
n-Propylbenzene	<5.0	<5.0	<5.0	<5.0	5.0

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way
Method: VOCs, OXY & TPHG by GC/MS EPA 5035

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06
Units: ug/kg

Date Sampled:	02/16/06	02/16/06	02/16/06	02/16/06	
Date Prepared:	02/22/06	02/22/06	02/22/06	02/22/06	
Date Analyzed:	02/22/06	02/22/06	02/22/06	02/22/06	
AA ID No:	6B16004-01	6B16004-03	6B16004-04	6B16004-05	
Client ID No:	S1-5	S2-5	S3-5	S4-5	
Matrix:	Soil	Soil	Soil	Soil	
Dilution Factor:	1	1	1	1	MRL
8260B/5035 +OXY+TPHG (EPA 8260B/5035) (continued)					
Styrene	<5.0	<5.0	<5.0	<5.0	5.0
1,1,1,2-Tetrachloroethane	<5.0	<5.0	<5.0	<5.0	5.0
1,1,2,2-Tetrachloroethane	<5.0	<5.0	<5.0	<5.0	5.0
Tetrachloroethylene (PCE)	<5.0	<5.0	<5.0	<5.0	5.0
Toluene	<2.0	<2.0	<2.0	<2.0	2.0
1,2,4-Trichlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0
1,2,3-Trichlorobenzene	<5.0	<5.0	<5.0	<5.0	5.0
1,1,2-Trichloroethane	<5.0	<5.0	<5.0	<5.0	5.0
1,1,1-Trichloroethane	<5.0	<5.0	<5.0	<5.0	5.0
Trichloroethylene (TCE)	<5.0	<5.0	<5.0	<5.0	5.0
Trichlorofluoromethane (R11)	<5.0	<5.0	<5.0	<5.0	5.0
1,2,3-Trichloropropane	<5.0	<5.0	<5.0	<5.0	5.0
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<5.0	<5.0	<5.0	<5.0	5.0
1,3,5-Trimethylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
1,2,4-Trimethylbenzene	<5.0	<5.0	<5.0	<5.0	5.0
Vinyl chloride	<5.0	<5.0	<5.0	<5.0	5.0
o-Xylene	<2.0	<2.0	<2.0	<2.0	2.0
m,p-Xylenes	<2.0	<2.0	<2.0	<2.0	2.0
Surrogates					%REC Limits
4-Bromofluorobenzene	95.2%	88.0%	94.0%	88.0%	80-120
Dibromofluoromethane	96.1%	86.0%	86.0%	86.0%	80-120
Toluene-d8	102%	106%	108%	104%	80-120

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011720
Project No:	E0304125	Date Received:	02/16/06
Project Name:	Panay Way	Date Reported:	03/09/06
Method:	VOCs, OXY & TPHG by GC/MS EPA 5035	Units:	ug/kg

Date Sampled:	02/16/06	
Date Prepared:	02/22/06	
Date Analyzed:	02/22/06	
AA ID No:	6B16004-06	
Client ID No:	S5-5	
Matrix:	Soil	
Dilution Factor:	1	MRL
8260B/5035 +OXY+TPHG (EPA 8260B(5035)		
Acetone	<50	50
tert-Amyl Methyl Ether (TAME)	<5.0	5.0
Benzene	<2.0	2.0
Bromobenzene	<5.0	5.0
Bromochloromethane	<5.0	5.0
Bromodichloromethane	<5.0	5.0
Bromoform	<5.0	5.0
Bromomethane	<5.0	5.0
2-Butanone (MEK)	<50	50
tert-Butyl alcohol (TBA)	<20	20
sec-Butylbenzene	<5.0	5.0
tert-Butylbenzene	<5.0	5.0
n-Butylbenzene	<5.0	5.0
Carbon Disulfide	<5.0	5.0
Carbon Tetrachloride	<5.0	5.0
Chlorobenzene	<5.0	5.0
Chloroethane	<5.0	5.0
Chloroform	<5.0	5.0
Chloromethane	<5.0	5.0
2-Chlorotoluene	<5.0	5.0
4-Chlorotoluene	<5.0	5.0
1,2-Dibromo-3-chloropropane	<10	10
Dibromochloromethane	<5.0	5.0
1,2-Dibromoethane (EDB)	<5.0	5.0
Dibromomethane	<5.0	5.0
1,4-Dichlorobenzene	<5.0	5.0
1,3-Dichlorobenzene	<5.0	5.0

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011720
Project No:	E0304125	Date Received:	02/16/06
Project Name:	Panay Way	Date Reported:	03/09/06
Method:	VOCs, OXY & TPHG by GC/MS EPA 5035	Units:	ug/kg

Date Sampled:	02/16/06	
Date Prepared:	02/22/06	
Date Analyzed:	02/22/06	
AA ID No:	6B16004-06	
Client ID No:	S5-5	
Matrix:	Soil	
Dilution Factor:	1	MRL

8260B/5035 +OXY+TPHG (EPA 8260B/5035) (continued)

1,2-Dichlorobenzene	<5.0	5.0
Dichlorodifluoromethane (R12)	<5.0	5.0
1,1-Dichloroethane	<5.0	5.0
1,2-Dichloroethane (EDC)	<5.0	5.0
trans-1,2-Dichloroethylene	<5.0	5.0
cis-1,2-Dichloroethylene	<5.0	5.0
1,1-Dichloroethylene	<5.0	5.0
2,2-Dichloropropane	<5.0	5.0
1,3-Dichloropropane	<5.0	5.0
1,2-Dichloropropane	<5.0	5.0
trans-1,3-Dichloropropylene	<5.0	5.0
1,1-Dichloropropylene	<5.0	5.0
cis-1,3-Dichloropropylene	<5.0	5.0
Diisopropyl ether (DIPE)	<5.0	5.0
Ethylbenzene	<2.0	2.0
Ethyl-tert-Butyl Ether (ETBE)	<5.0	5.0
Gasoline Range Organics (GRO)	<500	500
Hexachlorobutadiene	<10	10
2-Hexanone (MBK)	<50	50
Isopropylbenzene	<5.0	5.0
4-Isopropyltoluene	<5.0	5.0
Methyl-tert-Butyl Ether (MTBE)	<5.0	5.0
Methylene Chloride	<50	50
4-Methyl-2-pentanone (MIBK)	<50	50
Naphthalene	<10	10
n-Propylbenzene	<5.0	5.0

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011720
Project No:	E0304125	Date Received:	02/16/06
Project Name:	Panay Way	Date Reported:	03/09/06
Method:	VOCs, OXY & TPHG by GC/MS EPA 5035	Units:	ug/kg

Date Sampled:	02/16/06	
Date Prepared:	02/22/06	
Date Analyzed:	02/22/06	
AA ID No:	6B16004-06	
Client ID No:	S5-5	
Matrix:	Soil	
Dilution Factor:	1	MRL
8260B/5035 +OXY+TPHG (EPA 8260B/5035) (continued)		
Styrene	<5.0	5.0
1,1,1,2-Tetrachloroethane	<5.0	5.0
1,1,2,2-Tetrachloroethane	<5.0	5.0
Tetrachloroethylene (PCE)	<5.0	5.0
Toluene	<2.0	2.0
1,2,4-Trichlorobenzene	<5.0	5.0
1,2,3-Trichlorobenzene	<5.0	5.0
1,1,2-Trichloroethane	<5.0	5.0
1,1,1-Trichloroethane	<5.0	5.0
Trichloroethylene (TCE)	<5.0	5.0
Trichlorofluoromethane (R11)	<5.0	5.0
1,2,3-Trichloropropane	<5.0	5.0
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<5.0	5.0
1,3,5-Trimethylbenzene	<5.0	5.0
1,2,4-Trimethylbenzene	<5.0	5.0
Vinyl chloride	<5.0	2.0
o-Xylene	<2.0	2.0
m,p-Xylenes	<2.0	

Surrogates		%REC Limits
4-Bromofluorobenzene	96.0%	80-120
Dibromofluoromethane	86.0%	80-120
Toluene-d8	106%	80-120

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way
Method: Carbon Chain by GC/FID

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06
Units: mg/kg

Date Sampled:	02/16/06	02/16/06	02/16/06	02/16/06	
Date Prepared:	02/22/06	02/22/06	02/22/06	02/22/06	
Date Analyzed:	02/23/06	02/23/06	02/23/06	02/23/06	
AA ID No:	6B16004-01	6B16004-03	6B16004-04	6B16004-05	
Client ID No:	S1-5	S2-5	S3-5	S4-5	
Matrix:	Soil	Soil	Soil	Soil	
Dilution Factor:	1	1	1	1	MRL
Carbon Chain Characterization 8015M (EPA 8015M)					
C6-C8	<1.0	<1.0	<1.0	<1.0	1.0
C8-C10	<1.0	<1.0	<1.0	<1.0	1.0
C10-C12	<1.0	<1.0	<1.0	<1.0	1.0
C12-C14	<1.0	<1.0	<1.0	<1.0	1.0
C14-C16	<1.0	<1.0	<1.0	<1.0	1.0
C16-C18	<1.0	<1.0	<1.0	<1.0	1.0
C18-C20	<1.0	<1.0	<1.0	<1.0	1.0
C20-C22	<1.0	<1.0	<1.0	<1.0	1.0
C22-C24	<1.0	<1.0	<1.0	<1.0	1.0
C24-C26	<1.0	<1.0	<1.0	<1.0	1.0
C26-C28	<1.0	<1.0	<1.0	<1.0	1.0
C28-C32	<1.0	<1.0	<1.0	<1.0	1.0
C32-C34	<1.0	<1.0	<1.0	<1.0	1.0
C34-C36	<1.0	<1.0	<1.0	<1.0	1.0
C36-C40	<1.0	<1.0	<1.0	<1.0	1.0
C40-C44	<1.0	<1.0	<1.0	<1.0	1.0
TPH (C6-C44)	<10	<10	<10	<10	10
Surrogates					%REC Limits
o-Terphenyl	105%	86.3%	91.9%	78.8%	50-150

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011720
Project No:	E0304125	Date Received:	02/16/06
Project Name:	Panay Way	Date Reported:	03/09/06
Method:	Carbon Chain by GC/FID	Units:	mg/kg

Date Sampled:	02/16/06	
Date Prepared:	02/22/06	
Date Analyzed:	02/23/06	
AA ID No:	6B16004-06	
Client ID No:	S5-5	
Matrix:	Soil	
Dilution Factor:	1	MRL
Carbon Chain Characterization 8015M (EPA 8015M)		
C6-C8	<1.0	1.0
C8-C10	<1.0	1.0
C10-C12	<1.0	1.0
C12-C14	<1.0	1.0
C14-C16	<1.0	1.0
C16-C18	<1.0	1.0
C18-C20	<1.0	1.0
C20-C22	<1.0	1.0
C22-C24	<1.0	1.0
C24-C26	<1.0	1.0
C26-C28	<1.0	1.0
C28-C32	<1.0	1.0
C32-C34	<1.0	1.0
C34-C36	<1.0	1.0
C36-C40	<1.0	1.0
C40-C44	<1.0	1.0
TPH (C6-C44)	<10	10
Surrogates		**%REC Limits**
o-Terphenyl	88.3%	50-150

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011720
Project No:	E0304125	Date Received:	02/16/06
Project Name:	Panay Way	Date Reported:	03/09/06
Method:	Total Metals CAM 17	Units:	mg/kg

Date Sampled:	02/16/06	02/16/06	02/16/06	02/16/06	
Date Prepared:	02/21/06	02/21/06	02/21/06	02/21/06	
Date Analyzed:	02/21/06	02/21/06	02/21/06	02/21/06	
AA ID No:	6B16004-01	6B16004-03	6B16004-04	6B16004-05	
Client ID No:	S1-5	S2-5	S3-5	S4-5	
Matrix:	Soil	Soil	Soil	Soil	
Dilution Factor:	1	1	1	1	MRL
CAM Metals Less Hg 6000/7000 (EPA 6010B/7000)					
Antimony	<10	<10	<10	<10	10
Arsenic	3.0	2.6	2.4	2.5	0.50
Barium	60	28	27	32	10
Beryllium	<1.0	<1.0	<1.0	<1.0	1.0
Cadmium	<1.0	<1.0	<1.0	<1.0	1.0
Chromium	19	12	11	14	3.0
Cobalt	5.1	<3.0	<3.0	3.4	3.0
Copper	16	6.0	4.6	7.5	3.0
Lead	9.5	5.0	3.9	5.5	3.0
Molybdenum	<5.0	<5.0	<5.0	<5.0	5.0
Nickel	12	9.0	7.8	9.7	3.0
Selenium	<0.50	<0.50	<0.50	<0.50	0.50
Silver	<1.0	<1.0	<1.0	<1.0	1.0
Thallium	<5.0	<5.0	<5.0	<5.0	5.0
Vanadium	27	14	14	18	10
Zinc	42	27	20	29	3.0

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011720
Project No:	E0304125	Date Received:	02/16/06
Project Name:	Panay Way	Date Reported:	03/09/06
Method:	Total Metals CAM 17	Units:	mg/kg

Date Sampled:	02/16/06	
Date Prepared:	02/21/06	
Date Analyzed:	02/21/06	
AA ID No:	6B16004-06	
Client ID No:	S5-5	
Matrix:	Soil	
Dilution Factor:	1	MRL
CAM Metals Less Hg 6000/7000 (EPA 6010B/7000)		
Antimony	<10	10
Arsenic	9.8	0.50
Barium	170	10
Beryllium	<1.0	1.0
Cadmium	1.3	1.0
Chromium	36	3.0
Cobalt	9.1	3.0
Copper	29	3.0
Lead	16	3.0
Molybdenum	6.8	5.0
Nickel	31	3.0
Selenium	<0.50	0.50
Silver	<1.0	1.0
Thallium	<5.0	5.0
Vanadium	68	10
Zinc	90	3.0

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way
Method: Total Metals CAM 17

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06
Units: mg/kg

Date Sampled:	02/16/06	02/15/06	02/16/06	02/16/06	
Date Prepared:	02/24/06	02/24/06	02/24/06	02/24/06	
Date Analyzed:	02/24/06	02/24/06	02/24/06	02/24/06	
AA ID No:	6B16004-01	6B16004-03	6B16004-04	6B16004-05	
Client ID No:	S1-5	S2-5	S3-5	S4-5	
Matrix:	Soil	Soil	Soil	Soil	
Dilution Factor:	1	1	1	1	MRL
Mercury Total EPA 7470A/7471A (EPA 7471A)					
Mercury	0.10	0.11	0.081	0.090	0.020

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011720
Project No:	E0304125	Date Received:	02/16/06
Project Name:	Panay Way	Date Reported:	03/09/06
Method:	Total Metals CAM 17	Units:	mg/kg

Date Sampled:	02/16/06	
Date Prepared:	02/24/06	
Date Analyzed:	02/24/06	
AA ID No:	6B16004-06	
Client ID No:	S5-5	
Matrix:	Soil	
Dilution Factor:	1	MRL
Mercury Total EPA 7470A/7471A (EPA 7471A)		
Mercury	0.046	0.020

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Semivolatile Organics by GC/MS - Quality Control										
Batch B6B2203 - EPA 3545 MS										
Blank (B6B2203-BLK1)				Prepared: 02/21/06 Analyzed: 02/22/06						
3,3'-Dichlorobenzidine	<0.40	0.40	mg/kg							
Acenaphthene	<0.10	0.10	mg/kg							
Acenaphthylene	<0.10	0.10	mg/kg							
Aniline	<0.20	0.20	mg/kg							
Anthracene	<0.10	0.10	mg/kg							
Azobenzene	<0.10	0.10	mg/kg							
Benzidine	<0.40	0.40	mg/kg							
Benzo(a)anthracene	<0.10	0.10	mg/kg							
Benzo(a)pyrene	<0.10	0.10	mg/kg							
Benzo(b)fluoranthene	<0.10	0.10	mg/kg							
Benzo(g,h,i)perylene	<0.10	0.10	mg/kg							
Benzoic acid	<1.0	1.0	mg/kg							
Benzo(k)fluoranthene	<0.10	0.10	mg/kg							
Benzyl alcohol	<0.10	0.10	mg/kg							
4-Bromophenyl phenyl ether	<0.10	0.10	mg/kg							
Butyl benzyl phthalate	<0.50	0.50	mg/kg							
4-Chloro-3-methylphenol	<0.20	0.20	mg/kg							
4-Chloroaniline	<0.40	0.40	mg/kg							
Bis(2-chloroethoxy)methane	<0.10	0.10	mg/kg							
Bis(2-chloroethyl)ether	<0.10	0.10	mg/kg							
Bis(2-chloroisopropyl)ether	<0.10	0.10	mg/kg							
2-Chloronaphthalene	<0.10	0.10	mg/kg							
2-Chlorophenol	<0.10	0.10	mg/kg							
4-Chlorophenyl phenyl ether	<0.10	0.10	mg/kg							
Chrysene	<0.10	0.10	mg/kg							
Dibenzo(a,h)anthracene	<0.10	0.10	mg/kg							
Dibenzofuran	<0.10	0.10	mg/kg							
Di-n-butyl phthalate	<2.0	2.0	mg/kg							
1,2-Dichlorobenzene	<0.10	0.10	mg/kg							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Semivolatile Organics by GC/MS - Quality Control										
Batch B6B2203 - EPA 3545 MS										
Blank (B6B2203-BLK1) Continued				Prepared: 02/21/06 Analyzed: 02/22/06						
1,3-Dichlorobenzene	<0.10	0.10	mg/kg							
1,4-Dichlorobenzene	<0.10	0.10	mg/kg							
2,4-Dichlorophenol	<0.10	0.10	mg/kg							
Diethyl phthalate	<0.80	0.80	mg/kg							
2,4-Dimethylphenol	<0.10	0.10	mg/kg							
Dimethyl phthalate	<0.20	0.20	mg/kg							
4,6-Dinitro-2-methylphenol	<0.20	0.20	mg/kg							
2,4-Dinitrophenol	<0.40	0.40	mg/kg							
2,6-Dinitrotoluene	<0.10	0.10	mg/kg							
2,4-Dinitrotoluene	<0.10	0.10	mg/kg							
Di-n-octyl phthalate	<0.10	0.10	mg/kg							
1,2-Diphenylhydrazine	<0.10	0.10	mg/kg							
Bis(2-ethylhexyl)phthalate	<0.20	0.20	mg/kg							
Fluoranthene	<0.10	0.10	mg/kg							
Fluorene	<0.10	0.10	mg/kg							
Hexachlorobenzene	<0.10	0.10	mg/kg							
Hexachlorobutadiene	<0.10	0.10	mg/kg							
Hexachlorocyclopentadiene	<0.10	0.10	mg/kg							
Hexachloroethane	<0.10	0.10	mg/kg							
Indeno (1,2,3-cd) pyrene	<0.40	0.40	mg/kg							
Isophorone	<0.10	0.10	mg/kg							
2-Methylnaphthalene	<0.10	0.10	mg/kg							
2-Methylphenol	<0.20	0.20	mg/kg							
3-Methylphenol	<0.20	0.20	mg/kg							
4-Methylphenol	<0.20	0.20	mg/kg							
Naphthalene	<0.10	0.10	mg/kg							
4-Nitroaniline	<0.50	0.50	mg/kg							
3-Nitroaniline	<0.40	0.40	mg/kg							
2-Nitroaniline	<0.10	0.10	mg/kg							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Semivolatile Organics by GC/MS - Quality Control										
Batch B6B2203 - EPA 3545 MS										
Blank (B6B2203-BLK1) Continued				Prepared: 02/21/06 Analyzed: 02/22/06						
Nitrobenzene	<0.10	0.10	mg/kg							
2-Nitrophenol	<0.20	0.20	mg/kg							
4-Nitrophenol	<0.20	0.20	mg/kg							
N-Nitrosodimethylamine	<0.10	0.10	mg/kg							
N-Nitrosodiphenylamine	<0.10	0.10	mg/kg							
N-Nitrosodi-n-propylamine	<0.10	0.10	mg/kg							
Pentachlorophenol	<0.10	0.10	mg/kg							
Phenanthrene	<0.10	0.10	mg/kg							
Phenol	<0.10	0.10	mg/kg							
Pyrene	<0.10	0.10	mg/kg							
1,2,4-Trichlorobenzene	<0.10	0.10	mg/kg							
2,4,5-Trichlorophenol	<0.20	0.20	mg/kg							
2,4,6-Trichlorophenol	<0.20	0.20	mg/kg							
Surrogate: 2-Fluorobiphenyl	*0.514*		*mg/kg*	*1.00*		*51.4*	*43-116*			
Surrogate: 2-Fluorophenol	*0.731*		*mg/kg*	*2.00*		*36.6*	*21-100*			
Surrogate: Nitrobenzene-d5	*0.476*		*mg/kg*	*1.00*		*47.6*	*35-134*			
Surrogate: Phenol-d6	*0.769*		*mg/kg*	*2.00*		*38.4*	*10-94*			
Surrogate: Terphenyl-d14	*0.520*		*mg/kg*	*1.00*		*52.0*	*33-141*			
Surrogate: 2,4,6-Tribromophenol	*0.857*		*mg/kg*	*2.00*		*42.8*	*10-123*			
LCS (B6B2203-BS1)				Prepared: 02/21/06 Analyzed: 02/22/06						
Acenaphthene	0.535	0.10	mg/kg	1.00		53.5	50-121			
Anthracene	0.604	0.10	mg/kg	1.00		60.4	41-121			
Benzo(a)pyrene	0.526	0.10	mg/kg	1.00		52.6	17-163			
Benzo(b)fluoranthene	0.456	0.10	mg/kg	1.00		45.6	25-137			
Butyl benzyl phthalate	0.494	0.50	mg/kg	1.00		49.4	19-139			
4-Chloro-3-methylphenol	0.954	0.20	mg/kg	1.00		95.4	22-147			
Bis(2-chloroethyl)ether	0.534	0.10	mg/kg	1.00		53.4	26-122			
2-Chloronaphthalene	0.623	0.10	mg/kg	1.00		62.3	60-118			
4-Chlorophenyl phenyl ether	0.585	0.10	mg/kg	1.00		58.5	41-128			
1,4-Dichlorobenzene	0.587	0.10	mg/kg	1.00		58.7	26-105			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Semivolatile Organics by GC/MS - Quality Control										
Batch B6B2203 - EPA 3545 MS										
LCS (B6B2203-BS1) Continued				Prepared: 02/21/06 Analyzed: 02/22/06						
2,4-Dichlorophenol	0.505	0.10	mg/kg	1.00		50.5	39-135			
Di-n-octyl phthalate	0.401	0.10	mg/kg	1.00		40.1	4-146			
Fluoranthene	0.454	0.10	mg/kg	1.00		45.4	35-125			
Fluorene	0.560	0.10	mg/kg	1.00		56.0	50-120			
Hexachlorobenzene	0.584	0.10	mg/kg	1.00		58.4	2-152			
Hexachlorobutadiene	0.579	0.10	mg/kg	1.00		57.9	24-116			
Hexachloroethane	0.534	0.10	mg/kg	1.00		53.4	40-113			
Isophorone	0.418	0.10	mg/kg	1.00		41.8	21-196			
Naphthalene	0.533	0.10	mg/kg	1.00		53.3	25-121			
Nitrobenzene	0.524	0.10	mg/kg	1.00		52.4	38-133			
2-Nitrophenol	0.420	0.20	mg/kg	1.00		42.0	2-163			
N-Nitrosodi-n-propylamine	0.597	0.10	mg/kg	1.00		59.7	2-230			
Pentachlorophenol	0.578	0.10	mg/kg	1.00		57.8	14-176			
Phenol	0.534	0.10	mg/kg	1.00		53.4	5-112			
Pyrene	0.576	0.10	mg/kg	1.00		57.6	52-115			
1,2,4-Trichlorobenzene	0.513	0.10	mg/kg	1.00		51.3	44-142			
2,4,6-Trichlorophenol	0.738	0.20	mg/kg	1.00		73.8	37-144			
Surrogate: 2-Fluorobiphenyl	*0.581*		*mg/kg*	*1.00*		*58.1*	*43-116*			
Surrogate: 2-Fluorophenol	*0.760*		*mg/kg*	*2.00*		*38.0*	*21-100*			
Surrogate: Nitrobenzene-d5	*0.509*		*mg/kg*	*1.00*		*50.9*	*35-134*			
Surrogate: Phenol-d6	*0.937*		*mg/kg*	*2.00*		*46.8*	*10-94*			
Surrogate: Terphenyl-d14	*0.655*		*mg/kg*	*1.00*		*65.5*	*33-141*			
Surrogate: 2,4,6-Tribromophenol	*1.46*		*mg/kg*	*2.00*		*73.0*	*10-123*			
LCS Dup (B6B2203-BSD1)				Prepared: 02/21/06 Analyzed: 02/22/06						
Acenaphthene	0.510	0.10	mg/kg	1.00		51.0	50-121	4.78	40	
Anthracene	0.559	0.10	mg/kg	1.00		55.9	41-121	7.74	40	
Benzo(a)pyrene	0.524	0.10	mg/kg	1.00		52.4	17-163	0.381	40	
Benzo(b)fluoranthene	0.299	0.10	mg/kg	1.00		29.9	25-137	41.6	40	QR-01
Butyl benzyl phthalate	0.600	0.50	mg/kg	1.00		60.0	19-139	19.4	40	
4-Chloro-3-methylphenol	0.890	0.20	mg/kg	1.00		89.0	22-147	6.94	40	
Bis(2-chloroethyl)ether	0.503	0.10	mg/kg	1.00		50.3	26-122	5.98	40	

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Semivolatile Organics by GC/MS - Quality Control										
Batch B6B2203 - EPA 3545 MS										
LCS Dup (B6B2203-BSD1) Continued				Prepared: 02/21/06 Analyzed: 02/22/06						
2-Chloronaphthalene	0.608	0.10	mg/kg	1.00		60.8	60-118	2.44	40	
4-Chlorophenyl phenyl ether	0.559	0.10	mg/kg	1.00		55.9	41-128	4.55	40	
1,4-Dichlorobenzene	0.516	0.10	mg/kg	1.00		51.6	26-105	12.9	40	
2,4-Dichlorophenol	0.467	0.10	mg/kg	1.00		46.7	39-135	7.82	40	
Di-n-octyl phthalate	0.278	0.10	mg/kg	1.00		27.8	4-146	36.2	40	
Fluoranthene	0.377	0.10	mg/kg	1.00		37.7	35-125	18.5	40	
Fluorene	0.542	0.10	mg/kg	1.00		54.2	50-120	3.27	40	
Hexachlorobenzene	0.568	0.10	mg/kg	1.00		56.8	2-152	2.78	40	
Hexachlorobutadiene	0.519	0.10	mg/kg	1.00		51.9	24-116	10.9	40	
Hexachloroethane	0.531	0.10	mg/kg	1.00		53.1	40-113	0.563	40	
Isophorone	0.402	0.10	mg/kg	1.00		40.2	21-196	3.90	40	
Naphthalene	0.495	0.10	mg/kg	1.00		49.5	25-121	7.39	40	
Nitrobenzene	0.503	0.10	mg/kg	1.00		50.3	38-133	4.09	40	
2-Nitrophenol	0.392	0.20	mg/kg	1.00		39.2	2-163	6.90	40	
N-Nitrosodi-n-propylamine	0.536	0.10	mg/kg	1.00		53.6	2-230	10.8	40	
Pentachlorophenol	0.551	0.10	mg/kg	1.00		55.1	14-176	4.78	40	
Phenol	0.515	0.10	mg/kg	1.00		51.5	5-112	3.62	40	
Pyrene	0.862	0.10	mg/kg	1.00		86.2	52-115	39.8	40	
1,2,4-Trichlorobenzene	0.474	0.10	mg/kg	1.00		47.4	44-142	7.90	40	
2,4,6-Trichlorophenol	0.667	0.20	mg/kg	1.00		66.7	37-144	10.1	40	
Surrogate: 2-Fluorobiphenyl	*0.549*		*mg/kg*	*1.00*		*54.9*	*43-116*			
Surrogate: 2-Fluorophenol	*0.771*		*mg/kg*	*2.00*		*38.6*	*21-100*			
Surrogate: Nitrobenzene-d5	*0.481*		*mg/kg*	*1.00*		*48.1*	*35-134*			
Surrogate: Phenol-d6	*0.875*		*mg/kg*	*2.00*		*43.8*	*10-94*			
Surrogate: Terphenyl-d14	*0.865*		*mg/kg*	*1.00*		*86.5*	*33-141*			
Surrogate: 2,4,6-Tribromophenol	*1.28*		*mg/kg*	*2.00*		*64.0*	*10-123*			
Polychlorinated Biphenyls by GC - Quality Control										
Batch B6B2221 - EPA 3550B										
Blank (B6B2221-BLK1)				Prepared: 02/22/06 Analyzed: 02/24/06						
Aroclor-1016	<20	20	ug/kg							
Aroclor-1221	<20	20	ug/kg							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Polychlorinated Biphenyls by GC - Quality Control										
Batch B6B2221 - EPA 3550B										
Blank (B6B2221-BLK1) Continued				Prepared: 02/22/06 Analyzed: 02/24/06						
Aroclor-1232	<20	20	ug/kg							
Aroclor-1242	<20	20	ug/kg							
Aroclor-1248	<20	20	ug/kg							
Aroclor-1254	<20	20	ug/kg							
Aroclor-1260	<20	20	ug/kg							
Surrogate: Tetrachloro-meta-xylene	*6.90*		*ug/kg*	*5.00*		*138*	*50-150*			
LCS (B6B2221-BS1)				Prepared: 02/22/06 Analyzed: 02/24/06						
Aroclor-1016	57.1	20	ug/kg	50.0		114	60-140			
Aroclor-1260	56.6	20	ug/kg	50.0		113	60-140			
Surrogate: Tetrachloro-meta-xylene	*5.78*		*ug/kg*	*5.00*		*116*	*50-150*			
LCS Dup (B6B2221-BSD1)				Prepared: 02/22/06 Analyzed: 02/24/06						
Aroclor-1016	57.0	20	ug/kg	50.0		114	60-140	0.175	40	
Aroclor-1260	58.4	20	ug/kg	50.0		117	60-140	3.13	40	
Surrogate: Tetrachloro-meta-xylene	*5.87*		*ug/kg*	*5.00*		*117*	*50-150*			
Organochlorine Pesticides by GC EPA 8081A - Quality Control										
Batch B6B2221 - EPA 3550B										
Blank (B6B2221-BLK1)				Prepared: 02/22/06 Analyzed: 02/24/06						
4,4'-DDD	<4.0	4.0	ug/kg							
4,4'-DDE	<4.0	4.0	ug/kg							
4,4'-DDT	<4.0	4.0	ug/kg							
Aldrin	<2.0	2.0	ug/kg							
beta-BHC	<2.0	2.0	ug/kg							
delta-BHC	<2.0	2.0	ug/kg							
alpha-BHC	<2.0	2.0	ug/kg							
gamma-BHC (Lindane)	<4.0	4.0	ug/kg							
gamma-Chlordane	<4.0	4.0	ug/kg							
alpha-Chlordane	<4.0	4.0	ug/kg							
Chlordane	<20	20	ug/kg							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Organochlorine Pesticides by GC EPA 8081A - Quality Control										
Batch B6B2221 - EPA 3550B										
Blank (B6B2221-BLK1) Continued				Prepared: 02/22/06 Analyzed: 02/24/06						
Dieldrin	<4.0	4.0	ug/kg							
Endosulfan I	<2.0	2.0	ug/kg							
Endosulfan II	<4.0	4.0	ug/kg							
Endosulfan sulfate	<4.0	4.0	ug/kg							
Endrin	<4.0	4.0	ug/kg							
Endrin aldehyde	<4.0	4.0	ug/kg							
Endrin ketone	<4.0	4.0	ug/kg							
Heptachlor	<2.0	2.0	ug/kg							
Heptachlor epoxide	<2.0	2.0	ug/kg							
Methoxychlor	<20	20	ug/kg							
Toxaphene	<100	100	ug/kg							
Surrogate: Tetrachloro-meta-xylene	*6.90*		*ug/kg*	*5.00*		*138*	*50-150*			
LCS (B6B2221-BS1)				Prepared: 02/22/06 Analyzed: 02/24/06						
4,4'-DDD	5.75	4.0	ug/kg	5.00		115	60-140			
4,4'-DDE	6.81	4.0	ug/kg	5.00		136	60-140			
4,4'-DDT	5.37	4.0	ug/kg	5.00		107	60-140			
Aldrin	4.21	2.0	ug/kg	5.00		84.2	60-140			
beta-BHC	6.82	2.0	ug/kg	5.00		136	60-140			
delta-BHC	5.48	2.0	ug/kg	5.00		110	60-140			
alpha-BHC	5.05	2.0	ug/kg	5.00		101	60-140			
gamma-BHC (Lindane)	5.07	4.0	ug/kg	5.00		101	60-140			
gamma-Chlordane	4.63	4.0	ug/kg	5.00		92.6	60-140			
alpha-Chlordane	4.46	4.0	ug/kg	5.00		89.2	60-140			
Dieldrin	4.80	4.0	ug/kg	5.00		96.0	60-140			
Endosulfan I	5.40	2.0	ug/kg	5.00		108	60-140			
Endosulfan II	5.75	4.0	ug/kg	5.00		115	60-140			
Endosulfan sulfate	6.94	4.0	ug/kg	5.00		139	60-140			
Endrin	6.23	4.0	ug/kg	5.00		125	60-140			
Endrin aldehyde	5.10	4.0	ug/kg	5.00		102	60-140			
Endrin ketone	6.15	4.0	ug/kg	5.00		123	60-140			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Organochlorine Pesticides by GC EPA 8081A - Quality Control										
Batch B6B2221 - EPA 3550B										
LCS (B6B2221-BS1) Continued				Prepared: 02/22/06 Analyzed: 02/24/06						
Heptachlor	4.91	2.0	ug/kg	5.00		98.2	60-140			
Heptachlor epoxide	4.65	2.0	ug/kg	5.00		93.0	60-140			
Methoxychlor	4.33	20	ug/kg	5.00		86.6	60-140			
Surrogate: Tetrachloro-meta-xylene	*6.95*		*ug/kg*	*5.00*		*139*	*50-150*			
LCS Dup (B6B2221-BSD1)				Prepared: 02/22/06 Analyzed: 02/24/06						
4,4'-DDD	5.81	4.0	ug/kg	5.00		116	60-140	1.04	40	
4,4'-DDE	6.48	4.0	ug/kg	5.00		130	60-140	4.97	40	
4,4'-DDT	5.24	4.0	ug/kg	5.00		105	60-140	2.45	40	
Aldrin	4.27	2.0	ug/kg	5.00		85.4	60-140	1.42	40	
beta-BHC	5.72	2.0	ug/kg	5.00		114	60-140	17.5	40	
delta-BHC	5.31	2.0	ug/kg	5.00		106	60-140	3.15	40	
alpha-BHC	4.96	2.0	ug/kg	5.00		99.2	60-140	1.80	40	
gamma-BHC (Lindane)	5.05	4.0	ug/kg	5.00		101	60-140	0.395	40	
gamma-Chlordane	4.59	4.0	ug/kg	5.00		91.8	60-140	0.868	40	
alpha-Chlordane	4.47	4.0	ug/kg	5.00		89.4	60-140	0.224	40	
Dieldrin	4.70	4.0	ug/kg	5.00		94.0	60-140	2.11	40	
Endosulfan I	5.35	2.0	ug/kg	5.00		107	60-140	0.930	40	
Endosulfan II	5.81	4.0	ug/kg	5.00		116	60-140	1.04	40	
Endosulfan sulfate	6.69	4.0	ug/kg	5.00		134	60-140	3.67	40	
Endrin	6.08	4.0	ug/kg	5.00		122	60-140	2.44	40	
Endrin aldehyde	4.91	4.0	ug/kg	5.00		98.2	60-140	3.80	40	
Endrin ketone	5.86	4.0	ug/kg	5.00		117	60-140	4.83	40	
Heptachlor	4.83	2.0	ug/kg	5.00		96.6	60-140	1.64	40	
Heptachlor epoxide	5.21	2.0	ug/kg	5.00		104	60-140	11.4	40	
Methoxychlor	3.93	20	ug/kg	5.00		78.6	60-140	9.69	40	
Surrogate: Tetrachloro-meta-xylene	*7.20*		*ug/kg*	*5.00*		*144*	*50-150*			
Herbicides by EPA 8151A - Quality Control										
Batch B6B2820 - EPA 3550B										
Blank (B6B2820-BLK1)				Prepared: 02/24/06 Analyzed: 02/27/06						
Dalapon	<5.5	5.5	ug/kg							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

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Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Herbicides by EPA 8151A - Quality Control										
Batch B6B2820 - EPA 3550B										
Blank (B6B2820-BLK1) Continued				Prepared: 02/24/06 Analyzed: 02/27/06						
Dicamba	<1.5	1.5	ug/kg							
Dichloroprop	<1.5	1.5	ug/kg							
Dinoseb	<2.0	2.0	ug/kg							
MCPA	<250	250	ug/kg							
MCPP	<250	250	ug/kg							
4-Nitrophenol	<6.0	6.0	ug/kg							
Pentachlorophenol	<1.0	1.0	ug/kg							
2,4-D	<2.0	2.0	ug/kg							
2,4-DB	<5.0	5.0	ug/kg							
2,4,5-T	<2.0	2.0	ug/kg							
2,4,5-TP (Silvex)	<2.0	2.0	ug/kg							
Surrogate: DCAA	*4.90*		*ug/kg*	*5.00*		*98.0*	*43-169*			
LCS (B6B2820-BS1)				Prepared: 02/24/06 Analyzed: 02/27/06						
2,4-D	10.5	2.0	ug/kg	10.0		105	50-180			
2,4,5-T	9.30	2.0	ug/kg	10.0		93.0	68-160			
2,4,5-TP (Silvex)	8.60	2.0	ug/kg	10.0		86.0	42-180			
Surrogate: DCAA	*4.00*		*ug/kg*	*5.00*		*80.0*	*43-169*			
LCS Dup (B6B2820-BSD1)				Prepared: 02/24/06 Analyzed: 02/27/06						
2,4-D	10.8	2.0	ug/kg	10.0		108	50-180	2.82	30	
2,4,5-T	10.0	2.0	ug/kg	10.0		100	68-160	7.25	30	
2,4,5-TP (Silvex)	9.20	2.0	ug/kg	10.0		92.0	42-180	6.74	30	
Surrogate: DCAA	*4.10*		*ug/kg*	*5.00*		*82.0*	*43-169*			
VOCs, OXY & TPHG by GC/MS EPA 5035 - Quality Control										
Batch B6B2212 - EPA 5035										
Blank (B6B2212-BLK1)				Prepared & Analyzed: 02/22/06						
Acetone	<50	50	ug/kg							
tert-Amyl Methyl Ether (TAME)	<5.0	5.0	ug/kg							
Benzene	<2.0	2.0	ug/kg							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS EPA 5035 - Quality Control										
Batch B6B2212 - EPA 5035										
Blank (B6B2212-BLK1) Continued				Prepared & Analyzed: 02/22/06						
Bromobenzene	<5.0	5.0	ug/kg							
Bromochloromethane	<5.0	5.0	ug/kg							
Bromodichloromethane	<5.0	5.0	ug/kg							
Bromoform	<5.0	5.0	ug/kg							
Bromomethane	<5.0	5.0	ug/kg							
2-Butanone (MEK)	<50	50	ug/kg							
tert-Butyl alcohol (TBA)	<20	20	ug/kg							
sec-Butylbenzene	<5.0	5.0	ug/kg							
tert-Butylbenzene	<5.0	5.0	ug/kg							
n-Butylbenzene	<5.0	5.0	ug/kg							
Carbon Disulfide	<5.0	5.0	ug/kg							
Carbon Tetrachloride	<5.0	5.0	ug/kg							
Chlorobenzene	<5.0	5.0	ug/kg							
Chloroethane	<5.0	5.0	ug/kg							
Chloroform	<5.0	5.0	ug/kg							
Chloromethane	<5.0	5.0	ug/kg							
2-Chlorotoluene	<5.0	5.0	ug/kg							
4-Chlorotoluene	<5.0	5.0	ug/kg							
1,2-Dibromo-3-chloropropane	<10	10	ug/kg							
Dibromochloromethane	<5.0	5.0	ug/kg							
1,2-Dibromoethane (EDB)	<5.0	5.0	ug/kg							
Dibromomethane	<5.0	5.0	ug/kg							
1,4-Dichlorobenzene	<5.0	5.0	ug/kg							
1,3-Dichlorobenzene	<5.0	5.0	ug/kg							
1,2-Dichlorobenzene	<5.0	5.0	ug/kg							
Dichlorodifluoromethane (R12)	<5.0	5.0	ug/kg							
1,1-Dichloroethane	<5.0	5.0	ug/kg							
1,2-Dichloroethane (EDC)	<5.0	5.0	ug/kg							
trans-1,2-Dichloroethylene	<5.0	5.0	ug/kg							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

VOCs, OXY & TPHG by GC/MS EPA 5035 - Quality Control

Batch B6B2212 - EPA 5035

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (B6B2212-BLK1) Continued				Prepared & Analyzed: 02/22/06						
cis-1,2-Dichloroethylene	<5.0	5.0	ug/kg							
1,1-Dichloroethylene	<5.0	5.0	ug/kg							
2,2-Dichloropropane	<5.0	5.0	ug/kg							
1,3-Dichloropropane	<5.0	5.0	ug/kg							
1,2-Dichloropropane	<5.0	5.0	ug/kg							
trans-1,3-Dichloropropylene	<5.0	5.0	ug/kg							
1,1-Dichloropropylene	<5.0	5.0	ug/kg							
cis-1,3-Dichloropropylene	<5.0	5.0	ug/kg							
Diisopropyl ether (DIPE)	<5.0	5.0	ug/kg							
Ethylbenzene	<2.0	2.0	ug/kg							
Ethyl-tert-Butyl Ether (ETBE)	<5.0	5.0	ug/kg							
Gasoline Range Organics (GRO)	<500	500	ug/kg							
Hexachlorobutadiene	<10	10	ug/kg							
2-Hexanone (MBK)	<50	50	ug/kg							
Isopropylbenzene	<5.0	5.0	ug/kg							
4-Isopropyltoluene	<5.0	5.0	ug/kg							
Methyl-tert-Butyl Ether (MTBE)	<5.0	5.0	ug/kg							
Methylene Chloride	<50	50	ug/kg							
4-Methyl-2-pentanone (MIBK)	<50	50	ug/kg							
Naphthalene	<10	10	ug/kg							
n-Propylbenzene	<5.0	5.0	ug/kg							
Styrene	<5.0	5.0	ug/kg							
1,1,1,2-Tetrachloroethane	<5.0	5.0	ug/kg							
1,1,2,2-Tetrachloroethane	<5.0	5.0	ug/kg							
Tetrachloroethylene (PCE)	<5.0	5.0	ug/kg							
Toluene	<2.0	2.0	ug/kg							
1,2,4-Trichlorobenzene	<5.0	5.0	ug/kg							
1,2,3-Trichlorobenzene	<5.0	5.0	ug/kg							
1,1,2-Trichloroethane	<5.0	5.0	ug/kg							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS EPA 5035 - Quality Control										
Batch B6B2212 - EPA 5035										
Blank (B6B2212-BLK1) Continued				Prepared & Analyzed: 02/22/06						
1,1,1-Trichloroethane	<5.0	5.0	ug/kg							
Trichloroethylene (TCE)	<5.0	5.0	ug/kg							
Trichlorofluoromethane (R11)	<5.0	5.0	ug/kg							
1,2,3-Trichloropropane	<5.0	5.0	ug/kg							
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<5.0	5.0	ug/kg							
1,3,5-Trimethylbenzene	<5.0	5.0	ug/kg							
1,2,4-Trimethylbenzene	<5.0	5.0	ug/kg							
Vinyl chloride	<5.0	5.0	ug/kg							
o-Xylene	<2.0	2.0	ug/kg							
m,p-Xylenes	<2.0	2.0	ug/kg							
Surrogate: 4-Bromofluorobenzene	*82.2*		*ug/kg*	*100*		*82.2*	*80-120*			
Surrogate: Dibromofluoromethane	*86.8*		*ug/kg*	*100*		*86.8*	*80-120*			
Surrogate: Toluene-d8	*104*		*ug/kg*	*100*		*104*	*80-120*			
LCS (B6B2212-BS1)				Prepared & Analyzed: 02/22/06						
Benzene	43.6	2.0	ug/kg	40.0		109	75-125			
Bromodichloromethane	42.2	5.0	ug/kg	40.0		106	75-125			
Bromoform	30.6	5.0	ug/kg	40.0		76.5	75-125			
Carbon Tetrachloride	40.2	5.0	ug/kg	40.0		100	75-125			
Chlorobenzene	43.6	5.0	ug/kg	40.0		109	75-125			
Chloroethane	43.4	5.0	ug/kg	40.0		108	75-125			
Chloroform	40.8	5.0	ug/kg	40.0		102	75-125			
Chloromethane	45.2	5.0	ug/kg	40.0		113	75-125			
Dibromochloromethane	39.4	5.0	ug/kg	40.0		98.5	75-125			
1,4-Dichlorobenzene	41.4	5.0	ug/kg	40.0		104	75-125			
1,1-Dichloroethane	44.0	5.0	ug/kg	40.0		110	75-125			
1,2-Dichloroethane (EDC)	40.6	5.0	ug/kg	40.0		102	75-125			
trans-1,2-Dichloroethylene	44.2	5.0	ug/kg	40.0		110	75-125			
cis-1,2-Dichloroethylene	44.2	5.0	ug/kg	40.0		110	75-125			
1,1-Dichloroethylene	40.2	5.0	ug/kg	40.0		100	75-125			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS EPA 5035 - Quality Control										
Batch B6B2212 - EPA 5035										
LCS (B6B2212-BS1) Continued				Prepared & Analyzed: 02/22/06						
1,2-Dichloropropane	42.4	5.0	ug/kg	40.0		106	75-125			
cis-1,3-Dichloropropylene	42.2	5.0	ug/kg	40.0		106	75-125			
Ethylbenzene	45.8	2.0	ug/kg	40.0		114	75-125			
Methyl-tert-Butyl Ether (MTBE)	38.6	5.0	ug/kg	40.0		96.5	75-125			
Methylene Chloride	56.2	50	ug/kg	40.0		140	75-125			
n-Propylbenzene	39.0	5.0	ug/kg	40.0		97.5	75-125			
1,1,2,2-Tetrachloroethane	40.8	5.0	ug/kg	40.0		102	75-125			
Tetrachloroethylene (PCE)	46.6	5.0	ug/kg	40.0		116	75-125			
Toluene	42.4	2.0	ug/kg	40.0		106	75-125			
1,1,2-Trichloroethane	42.6	5.0	ug/kg	40.0		106	75-125			
1,1,1-Trichloroethane	37.4	5.0	ug/kg	40.0		93.5	75-125			
Trichloroethylene (TCE)	42.6	5.0	ug/kg	40.0		106	75-125			
Vinyl chloride	44.2	5.0	ug/kg	40.0		110	75-125			
o-Xylene	42.8	2.0	ug/kg	40.0		107	75-125			
Surrogate: 4-Bromofluorobenzene	*86.4*		*ug/kg*	*100*		*86.4*	*80-120*			
Surrogate: Dibromofluoromethane	*92.0*		*ug/kg*	*100*		*92.0*	*80-120*			
Surrogate: Toluene-d8	*107*		*ug/kg*	*100*		*107*	*80-120*			
LCS Dup (B6B2212-BSD1)				Prepared & Analyzed: 02/22/06						
Benzene	43.4	2.0	ug/kg	40.0		108	75-125	0.460	40	
Bromodichloromethane	38.4	5.0	ug/kg	40.0		96.0	75-125	9.43	40	
Bromoform	31.2	5.0	ug/kg	40.0		78.0	75-125	1.94	40	
Carbon Tetrachloride	37.6	5.0	ug/kg	40.0		94.0	75-125	6.68	40	
Chlorobenzene	40.2	5.0	ug/kg	40.0		100	75-125	8.11	40	
Chloroethane	43.4	5.0	ug/kg	40.0		108	75-125	0.00	40	
Chloroform	40.0	5.0	ug/kg	40.0		100	75-125	1.98	40	
Chloromethane	41.8	5.0	ug/kg	40.0		104	75-125	7.82	40	
Dibromochloromethane	38.4	5.0	ug/kg	40.0		96.0	75-125	2.57	40	
1,4-Dichlorobenzene	45.0	5.0	ug/kg	40.0		112	75-125	8.33	40	
1,1-Dichloroethane	43.4	5.0	ug/kg	40.0		108	75-125	1.37	40	
1,2-Dichloroethane (EDC)	39.4	5.0	ug/kg	40.0		98.5	75-125	3.00	40	
trans-1,2-Dichloroethylene	42.2	5.0	ug/kg	40.0		106	75-125	4.63	40	

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: M81011720
Date Received: 02/16/06
Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs, OXY & TPHG by GC/MS EPA 5035 - Quality Control										
Batch B6B2212 - EPA 5035										
LCS Dup (B6B2212-BSD1) Continued				Prepared & Analyzed: 02/22/06						
cis-1,2-Dichloroethylene	44.0	5.0	ug/kg	40.0		110	75-125	0.454	40	
1,1-Dichloroethylene	40.4	5.0	ug/kg	40.0		101	75-125	0.496	40	
1,2-Dichloropropane	43.8	5.0	ug/kg	40.0		110	75-125	3.25	40	
cis-1,3-Dichloropropylene	42.6	5.0	ug/kg	40.0		106	75-125	0.943	40	
Ethylbenzene	41.8	2.0	ug/kg	40.0		104	75-125	9.13	40	
Methyl-tert-Butyl Ether (MTBE)	33.8	5.0	ug/kg	40.0		84.5	75-125	13.3	40	
Methylene Chloride	55.4	50	ug/kg	40.0		138	75-125	1.43	40	
n-Propylbenzene	40.8	5.0	ug/kg	40.0		102	75-125	4.51	40	
1,1,2,2-Tetrachloroethane	42.6	5.0	ug/kg	40.0		106	75-125	4.32	40	
Tetrachloroethylene (PCE)	45.4	5.0	ug/kg	40.0		114	75-125	2.61	40	
Toluene	42.2	2.0	ug/kg	40.0		106	75-125	0.473	40	
1,1,2-Trichloroethane	43.4	5.0	ug/kg	40.0		108	75-125	1.86	40	
1,1,1-Trichloroethane	36.4	5.0	ug/kg	40.0		91.0	75-125	2.71	40	
Trichloroethylene (TCE)	40.4	5.0	ug/kg	40.0		101	75-125	5.30	40	
Vinyl chloride	41.8	5.0	ug/kg	40.0		104	75-125	5.58	40	
o-Xylene	39.4	2.0	ug/kg	40.0		98.5	75-125	8.27	40	
Surrogate: 4-Bromofluorobenzene	*94.0*		*ug/kg*	*100*		*94.0*	*80-120*			
Surrogate: Dibromofluoromethane	*91.4*		*ug/kg*	*100*		*91.4*	*80-120*			
Surrogate: Toluene-d8	*99.4*		*ug/kg*	*100*		*99.4*	*80-120*			
Carbon Chain by GC/FID - Quality Control										
Batch B6B2228 - EPA 3550B										
Blank (B6B2228-BLK1)				Prepared: 02/22/06 Analyzed: 02/23/06						
C6-C8	<1.0	1.0	mg/kg							
C8-C10	<1.0	1.0	mg/kg							
C10-C12	<1.0	1.0	mg/kg							
C12-C14	<1.0	1.0	mg/kg							
C14-C16	<1.0	1.0	mg/kg							
C16-C18	<1.0	1.0	mg/kg							
C18-C20	<1.0	1.0	mg/kg							
C20-C22	<1.0	1.0	mg/kg							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Metals CAM 17 - Quality Control										
Batch B6B2710 - EPA 3050B										
Blank (B6B2710-BLK1) Continued				Prepared & Analyzed: 02/21/06						
Cobalt	<3.0	3.0	mg/kg							
Copper	<3.0	3.0	mg/kg							
Lead	<3.0	3.0	mg/kg							
Molybdenum	<5.0	5.0	mg/kg							
Nickel	<3.0	3.0	mg/kg							
Selenium	<0.50	0.50	mg/kg							
Silver	<1.0	1.0	mg/kg							
Thallium	<5.0	5.0	mg/kg							
Vanadium	<10	10	mg/kg							
Zinc	<3.0	3.0	mg/kg							
LCS (B6B2710-BS1)				Prepared & Analyzed: 02/21/06						
Antimony	49.0	10	mg/kg	50.0		98.0	80-120			
Arsenic	48.6	0.50	mg/kg	50.0		97.2	80-120			
Barium	48.1	10	mg/kg	50.0		96.2	80-120			
Beryllium	48.8	1.0	mg/kg	50.0		97.6	80-120			
Cadmium	48.4	1.0	mg/kg	50.0		96.8	80-120			
Chromium	48.8	3.0	mg/kg	50.0		97.6	80-120			
Cobalt	49.0	3.0	mg/kg	50.0		98.0	80-120			
Copper	48.7	3.0	mg/kg	50.0		97.4	80-120			
Lead	48.8	3.0	mg/kg	50.0		97.6	80-120			
Molybdenum	49.6	5.0	mg/kg	50.0		99.2	80-120			
Nickel	48.7	3.0	mg/kg	50.0		97.4	80-120			
Selenium	48.2	0.50	mg/kg	50.0		96.4	80-120			
Silver	48.7	1.0	mg/kg	50.0		97.4	80-120			
Thallium	49.8	5.0	mg/kg	50.0		99.6	80-120			
Vanadium	48.8	10	mg/kg	50.0		97.6	80-120			
Zinc	49.3	3.0	mg/kg	50.0		98.6	80-120			
LCS Dup (B6B2710-BSD1)				Prepared & Analyzed: 02/21/06						
Antimony	49.7	10	mg/kg	50.0		99.4	80-120	1.42	20	
Arsenic	49.5	0.50	mg/kg	50.0		99.0	80-120	1.83	20	

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/15/06
Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Metals CAM 17 - Quality Control										
Batch B6B2710 - EPA 3050B										
LCS Dup (B6B2710-BSD1) Continued				Prepared & Analyzed: 02/21/06						
Barium	48.7	10	mg/kg	50.0		97.4	80-120	1.24	20	
Beryllium	49.5	1.0	mg/kg	50.0		99.0	80-120	1.42	20	
Cadmium	49.2	1.0	mg/kg	50.0		98.4	80-120	1.64	20	
Chromium	49.5	3.0	mg/kg	50.0		99.0	80-120	1.42	20	
Cobalt	49.7	3.0	mg/kg	50.0		99.4	80-120	1.42	20	
Copper	49.3	3.0	mg/kg	50.0		98.6	80-120	1.22	20	
Lead	49.8	3.0	mg/kg	50.0		99.6	80-120	2.03	20	
Molybdenum	50.6	5.0	mg/kg	50.0		101	80-120	2.00	20	
Nickel	49.4	3.0	mg/kg	50.0		98.8	80-120	1.43	20	
Selenium	49.4	0.50	mg/kg	50.0		98.8	80-120	2.46	20	
Silver	49.3	1.0	mg/kg	50.0		98.6	80-120	1.22	20	
Thallium	50.1	5.0	mg/kg	50.0		100	80-120	0.601	20	
Vanadium	49.5	10	mg/kg	50.0		99.0	80-120	1.42	20	
Zinc	50.1	3.0	mg/kg	50.0		100	80-120	1.61	20	
Matrix Spike (B6B2710-MS1)				Source: 6B16004-01 Prepared & Analyzed: 02/21/06						
Antimony	51.2	10	mg/kg	50.0	<10	102	75-125			
Arsenic	54.6	0.50	mg/kg	50.0	3.0	103	75-125			
Barium	111	10	mg/kg	50.0	60	102	75-125			
Beryllium	50.4	1.0	mg/kg	50.0	<1.0	101	75-125			
Cadmium	47.6	1.0	mg/kg	50.0	<1.0	95.2	75-125			
Chromium	67.6	3.0	mg/kg	50.0	19	97.2	75-125			
Cobalt	53.6	3.0	mg/kg	50.0	5.1	97.0	75-125			
Copper	71.2	3.0	mg/kg	50.0	16	110	75-125			
Lead	59.2	3.0	mg/kg	50.0	9.5	99.4	75-125			
Molybdenum	52.2	5.0	mg/kg	50.0	<5.0	104	75-125			
Nickel	59.7	3.0	mg/kg	50.0	12	95.4	75-125			
Selenium	42.6	0.50	mg/kg	50.0	<0.50	85.2	75-125			
Silver	53.0	1.0	mg/kg	50.0	<1.0	106	75-125			
Thallium	45.9	5.0	mg/kg	50.0	<5.0	91.8	75-125			
Vanadium	76.6	10	mg/kg	50.0	27	99.2	75-125			
Zinc	87.8	3.0	mg/kg	50.0	42	91.6	75-125			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client: Enviropro Inc
Project No: E0304125
Project Name: Panay Way

AA Project No: MB1011720
Date Received: 02/16/06
Date Reported: 03/09/06

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Metals CAM 17 - Quality Control										
Batch B6B2710 - EPA 3050B										
Matrix Spike Dup (B6B2710-MSD1)	Source: 6B16004-01 Prepared & Analyzed: 02/21/06									
Antimony	50.4	10	mg/kg	50.0	<10	101	75-125	1.57	40	
Arsenic	53.8	0.50	mg/kg	50.0	3.0	102	75-125	1.48	40	
Barium	108	10	mg/kg	50.0	60	96.0	75-125	2.74	40	
Beryllium	49.7	1.0	mg/kg	50.0	<1.0	99.4	75-125	1.40	40	
Cadmium	46.9	1.0	mg/kg	50.0	<1.0	93.8	75-125	1.48	40	
Chromium	66.6	3.0	mg/kg	50.0	19	95.2	75-125	1.49	40	
Cobalt	53.0	3.0	mg/kg	50.0	5.1	95.8	75-125	1.13	40	
Copper	69.9	3.0	mg/kg	50.0	16	108	75-125	1.84	40	
Lead	59.0	3.0	mg/kg	50.0	9.5	99.0	75-125	0.338	40	
Molybdenum	51.5	5.0	mg/kg	50.0	<5.0	103	75-125	1.35	40	
Nickel	58.9	3.0	mg/kg	50.0	12	93.8	75-125	1.35	40	
Selenium	42.8	0.50	mg/kg	50.0	<0.50	85.6	75-125	0.468	40	
Silver	52.2	1.0	mg/kg	50.0	<1.0	104	75-125	1.52	40	
Thallium	44.3	5.0	mg/kg	50.0	<5.0	88.6	75-125	3.55	40	
Vanadium	75.2	10	mg/kg	50.0	27	96.4	75-125	1.84	40	
Zinc	87.0	3.0	mg/kg	50.0	42	90.0	75-125	0.915	40	
Total Metals CAM 17 - Quality Control										
Batch B6B2713 - EPA 7471A Prep										
Blank (B6B2713-BLK1)	Prepared & Analyzed: 02/24/06									
Mercury	<0.020	0.020	mg/kg							
LCS (B6B2713-BS1)	Prepared & Analyzed: 02/24/06									
Mercury	0.938	0.020	mg/kg	1.00		93.8	85-115			
LCS Dup (B6B2713-BSD1)	Prepared & Analyzed: 02/24/06									
Mercury	0.938	0.020	mg/kg	1.00		93.8	85-115	0.00	25	
Matrix Spike (B6B2713-MS1)	Source: 6B16004-01 Prepared & Analyzed: 02/24/06									
Mercury	1.08	0.020	mg/kg	1.00	0.10	98.0	75-125			
Matrix Spike Dup (B6B2713-MSD1)	Source: 6B16004-01 Prepared & Analyzed: 02/24/06									
Mercury	1.08	0.020	mg/kg	1.00	0.10	98.0	75-125	0.00	25	

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	Enviropro Inc	AA Project No:	MB1011720
Project No:	E0304125	Date Received:	02/15/06
Project Name:	Panay Way	Date Reported:	03/09/06

Special Notes

[1] = QR-01 : Analyses are not controlled on RPD values from sample concentrations less than 10 times the reporting limit. QC batch accepted based on LCS and/or LCSD QC results.

Allen Aminian
QA/QC Manager

AMERICAN ANALYTICS CHAIN-OF-CUSTODY RECORD

9765 ETON AVE., CHATSWORTH, CA 91311
Tel: 818-998-5547 FAX: 818-998-7258

№ 308377
DATE: 2-16-06
PAGE 1 OF ___

AA Client: Enviropro, Inc	Phone: 8189987197	Sampler's Name (Print): William [illegible]	
Project Manager: Michael [illegible]	P.O. No.	Sampler's Signature: [signature]	
Project Name	Client's Project No. E0304125	Project Manager's Signature: [signature]	
Job Name and Address: Marina Del Rey, CA			

ANALYSIS REQUIRED (Test Name): 8260B+Oxy; 5035; 8270C; 8081/8082; 8151A; CAM 17 Metals; TPH C-C; 8141A

Client's Comment / Special Test Requirements / Comments (i.e., - Turnaround Time, Detection Limits, Data Package...)

Client's I.D.	A.A. I.D.#	Date	Time	Sample Type	Number of Containers	8260B+Oxy	5035	8270C	8081/8082	8151A	CAM 17 Metals	TPH C-C	8141A	Comments
S1-5	6B16004-01	2-16-06	0715	S	4	X	X	X	X	X	X	X	X	
S1-9	-02	2-16-06	0735	S	4	X	X	X	X	X	X	X	X	NORMAL T.A.T
S2-5	-03		0950	S	4	X	X	X	X	X	X	X	X	
S3-5	-04		1050	S	4	X	X	X	X	X	X	X	X	
S4-5	-05		1140	S	4	X	X	X	X	X	X	X	X	
S5-5	-06		1225	S	4	X	X	X	X	X	X	X	X	

LAB COMMENTS

Approved as Work Order by: Print Name: Allen Aminian; Signature: [signature]; Date/Time: 2/16/06
AA Project No. MB 1011920 / 6B16004

Relinquished by	Date	Time	Received by
[signature]	2/16/06	1330	Cesia [illegible]
Cesia [illegible]	2/16/06	1425	[signature]

DISTRIBUTION: Page 1, White - Laboratory Page 2, Yellow - Laboratory Page 3, Pink - Account Executive Page 4, Gold - Client

Subsurface Methane Gas Investigation for Proposed 120 Unit Retirement Hotel Parcel OT – APN 4224-006-900 Admiralty Way Marina Del Rey, California

GeoKinetics
Geotechnical & Environmental Engineers

Prepared by

GeoKinetics

15510 Rockfield Blvd., Suite C3
Irvine, CA 92618
Tel 949.580.1818, Fax 949.580.1819

Prepared for

Prestige Homes

March 25, 2004

GeoKinetics
Geotechnical &
Environmental Engineers

15510 Rockfield Blvd., Suite C3
Irvine, CA 92618

Tel 949.580.1818, Fax 949.580.1819
E-Mail: geokinetics@appliedgeokinetics.com

March 25, 2004

RECEIVED
MAR 29 2004
CONSTRUCTION

Mr. Todd Oliver
Prestige Homes
5150 Overland Avenue
Culver City, California 90230

SUBJECT: SUBSURFACE METHANE GAS INVESTIGATION, PROPOSED 120 UNIT RETIREMENT HOTEL, PARCEL OT - APN 4224-006-900, ADMIRALTY WAY, MARINA DEL REY, CALIFORNIA

Dear Mr. Oliver:

As requested, GeoKinetics has completed a subsurface methane gas investigation at the above referenced property. Elevated levels of methane gas were identified in the southeastern half of the site. Accordingly, mitigation measures may be required for any structures that are to be constructed on the property. The attached report presents a summary of the methane investigation and the associated results along with a description of the mitigation measures that are likely to be required by the County of Los Angeles and/or the City of Marina Del Rey.

I hope this information is helpful to you. Please do not hesitate to contact the undersigned if you have any questions or comments.

Sincerely,
GEOKINETICS, INC.

Glenn D. Tofani, GE/RCE/REA
Principal Engineer

attachment

1.0 Introduction: GeoKinetics has performed a subsurface methane gas investigation at the location of a proposed retirement hotel in Marina Del Rey, California. The general location of the site is shown in Figure 1 while a recent aerial photograph of the site is provided as Figure 2. It is our understanding the project will involve the construction of a multi-story 120-unit retirement hotel. As shown in Figure 3, the subject property is located approximately 500 feet to the north of the administrative limits of the Playa Del Rey Oil Field and approximately 1,000 feet to the east of the Venice Oil Field. Based upon our review of California Department of Conservation, Division of Oil, Gas & Geothermal Resources field maps, the closest oil wells to the property are located more than 1,000 feet away within these fields. The site appears to lie within the "Methane Buffer Zone" for the Playa Del Rey and Venice fields as identified by the Los Angeles Department of Building & Safety (LADBS). However, it is our understanding the property lies outside the limits of the City of Los Angeles and oversight with respect to methane mitigation issues will therefore likely be provided by the County of Los Angeles and/or the City of Marina Del Rey.

The purpose of the current investigation was to screen for the presence of elevated levels of methane gas in the subsurface in accordance with standard testing procedures. This report presents the results of this investigation along with general methane gas mitigation recommendations in accordance with typical Los Angeles County protocol.

2.0 Methane Occurrence And Characteristics: The presence of methane gas in the subsurface is common within former oil production areas and other locations where organic material - such as grass, leaves, wood, manure, etc. - are present in the soil. Methane is generated by the bacteriological digestion, or biodegradation, of organic matter in the absence of oxygen. Where oxygen is present, carbon dioxide rather than methane is typically produced as a result of the biodegradation of the organic material. Our experience indicates methane gas is common and can be found in the soil beneath a relatively high percentage of residential developments. Methane is not toxic, however it is combustible and potentially explosive at concentrations above 53,000 ppm in the presence of oxygen. This concentration is referred to as its Lower Explosive Level or LEL. Methane is lighter than air and therefore has a natural tendency to rise to the ground surface where it typically dissipates into the atmosphere. The presence of non-pressurized methane at shallow depths beneath the ground surface is normally not problematic. The rates at which the methane is generated and/or migrates towards the ground surface are slow enough such that the gas dissipates naturally under normal circumstances. However, as methane migrates

to the ground surface, the potential exists for its accumulation beneath slab-on-grade foundation systems or other relatively impermeable ground coverings. If the gas accumulates to high concentrations, and becomes pressurized, and a crack or other penetration is present in the floor slab of the structure, detectable levels of methane may enter the interior of the building. Improvements - such as sub-slab vent lines or gas membranes - are often installed as a precautionary measure when elevated subsurface gas levels are detected.

3.0 Field Investigation: The field work associated with the methane gas investigation at the subject property included:

1. Screening for combustible gas emissions at the ground surface using a photo-vac Flame Ionization Detector (FID) and a GA-90 methane-specific infrared gas analyzer; and

2. The installation and monitoring of six (6) subsurface gas probes.

Combustible gas measurements were taken along the existing ground surface at the site on March 16, 2004 using a Flame Ionization Detector (FID) and a GA-90 infrared gas analyzer. These measurements were taken in a grid pattern at approximately 20 foot spacings. Significantly elevated combustible gas levels were not detected at any location. The background and maximum combustible gas levels measured at the site were as follows:

Instrument	[1]Typical Background Level	[2]Maximum Recorded Concentration
FID (Combustible Gas)	5 to 10 ppm	35 ppm
GA-90 (Methane)	<1,000 ppm	<1,000 ppm

[1] Measured five feet above ground surface.
[2] Measured at pavement or ground surface.

Six multi-stage gas probes were installed on the subject property on March 11, 2004. The location of each installation is shown in Figure 2. Each of the gas probes was installed within a 8-inch diameter hollow-stem auger bore hole that had been excavated in conjunction with a separate geotechnical investigation at the site. Groundwater was encountered at a depth of approximately ten feet below the ground surface (bgs) in each of these borings. Methane gas sampling tips were installed at depths of 3, 5, and 8 feet bgs in each boring. A schematic illustrating the configuration of the gas probes is provided as Figure 4. As shown in this figure, each sampling tip consists of 1/4-inch diameter polyethylene tubing with an attached porous polypropylene tip embedded within a 12-inch interval of washed Monterey #3 sand. Bentonite clay seals were placed above and below each sand interval in order to isolate the gas sampling tips. Gas tight quick connect fittings were installed on the ends of the polyethylene tubing at the ground surface in order to seal the probes between monitoring events.

Monitoring of the gas probes was performed on three separate occasions during periods of falling barometric pressure between March 16th and 19th of 2004. The subsurface gas pressure relative to atmospheric, and the concentrations of methane, oxygen, and carbon dioxide, were measured in the subsurface probes during each monitoring event. The monitoring equipment that was utilized and the associated detection limits, or resolutions, are summarized in Table 1. As indicated, gas probe pressures were measured to the nearest 0.1 inches of water prior to each sampling event using a Magnahelic gauge while the barometric pressure was measured and recorded to the nearest 0.1 inches of mercury using a digital barometer. Methane, oxygen and carbon dioxide concentrations were measured in the field using a portable, methane specific, GA-90 infra-red gas analyzer. A volume of gas equivalent to approximately ten times that of the ¼-inch diameter polyethylene gas probe tube was extracted through the GA-90 during the monitoring process. Steady state readings were generally obtained after approximately two tubing volumes of gas had been extracted. The highest methane reading displayed in each instance was recorded.

The GA-90 was calibrated at the beginning and the end of each day of monitoring using a certified mixture of 15% methane, 15% carbon dioxide, and 70% nitrogen calibration gas (Note: all gas concentrations referred to in this report are on a volumetric basis). Ambient gas levels in the air five feet above the ground surface were recorded at the site periodically during the monitoring. In each instance, the

measured gas level fell within the following range:

Gas	Measured Range
Methane	<0.1%
Carbon Dioxide	<0.1%
Oxygen	20.2% to 20.3%

4.0 Results: The gas pressures and concentrations measured in each of the gas probes during the three monitoring events are summarized in Table 2. As indicated, one of the gas sampling tips (P-3 @ 5 ft. bgs) was found to be flooded during each of the monitoring events and could not be sampled. Similar conditions were not encountered at any of the remaining seventeen sampling tips. The highest methane level recorded for each installation is also shown on Figure 2. As indicated, methane gas was detected at three of the six installations at concentrations ranging from 10,000 to 28,000 ppm. Slightly elevated soil gas pressures were identified in only one of the sixteen sampling tips (P-3 @ 8 ft.). A maximum gas pressure of 0.2 inches of water was measured at that installation.

The concentration of oxygen in the atmosphere at sea level is approximately 21%. Depressed oxygen levels were found at each of the gas probe installations. Fully depleted oxygen levels were found in gas probe P-6 at eight feet bgs. The highest oxygen levels that were measured in the gas probes were on the order of 10%.

The average concentration of carbon dioxide in the atmosphere at sea level is approximately 0.03%. Subsurface carbon dioxide levels were elevated above typical atmospheric levels at each of the six installations. The carbon dioxide levels measured in the gas probes at the site ranged from approximately 4% to 14%. The depressed subsurface oxygen levels and elevated carbon dioxide concentrations are likely indicative of the ongoing biodegradation of organic material (such as leaves, roots, grass, etc.) in the onsite soils.

As discussed previously, mitigation improvements are typically required where subsurface methane concentrations exceed 5,000 ppm. Methane concentrations as high as 28,000 ppm were measured during the current investigation. Accordingly, mitigation measures are likely to be required by the oversight agency. The general mitigation measures that we recommend based upon the

available monitoring results include:

- o A passive ventilation system beneath the building foundation system;
- o A gas membrane beneath the building foundation system;
- o Conduit seals on dry utilities servicing the building; and
- o Utility trench dams.

The sub-slab vent system typically consist of 4-inch diameter perforated polyethylene piping installed within a 12-inch deep gravel-filled trenches beneath the building. These vent lines are normally spaced no more than 20 to 30 feet apart in order to effectively ventilate the subgrade beneath the building. The sub-slab vent lines are connected to vent risers installed within the building walls. As with typical sanitary sewer vent lines, the methane vent risers terminate above the roof line of the building. A dewatering system may be required if the methane vent lines are less than one foot above the historic high groundwater level at the site.

The sub-slab gas barrier typically consists of a continuous Liquid Boot™ membrane installed beneath the floor slab of the building. This membrane has a minimum required thickness of 100-mills. Gas tight seals are required at all locations where utilities or conduits penetrate the membrane. At the completion of the installation, the membrane is smoke tested using a procedure developed by GeoKinetics in order to confirm its integrity.

Conduit seals should be installed on dry utility conduits (e.g. electrical, telephone, cable T.V.) that terminate on the interior of the building. These seals are intended to prevent the migration of methane through the conduits to interior areas. Also, in order to reduce the potential for methane to migrate through the sand backfill of any utility trenches which extend up to and/or beneath the building, "dams" consisting of a lean sand / cement / bentonite slurry should be installed within the trench lines at the perimeter of the building.

It is our understanding that foundation and/or architectural plans for the proposed structure are not yet available. We can provide you with more detailed recommendations for methane mitigation measures, along with plans and specifications for those improvements, once the building plans are available.

5.0 Closing: This investigation has been performed with the degree of skill and care ordinarily exercised by engineers practicing in this, and similar, localities. No other warranty, expressed or implied, is given regarding the conclusions or professional opinions presented in this report. The scope of this report is limited to the matters expressly covered herein. This report is presented for the sole use of Prestige Homes and may not be relied upon by any other party without written authorization from GeoKinetics.

All recommendations, findings, and conclusions presented in this report are based upon facts and circumstances as they existed at the time this report was prepared. A change in any fact or circumstance upon which this report is based may necessitate re-evaluation and/or modification of the recommendations, findings, and conclusions presented herein. Due to the nature of this type of investigation, uncertainty exists with respect to the subsurface conditions that are present between boring / sampling locations. If the level of inherent uncertainty is unacceptable, additional sampling and/or testing should be considered.

We hope this information is helpful to you. Please do not hesitate to contact the undersigned if you have any questions or comments.

Sincerely,
GEOKINETICS, INC.

Glenn D. Tofani, GE/RCE/REA
Principal Engineer

attachments

Table 1. Gas Probe Monitoring Equipment & Parameters

Parameter	Equipment	Detection Limit or Resolution	Range
Barometric Pressure	Digital Barometer	0.1" of Hg	25 to 36 in Hg
Gas Probe Pressure	Pressure Gauge	0.1" of H_2O	-5 to +5 in H_2O
Methane Concentration	GA-90 Infrared Gas Analyzer	0.1%	0.1% to 100%
	FID	0.1 ppm	0.1 to 1,000 ppm
		1 ppm	1 to 10,000 ppm
Carbon Dioxide Concentration	GA-90 Infrared Gas Analyzer	0.1%	0.1% to 50%
Oxygen Concentrations	GA-90 Infrared Gas Analyzer	0.1%	0.1% to 25%

Table 2 - Prestige Homes Methane Investigation, Marina Del Rey, California

Multi-Stage Gas Probe Monitoring Results

GAS PROBE #	MONITORING DATE	PROBE DEPTH (feet)	GAS CONCENTRATION (%)			GAS PROBE PRESSURE (IN H_2O)	BAROMETRIC PRESSURE (IN Hg)
			CH_4	CO_2	O_2		
1	3/16/2004	3	0.0	12.4	6.7	0.0	30.1
	3/17/2004		0.0	12.5	6.7	0.0	30.0
	3/19/2004		0.0	12.3	8.2	0.0	30.0
	3/16/2004	5	0.0	14.0	3.0	0.0	30.1
	3/17/2004		0.0	14.0	3.0	0.0	30.0
	3/19/2004		0.0	14.1	3.0	0.0	30.0
	3/16/2004	8	0.0	13.5	2.8	0.0	30.1
	3/17/2004		0.0	13.6	2.8	0.0	30.1
	3/19/2004		0.0	13.5	2.8	0.0	30.0
2	3/16/2004	3	0.0	8.6	7.6	0.0	30.0
	3/17/2004		0.0	8.7	7.6	0.0	30.0
	3/19/2004		0.0	8.5	7.6	0.0	30.0
	3/16/2004	5	0.0	9.3	5.3	0.0	30.1
	3/17/2004		0.0	9.2	5.3	0.0	30.0
	3/19/2004		0.0	9.3	5.3	0.0	30.0
	3/16/2004	8	0.0	8.5	3.9	0.0	30.1
	3/17/2004		0.0	8.5	3.0	0.0	30.1
	3/19/2004		0.0	8.5	3.8	0.0	30.0
3	3/16/2004	3	0.0	5.0	5.8	0.0	30.0
	3/17/2004		0.0	5.1	5.8	0.0	30.0
	3/19/2004		0.0	5.0	5.8	0.0	30.0
	3/16/2004	5	FLOODED PROBE				30.0
	3/17/2004						30.0
	3/19/2004						30.0
	3/16/2004	8	2.7	3.9	2.4	0.2	30.0
	3/17/2004		2.8	3.8	2.3	0.2	30.0
	3/19/2004		2.8	3.8	2.2	0.0	30.0
4	3/16/2004	3	0.0	11.0	7.2	0.0	30.0
	3/17/2004		0.0	11.1	7.1	0.0	30.0
	3/19/2004		0.0	11.1	7.1	0.0	30.0
	3/16/2004	5	0.0	12.4	3.4	0.0	30.0
	3/17/2004		0.0	12.8	3.5	0.0	30.0
	3/19/2004		0.0	12.8	3.5	0.0	30.0
	3/16/2004	8	0.2	13.2	0.3	0.0	30.0
	3/17/2004		0.2	13.3	0.3	0.0	30.0
	3/19/2004		0.2	13.3	0.3	0.0	30.0
5	3/16/2004	3	0.0	7.4	10.4	0.0	30.0
	3/17/2004		0.0	7.3	10.3	0.0	30.0
	3/19/2004		0.0	7.3	10.3	0.0	30.0
	3/16/2004	5	0.0	8.1	8.4	0.0	30.0
	3/17/2004		0.0	8.0	8.5	0.0	30.0
	3/19/2004		0.0	8.0	8.5	0.0	30.0
	3/16/2004	8	1.0	7.5	1.6	0.0	30.0
	3/17/2004		1.0	7.5	1.6	0.0	30.0
	3/19/2004		1.0	7.6	1.5	0.0	3.0
6	3/16/2004	3	0.9	6.8	5.2	0.0	30.0
	3/17/2004		0.9	6.8	5.3	0.0	30.0
	3/19/2004		0.9	6.8	5.2	0.0	30.0
	3/16/2004	5	6.1	0.9	0.0	30.0	
	3/17/2004		6.1	0.9	0.0	30.0	
	3/19/2004		6.0	0.8	0.0	30.0	
	3/16/2004	8	6.0	0.0	0.0	30.0	
	3/17/2004		6.0	0.0	0.0	30.0	
	3/19/2004		6.0	0.0	0.0	30.0	

Denotes Methane Concentration of > 1.25% or 12,500ppm

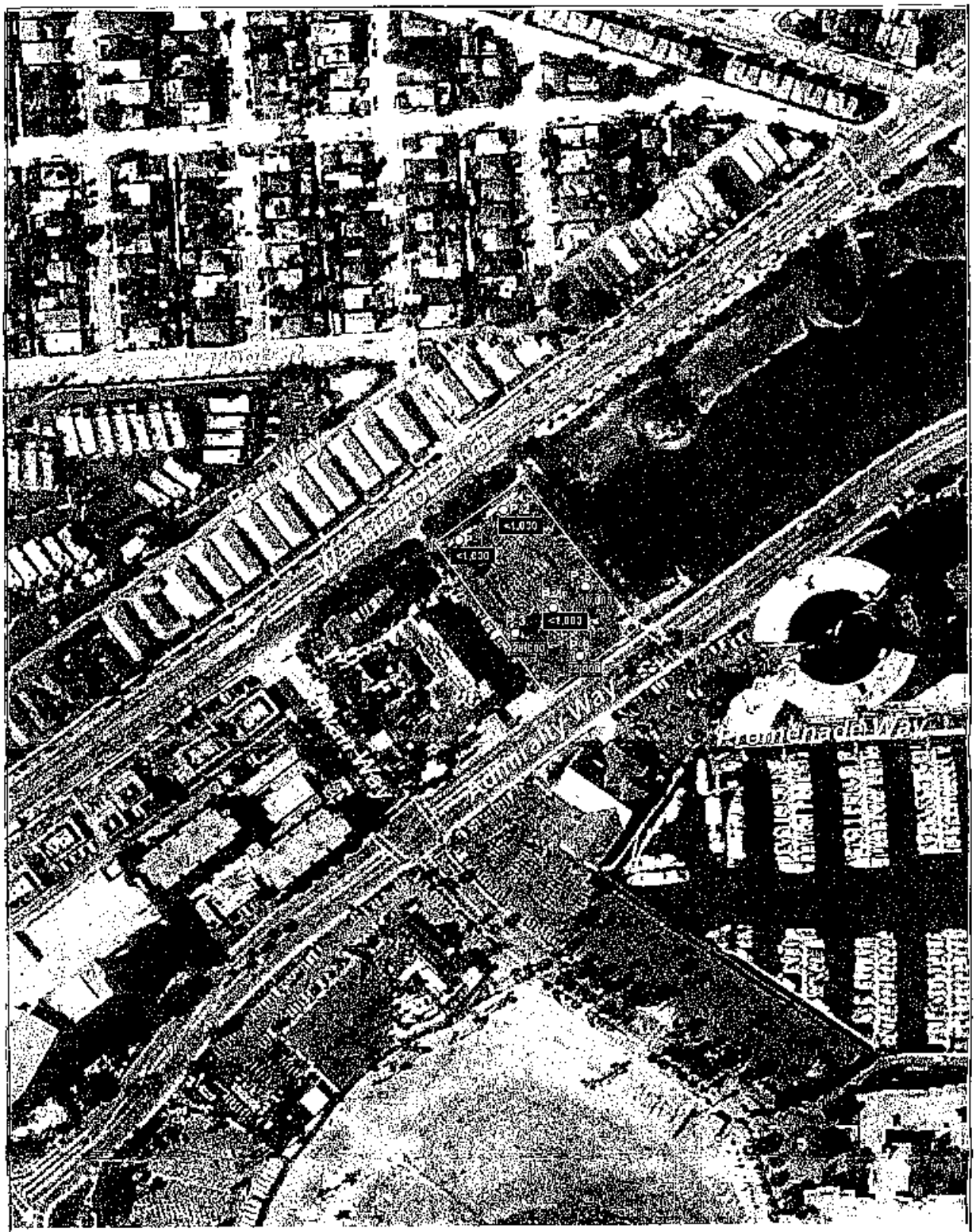
GeoKinetics
Geotechnical & Environmental Engineers

Project Name: Prestige Homes - Admiralty Way

Date: March 2004

Site Location Map

Figure 1



Legend

P-6 Approximate Gas Probe Location and Designation

3,000 Maximum Measured Methane Concentration in Parts Per Million (ppm)

<1,000 Methane Concentration Below Detection Limit in Parts Per Million (ppm)

N

0 170 340 Feet

Approximate Scale

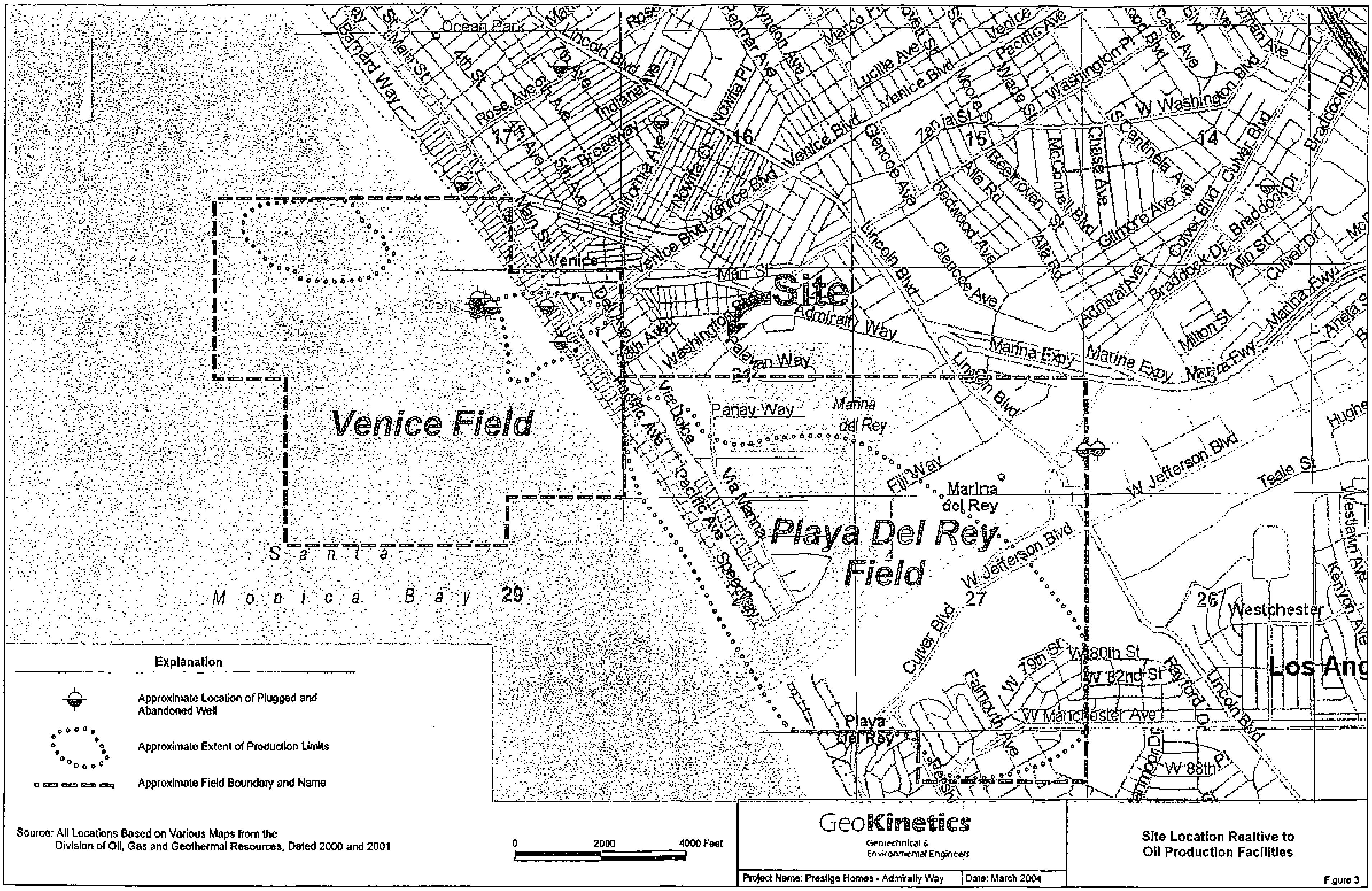
GeoKinetics
Geotechnical & Environmental Engineers

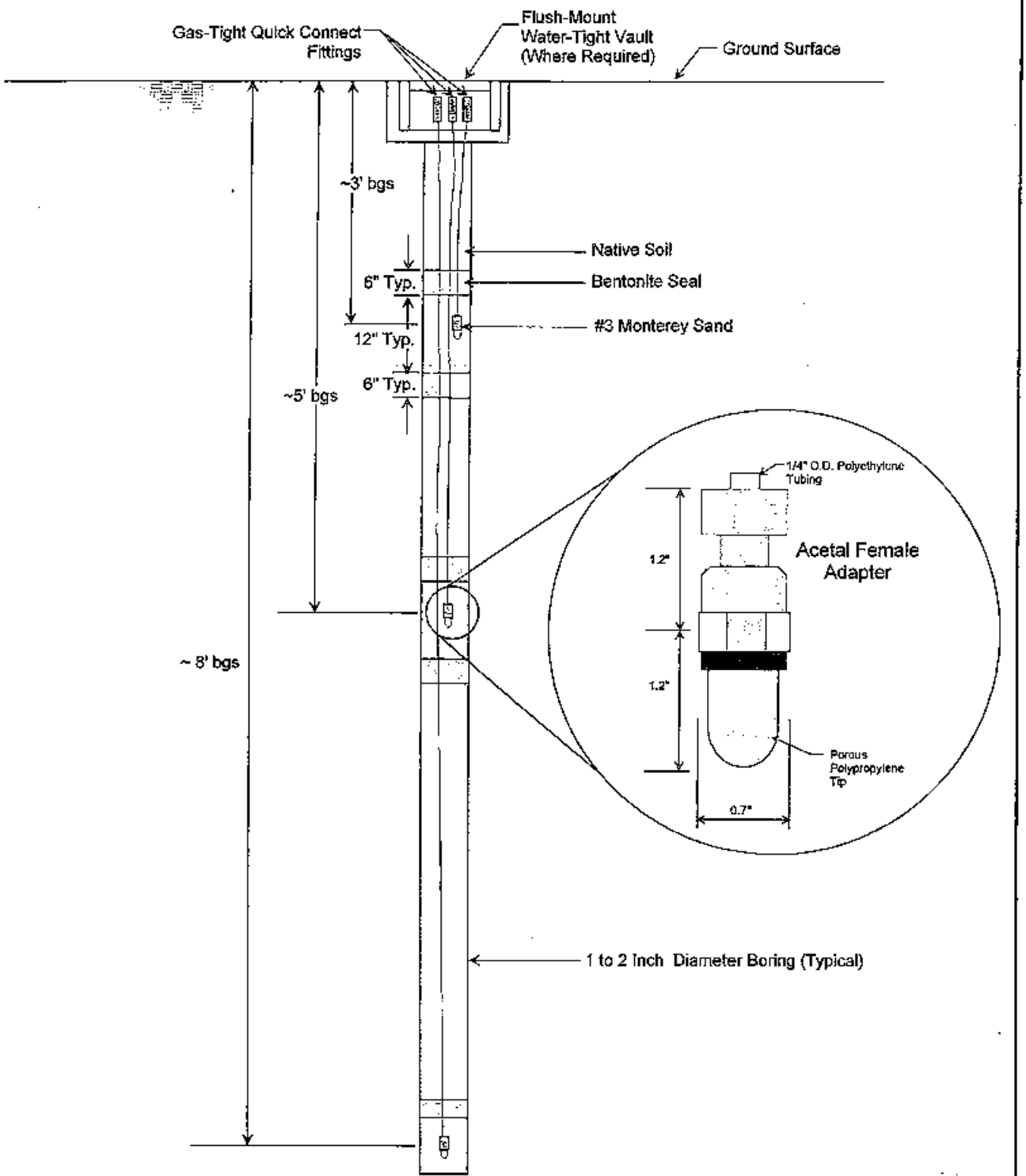
Project Name: Prestige Homes - Admiralty Way

Date: March 2004

Aerial Photograph of Site Area

Figure 2


Site
Venice Field
Playa Del Rey Field
Santa Monica Bay
Marina del Rey
Venice
Playa del Rey
Westchester
Los Ang
Lincoln Blvd
Venice Blvd
Admiralty Way
Marina Expy
W Jefferson Blvd
Culver Blvd
Pacific Ave
W Manchester Ave
Explanation
Approximate Location of Plugged and Abandoned Well
Approximate Extent of Production Limits
Approximate Field Boundary and Name
Source: All Locations Based on Various Maps from the Division of Oil, Gas and Geothermal Resources, Dated 2000 and 2001
0
2000
4000 Feet
GeoKinetics
Geotechnical & Environmental Engineers
Project Name: Prestige Homes - Admiralty Way
Date: March 2004
Site Location Realtive to Oil Production Facilities
Figure 3



Note: Probe Depths May Vary From One Installation to Another Due to sub-surface Conditions.

Not to Scale

GeoKinetics
Geotechnical & Environmental Engineers

Project Name: Prestige Home - Admiralty Way

Date: March 2004

Gas Probe Schematic

Figure 4

APPENDIX J

Wind Impact Assessments

August 17, 2006

CONSULTING ENGINEERS & SCIENTISTS

Mr. Kirk Buteyn
Prestige Homes, Inc.
5150 Overland Avenue
Culver City, CA
USA 90230

Rowan Williams
Davies & Irwin Inc.
650 Woodlawn Road West
Guelph, Ontario
Canada N1K 1B8

A member of the RWDI Group of Companies

Re: Wind Impact Assessment
Marina del Rey - Parcel OT
Marina del Rey, California
RWDI Reference No. 06-1471

Email: kbuteyn@gkind.com

Dear Kirk:

As per your request, this letter summarizes our professional opinion on the effect of the proposed Parcel OT Development on wind conditions within the adjacent basins, the potential loss of surface winds used by birds and the general air circulation in Marina del Rey.

This wind impact assessment includes a review of the project drawings, aerial photographs, regional wind data, the results of previous wind studies conducted by RWDI on projects in Marina del Rey, and our knowledge and experience. A qualitative study in lieu of a full wind tunnel model study is appropriate for the current development, considering the location and size of the development, the local wind directionality, as well as, the availability of test data from other projects in the area.

Description of Proposed Development

A set of design drawings for the proposed project were provided by GMP Architects through Prestige Homes, Inc. to RWDI on July 11, 2006. The proposed development is a five story retirement facility at Parcel OT, on the north side of the marina. As shown in Figure 1, the development site is located between Admiralty Way and Washington Street. Figure 2 is a site plan, showing a rectangular massing with an existing hotel to the west and the lagoon to the east. Figure 3 shows building elevations along Washington Boulevard and Admiralty Way.

RWDI
CONSULTING ENGINEERS & SCIENTISTS

Rowan Williams
Davies & Irwin Inc.
650 Woodlawn Road West
Guelph, Ontario
Canada N1K 1B8

Local Wind Directionality

Figure 4 shows directional distribution of seasonal winds, based on long-term wind records from the Los Angeles International Airport. These wind roses show the percentage of the time that wind blows from each of the 16 compass directions during the spring, summer, fall and winter seasons between 7:00 am and 9:00 pm, when most sailing would occur. It is evident that winds from the west, west-southwest, southwest and east directions are most dominant throughout the year.

Adjacent Wind Study

Of the many wind studies conducted by RWDI on projects in Marina del Rey since the 1990's, the Admiralty Apartments Project at Parcel 140 is immediately adjacent to the proposed Parcel OT Development, as shown in Figure 1.

The Admiralty Apartments are of a similar height and size to the proposed Parcel OT Development. In our May 22, 2003 report[1], it was concluded that "the proposed Parcel 140 Development will produce similar wind conditions over the majority of the basin areas of Marina del Rey, with insignificant areas of altered wind directions and speeds at the west end of Basin E. The overall wind conditions, after construction of the proposed development, are similar to those presently experienced in and around the marina and therefore the general air circulation patterns and the use of surface winds by birds will not be affected."

Effect on Sailing Conditions

When winds flow around a building, accelerations occur around the windward building corners and decelerations in the wake area on the leeward side of the building. High turbulence in the wake area is usually associated with variations in both wind direction and speed.

The proposed Parcel OT Development is located at the northwest corner of Basin E, which is at the north end of the marina. When winds are from the east, southwest and west-southwest directions, the acceleration and deceleration zones around the proposed building are likely to remain on land, not in basin areas. Wind exposure of the proposed development will be reduced by the tall buildings to the east and the existing hotel building to the west. Therefore, minimal effects on the sailing conditions are predicted for these wind directions.

---

1. RWDI Project Number 03-1283, Wind Study, Parcel 140 Development, Marina del Rey, California

RWDI
CONSULTING ENGINEERS & SCIENTISTS

Rowan Williams Davies & Irwin Inc.
650 Woodlawn Road West
Guelph, Ontario
Canada N1K 1B8

When winds are from the west direction, the existing hotel building to the west will partially shelter the proposed development, which in turn provides additional shelter the three existing circular towers further west. Westerly wind flows will interact with these buildings, resulting in altered wind conditions locally at the west end of Basin E. As the proposed development is similar in height to the existing hotel to the west, and they are both much shorter than the circular towers to the east, any additional wind effects caused by the proposed Parcel OT Development is predicted to be insignificant.

With the proposed development in place, wind conditions are not expected to change in other basins or in the main channel of Marina del Ray for the prevailing wind directions.

Loss of Surface Winds Utilized by Birds

In order to assess the effect of changes to surface winds on birds, a report (see Appendix A) was prepared by an expert in aerodynamics, kinematics and the behavior of birds, in which the author of the report considered the following issues:

- the types of birds likely to inhabit Marina del Rey,
- the ability of birds to take off and land,
- soaring conditions upwind and downwind of the proposed building,
- effects on local thermal soaring conditions, and
- changes in flight efficiency due to turbulence.

It is our opinion that the minimal changes in the existing wind fields due to the proposed development will result in no significant change to the birds' use of the area.

Change of Air Flow Patterns

Changes in wind speed and direction patterns are only expected in the immediate vicinity of the proposed development. Due to this localized nature, there will be no effect on the general air circulation patterns within Marina del Rey.

RWDI
CONSULTING ENGINEERS & SCIENTISTS

Rowan Williams
Davies & Irwin Inc.
650 Woodlawn Road West
Guelph, Ontario
Canada N1K 1B8

Closing

In conclusion, the proposed Parcel OT Development is expected to have minimal effect on wind conditions within the adjacent basins, the potential loss of surface winds used by birds and the general air circulation in Marina del Rey. The above opinion is based on the design information of Parcel OT Development, local wind directionality, previous wind studies in the Marina del Rey area, and our experience and engineering judgement. If you have any questions in this regard, please do not hesitate to contact us.

Your very truly,

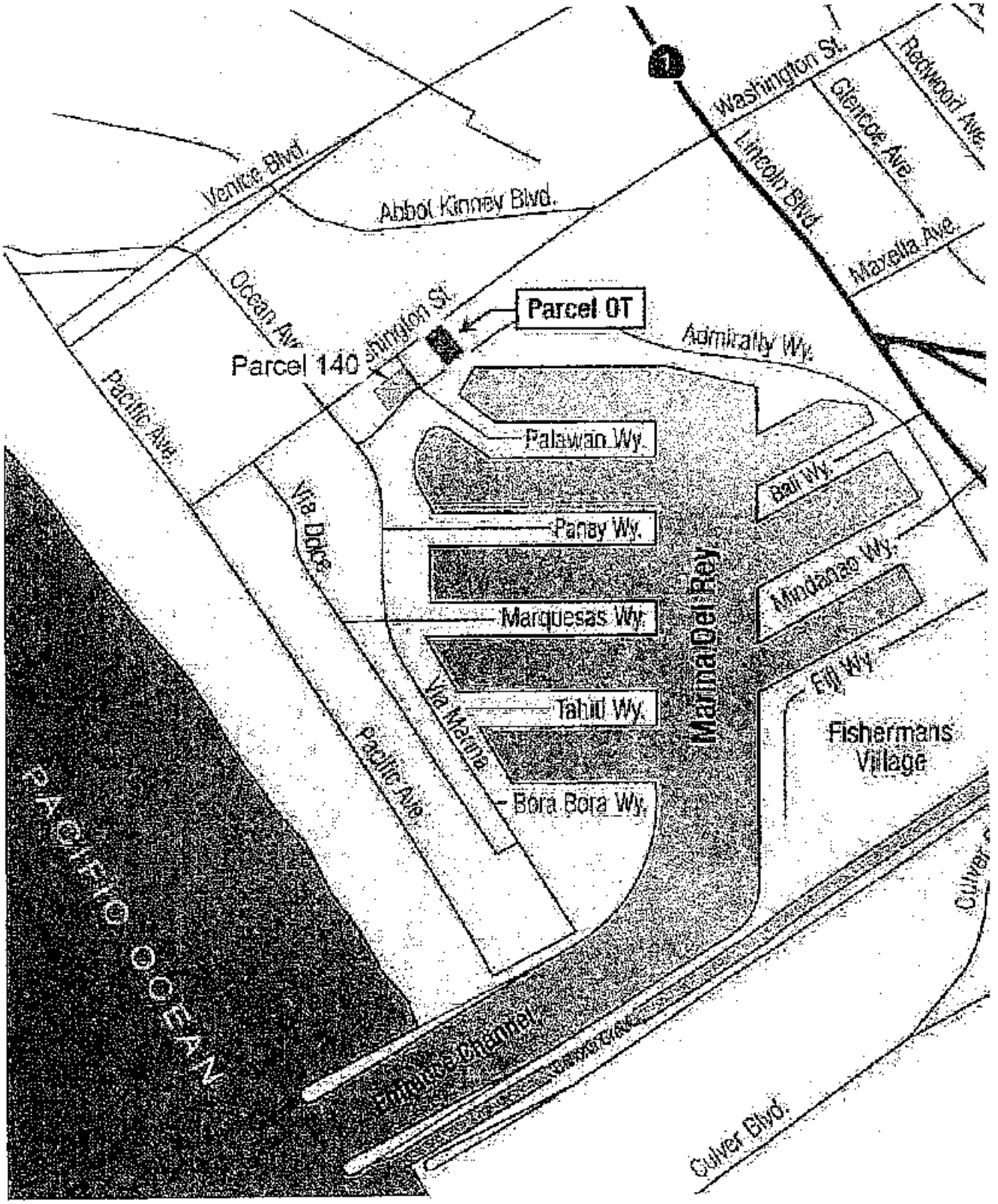
ROWAN WILLIAMS DAVIES & IRWIN Inc.

Hanqing Wu, Ph.D., P.Eng.
Senior Specialist / Associate

Dan Bacon
Senior Project Manager / Associate

HW/DEB/smd
Attach.

FIGURES



Project Location

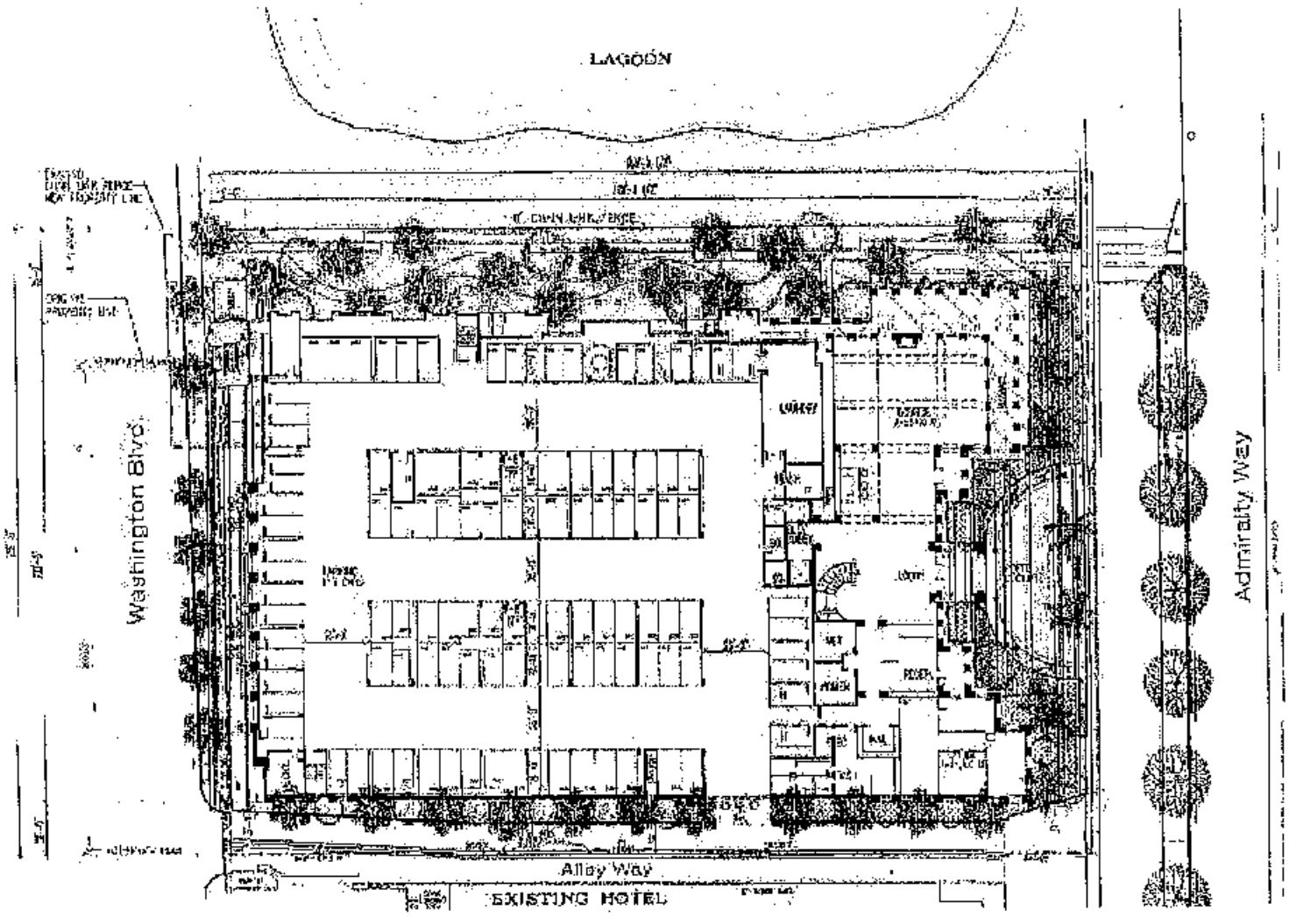
Parcel OT - Marina del Rey, California

True North

Project: #05-1471

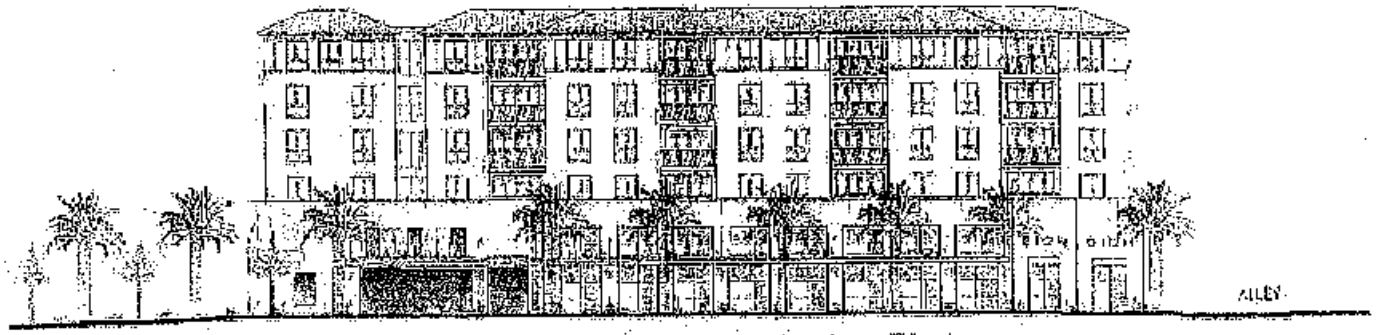
Drawn by:	EG	Figure:	1
Approx. Scale:			N.T.S
Date Revised:	Aug. 11, 2006		

RWDI

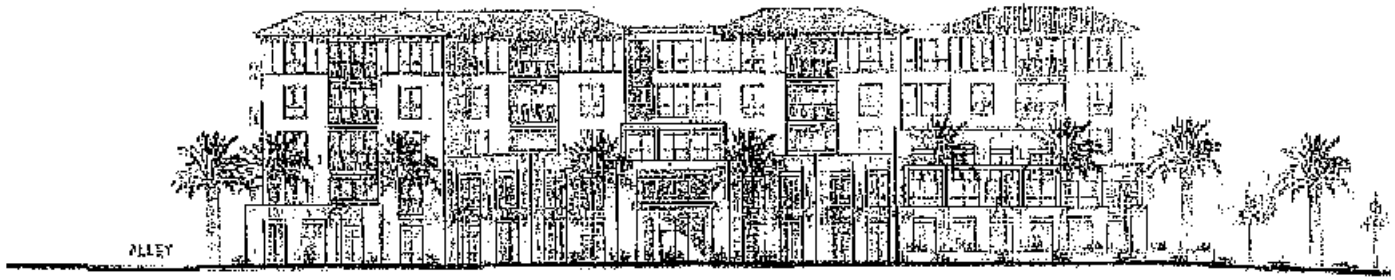


Ground Floor Level / Site Plan

Site Plan	True North	Drawn by: EO	Figure: 2
		Approx. Scale:	N.T.S
Parcel OT - Marina del Rey, California	Project #06-147I	Date Revised: Aug. 11, 2006	RWDI

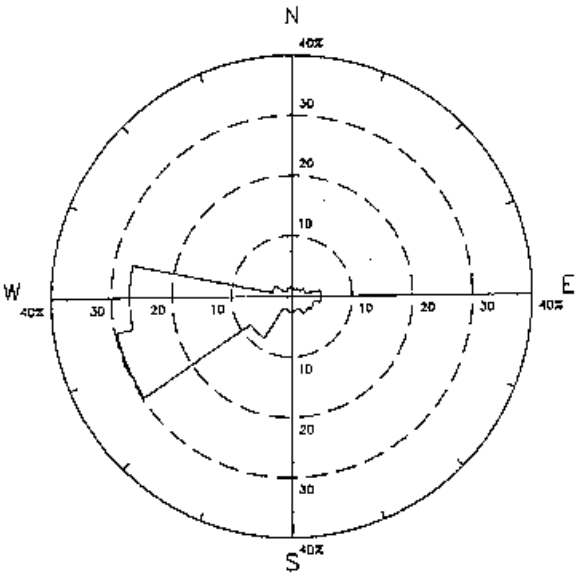


Elevation Along Washington Blvd.

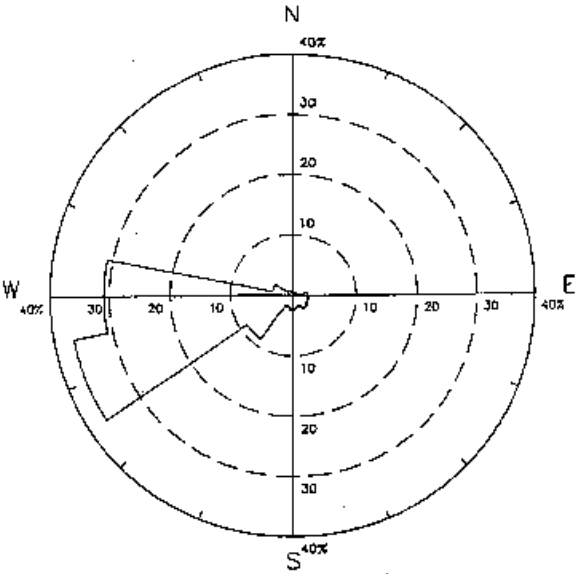


Elevation Along Admiralty Way

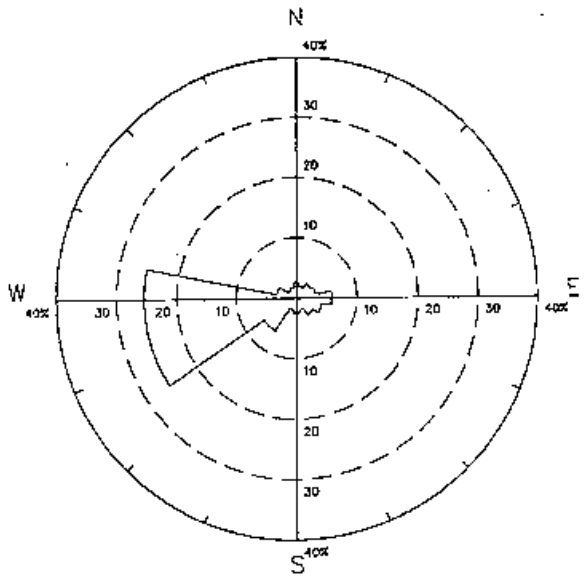
Building Elevations	Drawn by: BG	Figure: 3	RWDI
	Approx. Scale:	N.T.S	
Parcel OT - Marina del Rey, California Project #06-1471	Date Revised:	Aug. 11, 2006	



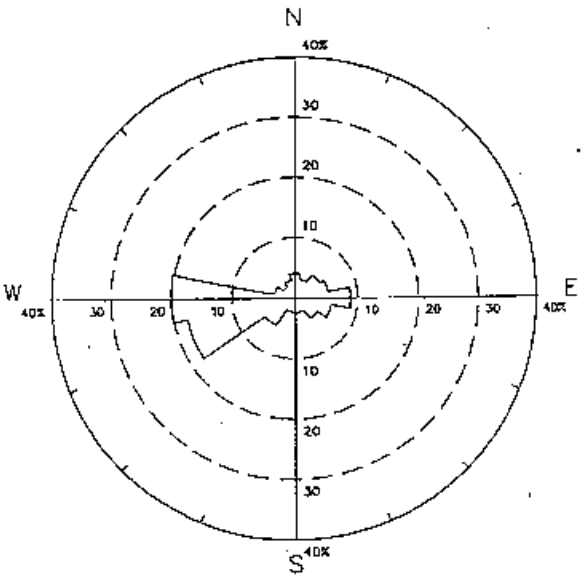
SPRING
(March, April, May)



SUMMER
(June, July, August)



FALL
(September, October, November)



WINTER
(December, January, February)

Directional Distribution of Seasonal Winds (7:00 am - 9:00 pm) Los Angeles International Airport (1947 - 1990)	Figure No. 4	RWDI
Parcel OT - Marina del Rey, California Project #04-1692	Date: August 11, 2006	

APPENDIX A

Effect of a proposed structure at Marina Del Rey, California on surface winds used by local birds.

A report prepared For Rowan Williams Davies & Irwin Inc.

Wayne Bezner Kerr
Migratory Bird Research Group

Attn: Colin Williams
Principal,
Rowan, Williams, Davies and Irwin Inc.

From: Wayne Bezner Kerr
Migratory Bird Research Group

Re: **Effect of a proposed structure at Marina del Rey, California on surface winds used by local birds.**

The proposed structure at Marina del Rey appears to be fairly straight forward, insofar as use of surface winds by local and/or transient populations of birds are concerned. In response to your request I have undertaken a literature search on the aerodynamics, kinematics and behaviors of flying birds. Combined with my own observations from four seasons of experimental work with flying birds of different weights, wing loadings and Reynolds numbers (Re), I have formed some basic conclusions regarding the project under discussion. My conclusions are presented under five general subheadings.

1. Changes to surface winds on open water:

The concept of "surface winds" does not necessarily apply to birds in powered flight, at least as far as wind strength and direction are concerned. Unlike humans who experience wind relative to a fixed frame of reference on the ground, birds in flight always experience a direct headwind exactly equal to their airspeed and heading. Thus, a gull in steady state flight at 21 knots on a heading of 090 degrees will always experience a 21 knot east wind, regardless of actual wind strength and direction at the time of observation. The actual track described by a bird in flight will be the vector of the birds heading less the vector of the wind at that moment. Birds in translational, foraging and migratory flight may fly with wind speeds equal to or greater than their actual flying speed at angles greater than 90 degrees to their intended course (Kerlinger 1989). By altering airspeeds and headings, birds are able to complete flights along a desired ground track in a range of winds much greater than the expected changes to winds measured at the surface at Marina Del Rey.

In our experiments with migratory waterfowl and wading birds, we have seen that changes to

wind direction and strength can create problems for birds when taking off or landing in confined areas. For the few moments while a bird is accelerating during takeoff or decelerating during landing it is generally limited to headings that take it directly against the wind. On open water such as the channel found at Marina Del Rey, birds are able to takeoff and land in almost any direction, allowing unrestricted flight in winds from any direction. In my opinion, predicted changes to surface winds at Marina Del Rey are unlikely to have a measurable negative effect on local birds.

2. Changes to ridge soaring conditions downwind of the structure:

Some species commonly observed at Marina Del Rey exploit winds deflected upwards against vertical structures in a behavior known as "ridge soaring". Ridge soaring birds minimize the energy expended to remain aloft while in translational, foraging and migratory flight. The energy savings gained through the use of ridge lift are proportional to wind speed and the proportion of wind directed perpendicular to the obstruction (Kerlinger 1989). Ridge soaring birds may use lift provided by wind deflecting over and around towers, buildings, boats, hills and other structures. In my opinion, the predicted changes in wind speed and direction as a result of the proposed structure at Marina Del Rey are unlikely to significantly affect ridge soaring birds exploiting flows directed upwards along the downwind shore of the channel.

3. Changes to ridge soaring conditions upwind of the structure.

It is reasonable to expect that some ridge soaring behavior will occur on the upwind facing side of the structure under discussion. A new structure with a face oriented within 45 degrees to the prevailing wind direction will generate lift on days when winds are sufficiently strong. Soaring birds moving across the area can derive energetic benefits by diverting slightly to pass through the area of rising air. In my opinion, several species of birds observed at Marina Del Rey will likely utilize ridge lift created by the proposed structure at least occasionally.

4. Changes to local thermal soaring conditions:

Some species present at Marina Del Rey utilize small columns of rising warm air known as thermals to reduce the energy expended while climbing. Thermal conditions are relatively rare in coastal areas, especially at sites surrounded by water where stable marine air suppresses thermal

activity (Lindsay 1988). Thermal lift at Marina Del Rey is most likely found over larger built up or constructed areas such as docks, parking lots and buildings. In my opinion, a microscale change to the total built horizontal area at Marina Del Rey such as the addition or removal of a single building is unlikely to result in a measurable change to thermal frequency, size or distribution.

5. Changes to flight efficiency due to turbulence.

Birds, like miniature aircraft are subject to basic laws of aerodynamics. Generally speaking, birds of the weights and speeds observed at Marina Del Rey operate at Reynolds numbers (Re) between approximately 70,000 and 250,000 (Pennycuick 1989). Like artificially constructed airfoils, bird wings can be adversely affected by turbulence (Lissaman 1983), at least hypothetically reducing lift by a large degree. It is important to note that atmospheric turbulence occurs over a broad range of scales. Low speed airfoils operating at Re similar to birds observed at Marina Del Rey are most likely to suffer reduced aerodynamic performance where turbulence occurs at scales approximately 1/4 the average wingspan. Microscale turbulence in this range is short lived in the atmosphere, and is more typical of flows around small, complicated structures such as sailboat rigging or tree branches than larger solid structures. Larger scale wake vortices and eddies typical of flow downwind of large buildings is likely experienced by birds as long period changes to the free stream air, rather than aerodynamically disruptive turbulence *per se.* In my opinion, turbulence created by the proposed structure is unlikely to result in reduced aerodynamic efficiency of birds flying at Marina Del Rey.

Conclusion:

The addition or removal of a building at Marina Del Rey will undoubtably result in changes to local winds in the altitudes and areas utilized by birds. However, due to the relatively minor nature of the changes expected, the wide variety of airspeeds birds are capable of flying at, the diverse flight strategies employed by birds and the relatively small percentage of total area where measurable impacts will be observable, it is my opinion that the proposed structure will not result in major changes to birds' use of surface winds at Marina Del Rey.

Related Readings:

Burton, Robert
1990 **Bird Flight**. Facts on File. New York.160 pp.

Kerlinger, Paul
1989 **Flight Strategies of Migrating Hawks**. The University of Chicago Press. 375 pp.

Lindsay, Chas V.
1988 **A Handbook of Soaring Meteorology**. Chas Wilson. 211 pp.

Lissaman P.
1996 **The meaning of lift.** AIAA 96-0161

Lissaman P.
1983 **Low-Reynolds-number airfoils.** Ann. Rev. Fluid Mech. 15:223-239

Pennycuick, C. J., Klaassen, M., Kvist, A. and Lindstrom, A.
1996. **Wingbeat frequency and the body drag anomaly: wind-tunnel observations on a thrush nightingale (Luscinia luscinia) and a teal (Anas crecca).**The Journal of Experimental Biology 199, 2757-2765

1989 **Bird Flight Performance. A Practical Calculation Manual.** Oxford University Press. 153 pp.

Simons, Martin
1994 **Model Aircraft Aerodynamics** (3rd edition). Argus 270 pp.

Spedding GR
1992 **The Aerodynamics of Flight** In Mechanics of Animal Locomotion ed. RN Alexander Adv. Comp. Physiol. 11:59-78

Tobalske, B. W. and Dial, K. P.
1996. **Flight kinematics of black-billed magpies and pigeons over a wide range of speeds.**The Journal of Experimental Biology 199, 263-280

U.S. Fish and Wildlife Service.
No date. **Checklist of Birds of Naval Weapons Station Seal Beach National Wildlife Refuge.** U.S. Fish and Wildlife Service. Unpaginated.

Van den Berg, C. and Rayner, J. M. V.
1995. **The moment of inertia of bird wings and the inertial power requirement for flapping flight.** The Journal of Experimental Biology 198, 1655-1664

Wayne Bezner Kerr
1 Forest Hill Drive #10
Guelph, Ontario
N1G 2E1

Recent Work and Research Experience:

1998 - Present	M.Sc. Candidate.	Dept of Zoology University of Guelph Guelph, Ontario
1996 - 1999	Coordinator	Trumpeter Swan Migration Project Migratory Bird Research Group Guelph, Ontario
1995	Researcher	Sandhill Crane Induced Migration - Experiment Operation Migration Blackstock, Ontario

Publications:

1999 W. Bezner Kerr. **Imprinting techniques and the development of in flight following behavior in migratory trumpeter swans.** North American Swans 28 (3) (in press).

1998 W. Bezner Kerr. **No Swan Songs Here**. FAI AirSports International. Vol 1. http://airsports.fai.org/

1997 W. Bezner Kerr. **Swan Songs.** Dofasco Illustrated News. Dec. Pp 12-13

1996 Lishman, W.A., T.L. Teets, J. Duff, W.J.L. Sladen, G.G. Shire, K. Goolsby, W.A. Bezner Kerr, and R.P. Urbanek. 1997. **A reintroduction technique for migratory birds: Leading canada geese and isolation-reared sandhill cranes with ultralight aircraft.** Proc. North Am. Crane Workshop 7:114-122

Wayne Bezner Kerr, *continued ...*

Presentations:

September 1999 **The Use of Induced Migration Techniques in the Restoration of Migratory Populations of Trumpeter Swans (Cygnus buccinator).** 17th Trumpeter Swan Society Conference. Idaho Falls (scheduled)

July 1999 **The Use of Ultralight Aircraft in Waterfowl Restoration and Research.** COPA Annual Convention. North Bay

March 1998 **Trumpeter Swan Migration Project Overview.** North Bay Naturalists Association.

Awards, Scholarships and Research Support:

1999 Ontario Graduate Scholarship in Science and Technology
1999 Trumpeter Swan Society Certificate of Special Appreciation.
1999 USUA Public Service Award.
1999 Elgin Card Scholarship in Terrestrial Ecology
1999 University of Guelph Graduate Scholarship.
1998 Canada Trust Friends of the Environment Grant
1998 - 99 EcoAction 2000 Grant
1998 University of Guelph Graduate Scholarship.
1998 University of Guelph Graduate Scholarship.
1998 OFAH Waterfowl Ecology Grant.
1998 Conrad N Hilton Foundation Research Grant

August 31, 2006

CONSULTING ENGINEERS
& SCIENTISTS

Rowan Williams
Davies & Irwin Inc.
650 Woodlawn Road West
Guelph, Ontario
Canada N1K 1B8

A member of the
RWDI Group of Companies

Mr. Kirk Buteyn
Prestige Homes, Inc.
5150 Overland Avenue
Culver City, CA
USA 90230

Re: Wind Impact Assessment
Marina del Rey - Parcel 21
Marina del Rey, California
RWDI Reference No. 06-1472

Email: kbuteyn@gkind.com

Dear Mr. Buteyn:

As per your request, this letter summarizes our professional opinion of the effect of the proposed Parcel 21 Development on wind conditions within the adjacent basins, the potential loss of surface winds used by birds and the general air circulation in Marina del Rey.

This wind impact assessment includes a review of the project drawings, aerial photographs, regional wind data, the results of previous wind tunnel studies conducted by RWDI on projects in Marina del Rey, and our knowledge and experience. A qualitative study in lieu of a full wind tunnel model study is appropriate for the current development, considering the location and size of the development, the local wind directionality, as well as the availability of test data from other projects in the area.

Description of Proposed Development

A set of design drawings for the proposed project were provided by GMP Architects through Prestige Homes, Inc. to RWDI on July 12, 2006. The proposed Parcel 21 Development is located on the north side of Panay Way (Figure 1) between Parcel 20 to the east and an existing building to the immediate west. The development consists of two rectangular buildings and a landscaped plaza (Figure 2). The east building is a five-story public parking structure of approximately 56 ft high, while the west building is four stories and 56 ft high, and designed for retail, office, club, parking and other purposes. Building elevations are shown in Figure 3.

Compared to the proposed development, adjacent buildings to the east and west are of similar height. The existing buildings on the south side of Panay Way (Parcel 15) are slightly lower, although future developments on Parcel 15 allow for taller buildings, similar to those on Parcels 20 and 21. Basin D is located on the north side of Parcel 21.

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Local Wind Directionality

Figure 4 shows the directional distribution of seasonal winds, based on long-term wind records from the Los Angeles International Airport. These wind roses show the percentage of the time that wind blows from each of the 16 compass directions during the spring, summer, fall and winter seasons between 7:00 am and 9:00 pm, when most sailing would occur. It is evident that winds from the west, west-southwest, southwest and east directions are most dominant throughout the year.

Wind Studies on Adjacent Parcels

Of many wind studies conducted by RWDI on projects in Marina del Rey since the 1990's, Parcel 20 on the east side of Parcel 21 was tested in our wind tunnel first as a proposed development[1] and then as a future building in the study for Parcels 12 and 15[2]. Both wind tunnel studies were conducted in 1999.

In our Parcel 20 report, it was concluded that "the proposed Parcel 20 Development will not significantly affect sailing conditions in the Main Channel, Basin C or Basin D. Reductions in wind speed, which could be sufficient to affect sailing conditions for certain sailboats, were noted for some of the prevailing wind directions in Basins C and D for the Expected Development Configuration only." The Expected Development Configuration included not only buildings on Parcel 20, but also future buildings on Parcels 12 and 15. In addition, "the overall wind conditions predicted with the Proposed and Expected Future Developments are similar to those presently experienced in and around the marina and therefore the general air circulation patterns and the use of surface winds by birds will not be affected."

In our Parcels 12 and 15 report, it was stated that, based on wind tunnel results, "the wind conditions will not change from that discussed above (for Parcels 12 and 15 alone without Parcel 20) when the expected development on Parcel 20 is constructed".

The above conclusions of insignificant wind effects for Parcel 20 were based on wind tunnel tests. The proposed Parcel 21 Development is adjacent to Parcel 20 and of a similar height and size. Therefore, the same conclusions can be reached for Parcel 21.

---

1. RWDI Project Number 99-516, Wind Study, Parcel 20, Marina del Rey, California, August 20, 1999.

2. RWDI Project Number 00-101, Wind Study, Parcels 12 and 15, Marina del Rey, California, September 28, 1999.

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Effect on Sailing Conditions

When winds flow around a building, accelerations occur around the windward building corners and decelerations in the wake area on the leeward side of the building. High turbulence in the wake area is usually associated with variations in both wind direction and speed.

When winds are from the east and west directions, the adjacent existing buildings in these directions will shelter the proposed development. As the proposed development is similar in height to those existing buildings, any additional wind effects caused by the proposed Parcel 21 Development is predicted to be insignificant, in either Basin C or Basin D, for the east and west wind directions.

The proposed Parcel 21 Development is located north of Basin C and on the south side of Basin D. When winds are from the southwest and west-southwest directions, the acceleration and deceleration zones around the proposed development are likely to be on land and in Basin D, but not in Basin C. Wind conditions in localized areas adjacent to the Parcel 21 Development in Basin D will experience altered wind speeds and directions after construction of Parcel 21. Fortunately, wind exposure of the proposed Parcel 21 Development will be reduced by the existing buildings on the south side of Panay Way (Parcel 15), and would be further reduced by taller future buildings on Parcel 15. Therefore, minimal effects on the sailing conditions are predicted for these two wind directions.

With the proposed development in place, wind conditions are not expected to change in other basins or in the main channel of Marina del Ray for the prevailing wind directions.

Loss of Surface Winds Utilized by Birds

In order to assess the effect of changes to surface winds on birds, a report (see Appendix A) was prepared by an expert in aerodynamics, kinematics and the behavior of birds, in which the author of the report considered the following issues:

- the types of birds likely to inhabit Marina del Rey,
- the ability of birds to take off and land,
- soaring conditions upwind and downwind of the proposed building,
- effects on local thermal soaring conditions, and
- changes in flight efficiency due to turbulence.

It is our opinion that the minimal changes in the existing wind fields due to the proposed development will result in no significant change to the birds' use of the area.

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Change of Air Flow Patterns

Changes in wind speed and direction patterns are only expected in the immediate vicinity of the proposed development. Due to this localized nature, there will be no effect on the general air circulation patterns within Marina del Rey.

Closing

In conclusion, the proposed Parcel 21 Development is expected to have minimal effect on wind conditions within the adjacent basins, the potential loss of surface winds used by birds and the general air circulation in Marina del Rey. The above opinion is based on the design information of Parcel 21 Development, local wind directionality, previous wind tunnel studies in the Marina del Rey area, and our experience and engineering judgement. If you have any questions in this regard, please do not hesitate to contact us.

Your very truly,

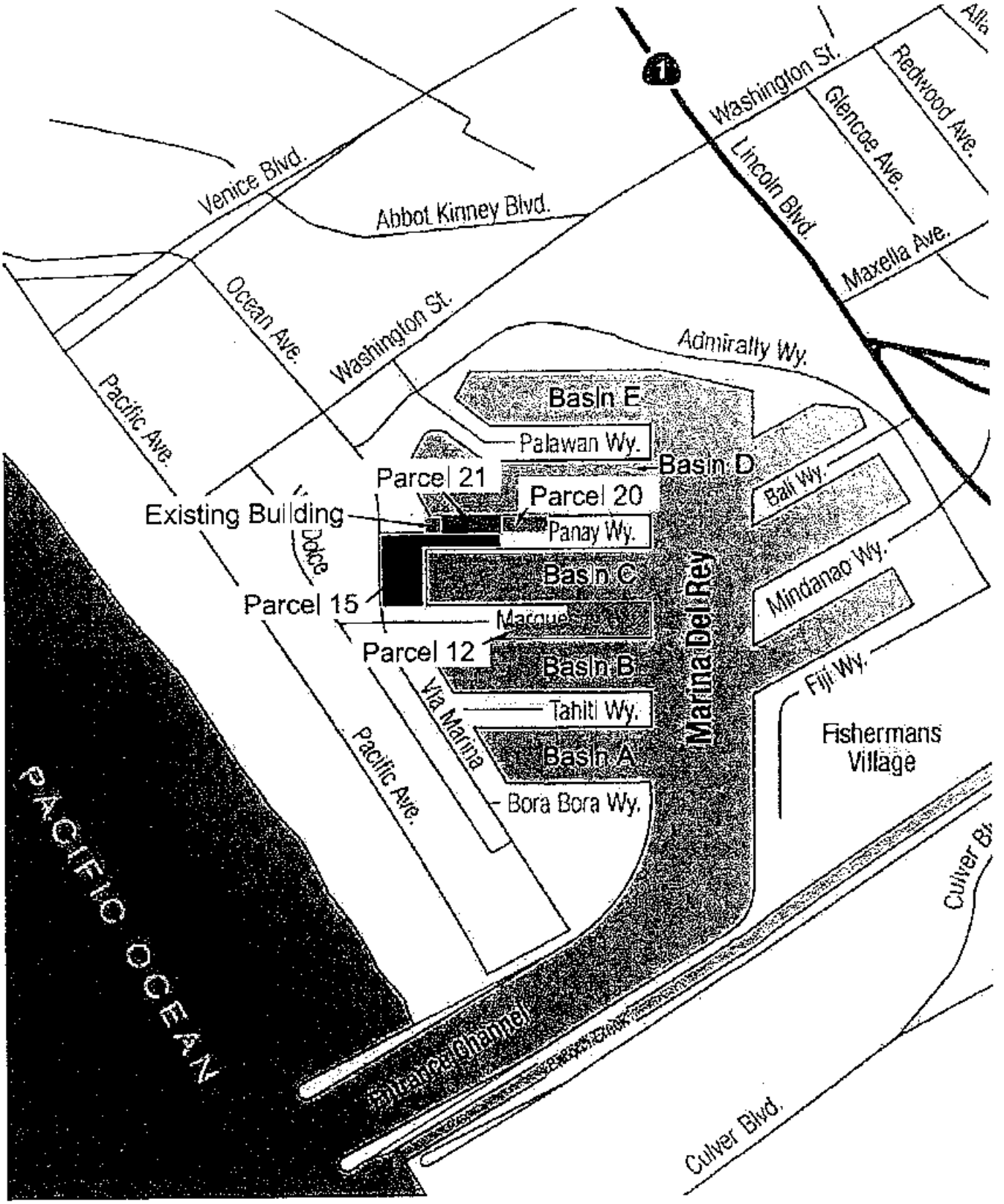
ROWAN WILLIAMS DAVIES & IRWIN Inc.

Hanqing Wu, Ph.D., P.Eng.
Senior Specialist / Associate

Dan Bacon
Senior Project Manager / Associate

HW/DEB/smd
Attach.

FIGURES



Project Location
Source: Marina del Rey Land Use Plan, February 1996

True North

Drawn by: EG | Figure: 1

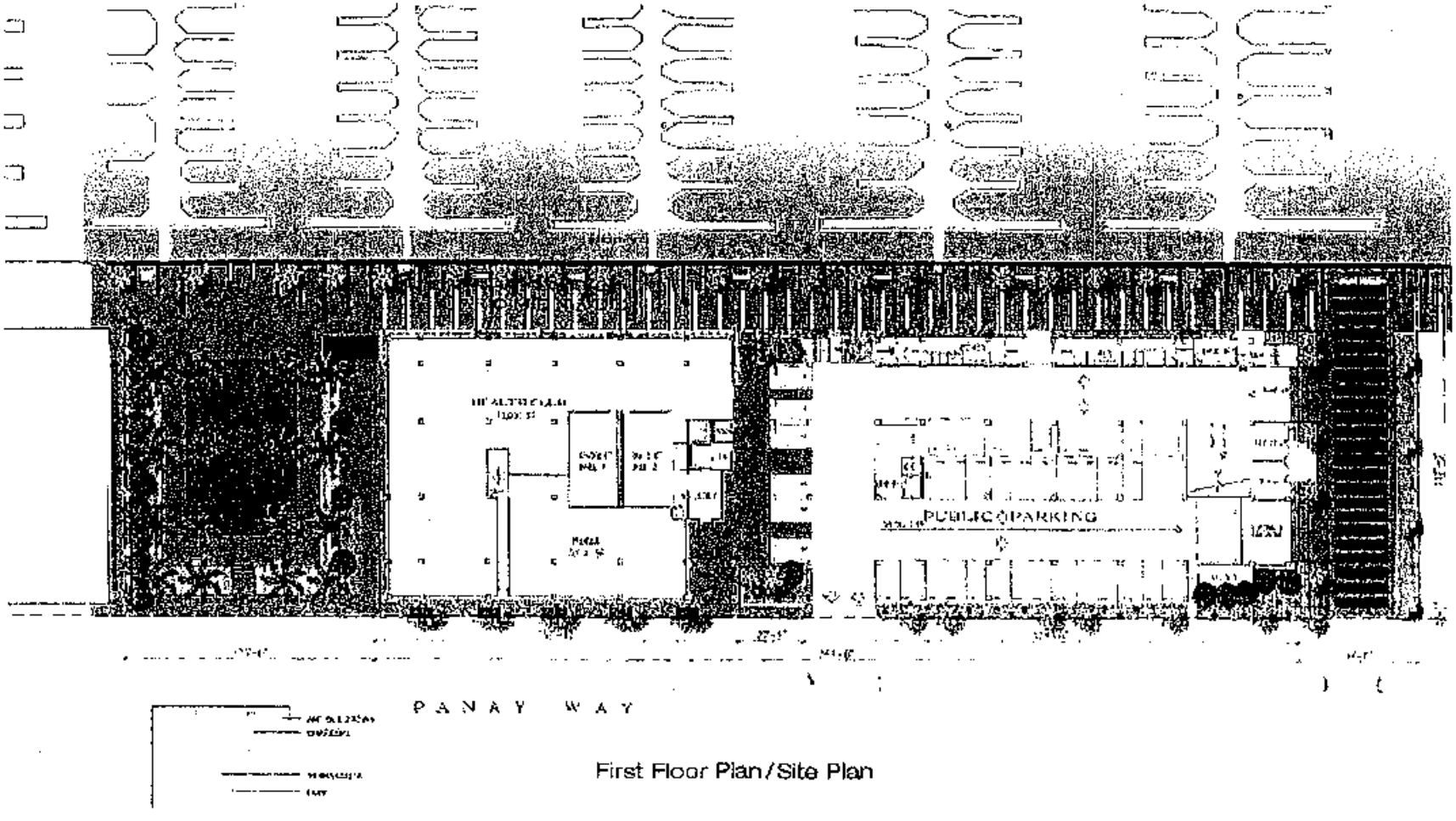
Approx. Scale: N.T.S

Date Revised: Aug. 28, 2006

RWDI

Parcel 21 - Marina del Rey, California

Project #06-1472



First Floor Plan/Site Plan

Site Plan
Source: GMP Architects, March 2006

True North

Drawn by: EG | Figure: 2

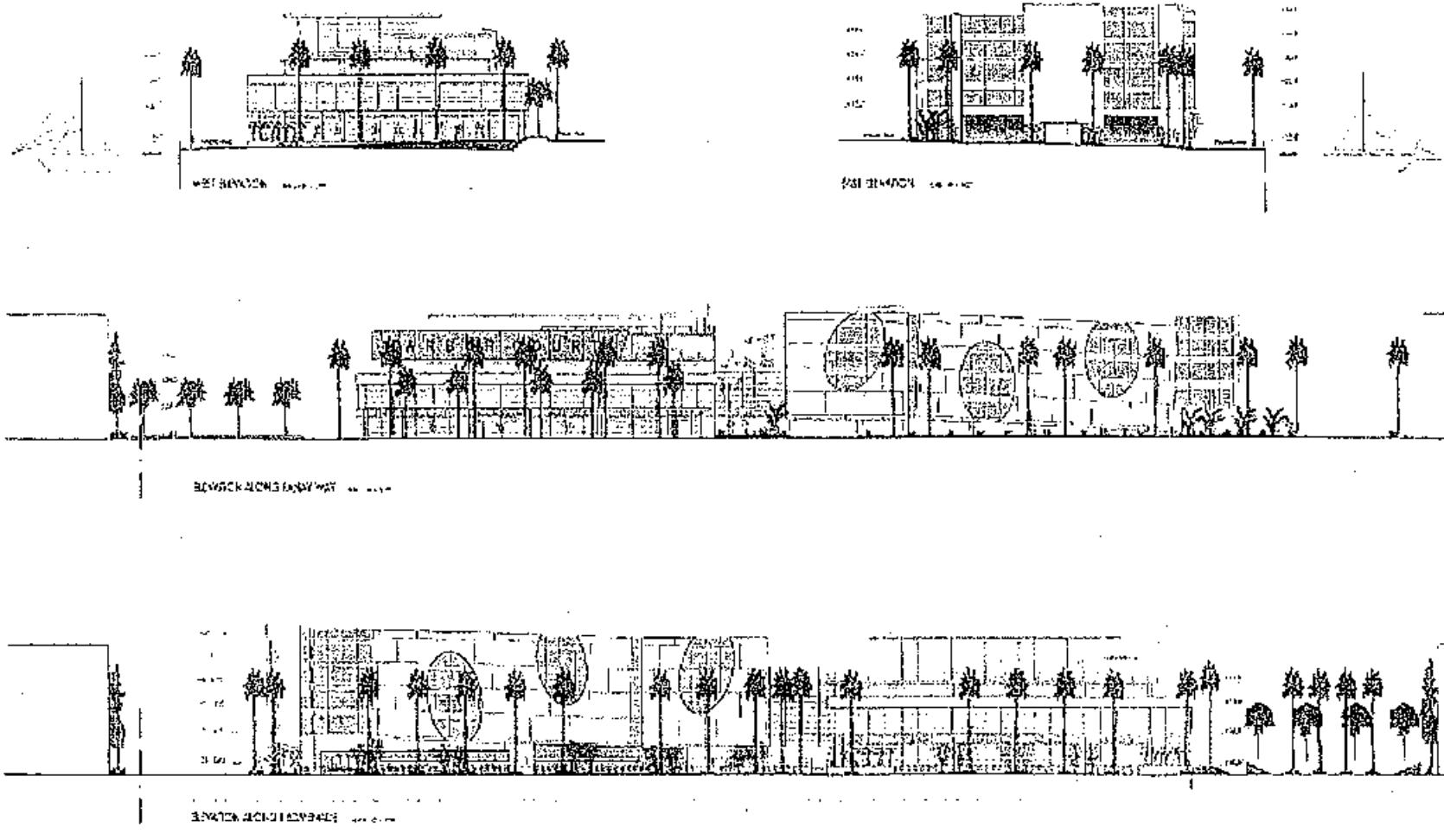
Approx. Scale: N.T.S

Date Revised: Aug. 28, 2006

Parcel 21 - Marina del Rey, California

Project #06-1472

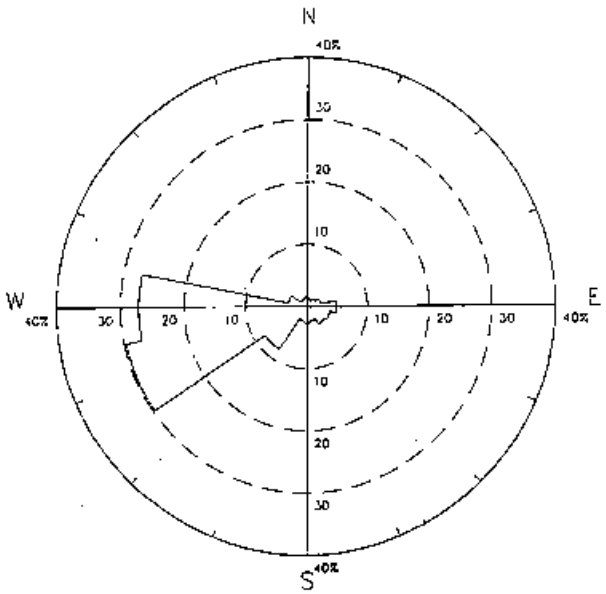
RWDI



Building Elevations
Source: GMP Architects, March 2006

Drawn by: EG	Figure: 3	RWDI	
Approx. Scale: N.T.S			
Date Revised: Aug. 28, 2006			

Parcel 21 - Marina del Rey, California — Project #06-1472



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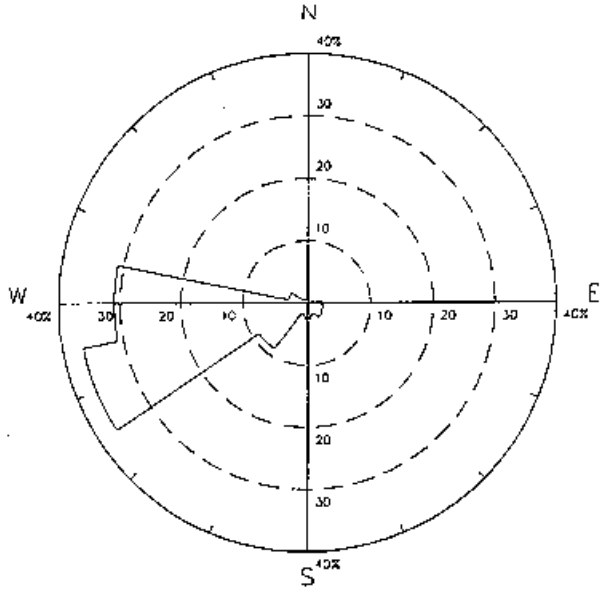
(March, April, May)



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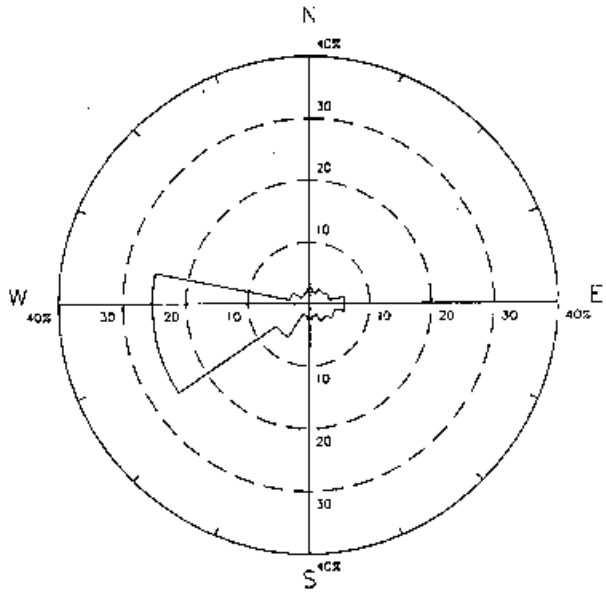

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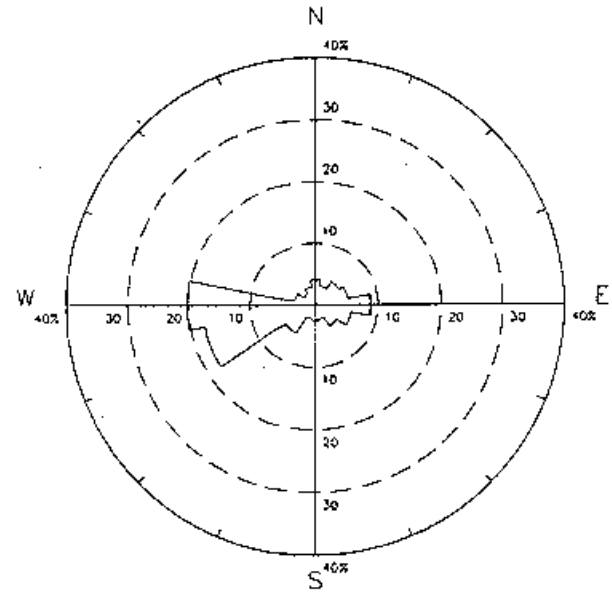

WINTER
(December, January, February)

Directional Distribution of Seasonal Winds
(7:00 am - 9:00 pm)
Los Angeles International Airport (1947 - 1990)

Parcel 21 - Marina del Rey, California

Project #06-1472

Figure No. 4

Date: August 31, 2006

RWDI

APPENDIX A

Effect of a proposed structure at Marina Del Rey, California on surface winds used by local birds.

A report prepared For Rowan Williams Davies & Irwin Inc.

Wayne Bezner Kerr
Migratory Bird Research Group

Attn: Colin Williams
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From: Wayne Bezner Kerr
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wind direction and strength can create problems for birds when taking off or landing in confined areas. For the few moments while a bird is accelerating during takeoff or decelerating during landing it is generally limited to headings that take it directly against the wind. On open water such as the channel found at Marina Del Rey, birds are able to takeoff and land in almost any direction, allowing unrestricted flight in winds from any direction. In my opinion, predicted changes to surface winds at Marina Del Rey are unlikely to have a measurable negative effect on local birds.

2. Changes to ridge soaring conditions downwind of the structure:

Some species commonly observed at Marina Del Rey exploit winds deflected upwards against vertical structures in a behavior known as "ridge soaring". Ridge soaring birds minimize the energy expended to remain aloft while in translational, foraging and migratory flight. The energy savings gained through the use of ridge lift are proportional to wind speed and the proportion of wind directed perpendicular to the obstruction (Kerlinger 1989). Ridge soaring birds may use lift provided by wind deflecting over and around towers, buildings, boats, hills and other structures. In my opinion, the predicted changes in wind speed and direction as a result of the proposed structure at Marina Del Rey are unlikely to significantly affect ridge soaring birds exploiting flows directed upwards along the downwind shore of the channel.

3. Changes to ridge soaring conditions upwind of the structure.

It is reasonable to expect that some ridge soaring behavior will occur on the upwind facing side of the structure under discussion. A new structure with a face oriented within 45 degrees to the prevailing wind direction will generate lift on days when winds are sufficiently strong. Soaring birds moving across the area can derive energetic benefits by diverting slightly to pass through the area of rising air. In my opinion, several species of birds observed at Marina Del Rey will likely utilize ridge lift created by the proposed structure at least occasionally.

4. Changes to local thermal soaring conditions:

Some species present at Marina Del Rey utilize small columns of rising warm air known as thermals to reduce the energy expended while climbing. Thermal conditions are relatively rare in coastal areas, especially at sites surrounded by water where stable marine air suppresses thermal

activity (Lindsay 1988). Thermal lift at Marina Del Rey is most likely found over larger built up or constructed areas such as docks, parking lots and buildings. In my opinion, a microscale change to the total built horizontal area at Marina Del Rey such as the addition or removal of a single building is unlikely to result in a measurable change to thermal frequency, size or distribution.

5. Changes to flight efficiency due to turbulence.

Birds, like miniature aircraft are subject to basic laws of aerodynamics. Generally speaking, birds of the weights and speeds observed at Marina Del Rey operate at Reynolds numbers (Re) between approximately 70,000 and 250,000 (Pennycuick 1989). Like artificially constructed airfoils, bird wings can be adversely affected by turbulence (Lissaman 1983), at least hypothetically reducing lift by a large degree. It is important to note that atmospheric turbulence occurs over a broad range of scales. Low speed airfoils operating at Re similar to birds observed at Marina Del Rey are most likely to suffer reduced aerodynamic performance where turbulence occurs at scales approximately 1/4 the average wingspan. Microscale turbulence in this range is short lived in the atmosphere, and is more typical of flows around small, complicated structures such as sailboat rigging or tree branches than larger solid structures. Larger scale wake vortices and eddies typical of flow downwind of large buildings is likely experienced by birds as long period changes to the free stream air, rather than aerodynamically disruptive turbulence *per se*. In my opinion, turbulence created by the proposed structure is unlikely to result in reduced aerodynamic efficiency of birds flying at Marina Del Rey.

Conclusion:

The addition or removal of a building at Marina Del Rey will undoubtably result in changes to local winds in the altitudes and areas utilized by birds. However, due to the relatively minor nature of the changes expected, the wide variety of airspeeds birds are capable of flying at, the diverse flight strategies employed by birds and the relatively small percentage of total area where measurable impacts will be observable, it is my opinion that the proposed structure will not result in major changes to birds' use of surface winds at Marina Del Rey.

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Publications:

1999 W. Bezner Kerr. **Imprinting techniques and the development of in flight following behavior in migratory trumpeter swans.** North American Swans 28 (3) (in press).

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Presentations:

September 1999 **The Use of Induced Migration Techniques in the Restoration of Migratory Populations of Trumpeter Swans (Cygnus buccinator).** 17th Trumpeter Swan Society Conference. Idaho Falls (scheduled)

July 1999 **The Use of Ultralight Aircraft in Waterfowl Restoration and Research**. COPA Annual Convention. North Bay

March 1998 **Trumpeter Swan Migration Project Overview**. North Bay Naturalists Association.

Awards, Scholarships and Research Support:

1999 Ontario Graduate Scholarship in Science and Technology
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1999 USUA Public Service Award.
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1998 Canada Trust Friends of the Environment Grant
1998 - 99 EcoAction 2000 Grant
1998 University of Guelph Graduate Scholarship.
1998 University of Guelph Graduate Scholarship.
1998 OFAH Waterfowl Ecology Grant.
1998 Conrad N Hilton Foundation Research Grant